Maritime Office Users

"What location factors are important for office users in the Rotterdam port- and industry complex and which factors influence the satisfaction level of their current office accommodation?"

Abstract

Providing suitable office accommodations for (international) firms in the industrial-, logistical-, transport- and other port related sectors is vital for the improvement of the economic synergy between the port and the city of Rotterdam in the Netherlands. This thesis investigates the most important location factors for maritime office users in the Rotterdam region. Furthermore, it investigates the factors that will influence the satisfaction level of their current office accommodation. The cost of accommodation and accessibility are considered very important location factors for maritime office users. Other hard factors that directly contribute to the functioning of the firm's activities are also considered important for the locational choice and preference of maritime office users. In general, the maritime office users are very satisfied with their current office building and environment in the Rotterdam region. Their satisfaction level is mainly influenced by soft factors, such as the image of the surrounding area and the architecture of the building.

Keywords

economic geography | location factors | maritime office users | port- and industry complex

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Willemien van der Windt, May 2012

TABLE OF CONTENTS

1 INTRODUCTION

In this first chapter the topic of this thesis will be introduced. Paragraph 1.1 provides some relevant background information to get the reader more acquainted with the topic. The relevance of this research, both scientific and societal, is explained in paragraph 1.2. The problem statement addressed in this research, is defined in paragraph 1.3. Paragraph 1.4 discusses the method and restrictions used in this research. The last paragraph of this chapter provides an outline for the rest of this thesis.

1.1 Background

Stadsontwikkeling Gemeente Rotterdam is responsible for the implementation of the policy and program of the cities' executive committee, in the following fields:

- living
- spatial economic urban- and regional developments
- real estate
- traffic and transport
- town-planning
- landscape architecture
- provision of other related services

The spatial development strategy of Rotterdam for the coming years has been determined by the executive committee of Rotterdam in the so called "Stadsvisie 2030" (Gemeente Rotterdam, 2007). This vision for the city rest on two pillars: the strengthening of the economic structure; and the creation of an attractive city to live in. Both objectives are inextricably linked to each other. One of the sub objectives of the strengthening of the economic structure is the provision of space (i.e. square metres) for firms to locate in the city, which is the starting point of this thesis. Providing suitable (office) space to firms is necessary to accommodate their growth in Rotterdam. This will further enhance the competitiveness of mainport Rotterdam. In a city as Rotterdam there is great diversity in types of locations for specific target groups. A broad distinction can be made between so called "wet sites" in the port area and "dry sites" for business areas and corporate offices.

In 2011, the port- and industry complex of Rotterdam accounts for 45.000 jobs in the municipality of Rotterdam[1] and contributes therefore a significant amount of employment. The

[1] Economische Verkenning 2012 (Ecorys and Stadsontwikkeling Gemeente Rotterdam, 2012)

strategic value of the port of Rotterdam is great for the whole Netherlands as well, because of the substantial contribution to the international innovative competitiveness of the Netherlands. Due to the presence of the port, Rotterdam has become a city of international meaning and interest. As a consequence to the growth spurt that Asia and East-Europe endure, the volume of the international flow of goods has grown substantially the past decades. The port of Rotterdam fulfils an important task in the distribution and transportation of these goods to its European hinterland (with more than 350 million consumers[2]) and as a transit port. Thanks to its strategic location, the port of Rotterdam is still one of the most important ports in the world. The construction of the second Maasvlakte[3] facilitates a great part of the wet sites that is necessary in order to accommodate further growth of the port of Rotterdam. However, the supply of dry sites in Rotterdam for port related firms is limited (Gemeente Rotterdam, 2007). This could become a threat for the international competitive position of Rotterdam when improvements in the economy pulls the demand for dry sites to a higher level.

The provision of suitable accommodations for different types of office users is a requisite to retain firms within the city of Rotterdam and to attract (international) firms to locate in the city. Especially in a more globalised world where firms are becoming more footloose, it is relevant that the supply of office accommodations in Rotterdam should be suitable for the spatial demand in order to retain and/or attract firms. Obviously, firms active in different sectors prefer different types of offices at different locations within the city. The locational decision of firms is influenced by so-called location factors. This research investigates what location factors are important for the locational decision of office users in the port- and industry complex in the Rotterdam region. Furthermore, the factors that will influence their current satisfaction level with regard to their office accommodation are investigated as well. Providing suitable accommodations for corporate offices of (international) firms in the industrial-, logistical-, transport- and other port related sectors is vital for the improvement of the economic synergy between the port and the city of Rotterdam.

1.2 Relevance

1.2.1 Scientific relevance

Much has been written about location factors, both theoretically and empirically (Pellenbarg et al., 2002; Pen, 2002; Derksen & Van Dongen, 2010; Mariotti & Pen, 2001; Jansen, 2009; Louw, 1996; Korteweg, 2002; Remøy et al., 2007). The office market is in transformation and other

[2] Port of Rotterdam: http://www.portofrotterdam.com/en/Port/port-in-general/Pages/default.aspx [accessed on 10 January 2012]

[3] The second Maasvlakte is a westwards extension of the Rotterdam port area into the sea to provide space for container trans-shipments, distribution and chemical industries.

“new” location factors emerge (CB Richard Ellis, DTZ Zadelhoff). The vacancy of offices amounts currently 15 percent of the total supply of offices in the Netherlands and has a structural character. The need for office space is declining, due to several reasons: global shifts in economic activities, ageing of the Dutch population, the introduction of new types of employment, and a changing qualitative demand for offices. The demand for office space has changed the past ten years from expansion into replacement demand. Within this concept of vacant offices, a demand-driven approach for the provision of office space is becoming more relevant and should prevent more vacant offices in the (near) future.

A research of Kuipers et al. (2011) concluded that firms in the port, demand high quality, port related business services. Other research, performed by Jacobs et al. (2009, 2010), concluded that spatial proximity to seaports and maritime transport activity matters for these high quality, port related business services (called Advanced Producer Services) to some extent. In those researches, an interdependent relationship was observed: headquarters of ship owners; carriers, and other port users want to be in the proximity of advanced producer services and vice versa. The difference between this research and previous research, is that this research investigates the most important factors in the locational preference of firms in the Rotterdam port- and industry complex, including these Advanced Producer Services.

1.2.2 Societal relevance

The intended research has several implications for policy makers of the municipality of Rotterdam. First, they know more about where maritime office users are currently located. Secondly, this research will result in some building and location characteristics that play an important role in the locational decision of these maritime office users. Third, the results of this research can have implications on the policies of Stadsontwikkeling Rotterdam in their provision of office space to firms in the port- and industry complex. Providing suitable supply of offices is a prelimiting condition to retain and attract port related firms to Rotterdam, which will further enhance its competitive position.

In addition to these implications, this research is also of societal relevance for the office market itself. A demand-driven approach for the provision of office space has become of significant importance, because of the high volume of vacant offices. Reducing this volume will have a positive effect on the liveability of society in urban areas.

1.3 Problem statement

The research question that is central during this thesis is the following:

> *"What location factors are important for office users in the Rotterdam port- and industry complex and which factors influence the satisfaction level of their current office accommodation?"*

This research question covers a lot of sub-questions, which are formulated below:

- What location factors can be identified according to some location theories and empirical research?
- What is meant by the port- and industry complex in Rotterdam?
- Which trends and developments in the port- and industry complex in Rotterdam are relevant for this research?
- Which office users are active in the port- and industry complex and where are they currently located?
- Which location factors play an important role in the locational decision of maritime office users?
- Which location factors influence the satisfaction level of the current office accommodation of maritime office users?

1.4 Structure of this research

1.4.1 Method

To answer the above stated research question, a theoretical part and an empirical part will be presented. First, scientific literature will be used to understand the spatial dimension of firms via the identification of some location factors. The developments in the port- and industry complex in Rotterdam that are relevant for this research will be elaborated as well. The empirical part will be performed by taking several steps. First, the maritime office users in Rotterdam have to be identified. This will be done by SBI (standard business classification) codes based on two literature sources about port related firms (Nijdam et al., 2009; Kuipers et al., 2011). Second it has to be determined which of these firms are settled in an office, which will be done via a crosscheck with data of COS (Centre for Research and Statistics). This desk research will – together with the theoretical part – contribute to the formulation of a number of hypotheses which are subsequently tested via a survey. This quantitative research method is chosen so that much statistical data can be collected of many maritime office users.

1.4.2 Restrictions

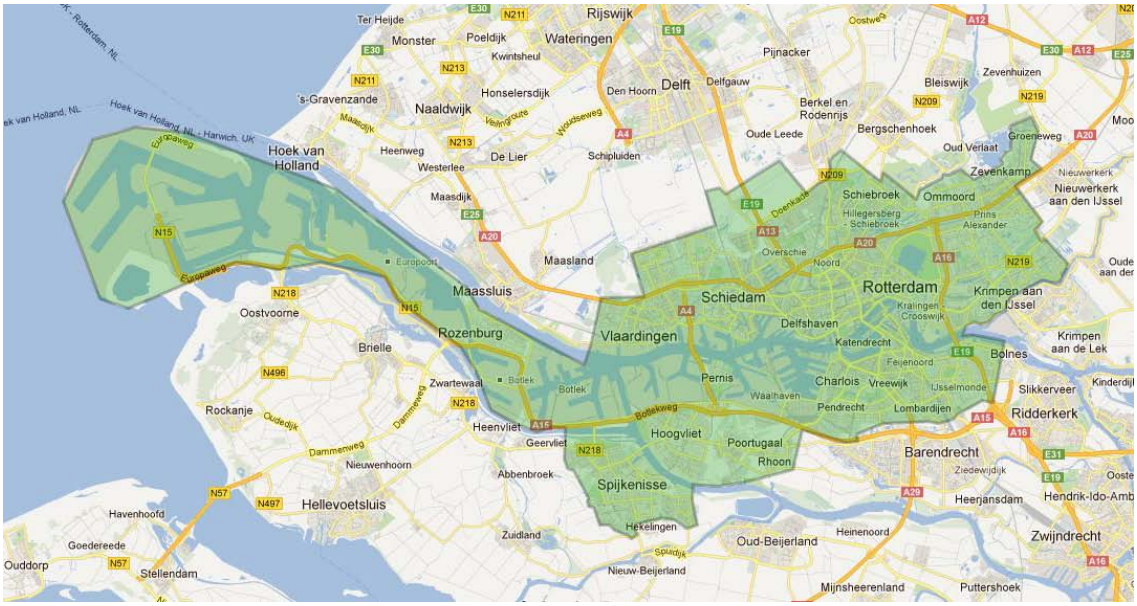
Office users active in the Rotterdam port- and industry complex are central in this thesis. In the Rotterdam region, the following cities are included: Rotterdam, Vlaardingen, Schiedam, Albrandswaard, Spijkenisse, Hoogvliet and Capelle a/d IJssel (figure 1.1).

It must be understood that many port related firms are located on industrial (wet) sites, where the office will only take up a small fraction of the total surface. However, the focus of this research is on sole office locations and offices that are a significant part of the total site. The following definition for an office will be used in this thesis:

“An office is a physical space mainly used for desk activities. Office space that is physically situated at another type of business site – that cannot be defined as office space – and in which this business site facilitates the primary income of the firm are not attributed to office space”.

This definition is clarified in appendix i.

Figure 1.1 Rotterdam region



Source: revision of Google Maps

1.5 Outline

In this paragraph the outline for the remainder of this thesis is provided. Chapter two starts with the identification of location factors based on some location theories and empirical research. The third chapter exemplifies the port- and industry complex in the Rotterdam region. Trends and developments that are relevant for this research are described in this chapter as well. In chapter four the location and distribution of maritime office users in the Rotterdam region is exemplified. The field research and the survey is explained in chapter five. The research results will follow in chapter six. Chapter seven provides the conclusions of this research, as well as the policy recommendations for Stadsontwikkeling Gemeente Rotterdam. In the last chapter of this thesis, the limitations of this research will be discussed.

2 LOCATION FACTORS

Due to changes in markets, preferences of consumers, technological progress, environmental issues, etc. firms constantly have to adjust to new situations. This adjustment process of firms often involves a spatial dimension. *"Characteristics of the spatial environment of a firm may change over time, but also internal changes in firms may lead to other locational preferences"* (Pellenbarg et al., 2002, p. 2). Very often the current location can cope with these changes, by way of expansion, contraction or rebuilding the property. However, sometimes the firm must seek for a different business location in order to cope with external or internal changes. In continuation of the prescribed problem statement in the introduction, the factors that influence the locational decision of firms will be explored in this chapter. Location factors can be hard and soft. Hard location factors are objective and concrete (e.g. size of the building, accessibility and the proximity to other firms). These factors have a direct impact on the business activities of firms. Soft factors (e.g. charisma of the building, image and quality of the surrounding area) are more subjective and indirectly influence the firms' business activities (Eickelpasch et al., 2007). Soft factors are relatively difficult to express in a quantitative unit, such as an amount of money, number of square metres or distance level. The first paragraph in this chapter explores the location factors that can be deduced from some location theories. Paragraph 2.2 investigates a number of empirical researches and identifies the location factors that come forward.

2.1 Location theories

To get insight in the relevance and scope of firm (re)locations, some theories were developed to shed light on the economic geography of firms. A location pattern of any firm is the result of numerous individual decisions taken over a varying periods of time. The theories attempt to clarify the (re)location behaviour of firms. The literature distinguishes three location theories with each having their own conception of the firm and how the firm functions within its business environment (Pellenbarg et al., 2002; Pen, 2002; Derksen & Van Dongen, 2010; Mariotti & Pen, 2001; Jansen, 2009; Louw, 1996). The past decade a fourth theory, the evolutionary approach, has attracted some interest which is described by Boschma et al. (2002). The location factors that can be deduced from these location theories are explored in this paragraph.

2.1.1 Neo-classical approach

The first location theory is derived from standard classical economic theory. It focuses on cost-minimization and profit maximization theories. The general principles of this approach go back

to Adam Smith (1723-1790[4]). Transportation costs, labour costs, market size and other economic variables determine the optimal location for a firm via a mathematical product function. These economic variables can be defined as hard location factors. The neo-classical approach assumes that each firm possesses perfect information and that every economic actor acts autonomous and rational based on this information. The product function will be maximized into an optimal location assuming a homogenous space in a completely open market. These assumptions received quite some criticism, since imperfect information and bounded rationality are more likely to occur. The neo-classical theory shows principally how locational decision should be made in theory instead of how they are made in reality.

Agrarian and industrial premises are central in the neo-classical location theory. Since the focus of this research is on offices, the neo-classical theory seems less applicable for the deduction of location factors. However, according to Jansen (2009), some hard factors are also important for the locational decision of offices, namely labour costs, cost of accommodation, transportation costs, proximity to the selling market and agglomeration advantages.

2.1.2 Behavioural approach

The neo-classical approach does not take into account that imperfect information and uncertainty occur. Even profit maximizing behaviour does not need to be the ultimate goal of every firm. Essential principles of the behavioural approach is that decisions are made on the basis of bounded rationality, in uncertainty and with personal perceptions. The behaviour of economic actors within this location theory is not determined by space, but by their perceptions and cognition of the space. Firms will indeed try to make an as good as possible deliberation in their locational choice. However, the locational decision will always be suboptimal. The “optimal” behaviour of the firm as assumed in the neo-classical approach is now replaced by “satisfying” behaviour. Within this approach, the decision makers assume a limited number of offices where all kinds of non- or less rational factors play a role as well. Jansen (2009) stated that the behavioural approach shows the importance of soft location factors, such as the image of the region, the quality of life, security, etc.

The behavioural location theory merely deals with the decision making process than with the location factors itself. When the current business location does not meet the requirements of the firm anymore, the decision making process will begin. It is important here to distinguish between push and pull factors, as described by Van Dijk and Pellenberg (1999). Push factors consist of reasons to leave the current location. Pull factors attract a firm to another location, which consequently makes the current location relatively less optimal. In addition to push and pull factors, a third factor can be distinguished: keep factors. This factor does not induce relocation,

[4] Adam Smith Institute: www.adamsmith.org [accessed on 13 January 2012]

but is a reason to stay at the present location. It reflects the fact that the firm has made large investments at the current location, which will have to be made again at the new location. According to Van Dijk and Pellenbarg (1999) the lack of space for expansion has been seen as push factor number one. Accessibility problems are seen as the second important push factor. Both of these factors are also leading as pull factors, although of equal importance. The labour market is the third key-variable and is the most important keep factor. *"Especially for firms which invested in highly specialized labour and face high hiring, firing and training costs, the cost of inter-regional moves can be extremely high compared to intra-regional moves"* (Van Dijk and Pellenbarg, 1999, p. 196) Push factors play an important role in the locational choice of firms. According to Louw (1996), the decision making process consists of three phases: orientation, selection and negotiation. Within each of these phases the relative importance of location factors is different. In this thesis however, there will be no distinction made between the various phases in the decision making process.

2.1.3 Institutional approach

The previous two location theories have one view in common: *"the firm as an active decision making agent in a static environment"* (Pellenbarg et al., 2002 p.9.). However, the environment is not static, but shaped by the cultural institutions and value systems of society. The institutional approach takes, besides the behaviour of firms, the social and cultural context in which this behaviour is embedded into account as well. Firms are in interaction with their environment. *"Firms have to negotiate with deliverers and suppliers, local, regional or national governments, labour unions and other institutions, about prices, wages, taxes, subsidies, infrastructure, and other key factors in the production process of the firm"* (Pellenbarg et al., 2002 p.10).

According to Derksen and Van Dongen (2010) some location factors can be deduced from the institutional approach: the proximity to suppliers, consumers, knowledge centers, government institutions and other institutions.

2.1.4 Evolutionary approach

This fourth theory described in the book of Boschma et al. (2002), has gained interest of some economists for the past ten years. It tries to supplement the earlier discussed theories. In addition, this approach gives much attention to historical relations of the decision makers. Social relationships with family, relatives and friends can play a significant role in the decision making process. According to Derksen and Van Dongen (2010) the growth and development of a "new" sector in a region is an evolutionary process, whereby the environment gradually transforms in a favourable business environment. Coincidence plays an important role here, because it is uncertain and unpredictable which regions will facilitate the development of this "new" sector.

2.1.5 Summary

The described theories try to give an explanation for the location behaviour of firms. The theories are focused on some location factors that play a role in the decision making process. A locational choice can be based on a variety of these location factors and often transcends one individual location theory. Table 2.1 summarises the four location theories.

Table 2.1 Summary location theories and factors

Location theory	Type of location factor	Example of location factor
Neo-classical	Hard factors focused on cost minimization	- transportation costs - labour costs - market size - presence of raw materials - etc
Behavioural	Soft factors including non- or less rational factors	- image of the region - quality of life - security - etc
Institutional	Firm external factors: cluster factors & policy factors	- rules and regulations - subsidies - specialised labour - knowledge spill-overs - proximity to suppliers and consumers - university
Evolutionary	Firm external factors: cluster factors & historical relationships	- place of residence decision maker - social relationships - evolution of the business environment

Source: revision of Derksen & Van Dongen (2010)

2.2 Empirical research into locational behaviour

Much empirical research has been conducted into the locational choice and preferences of firms. Some Dutch researches with different methodologies are elaborated in this paragraph. The concept of “The new way of working” is introduced in this paragraph as well. This progressive concept has changed the preferences of office users and is therefore quite relevant for this thesis. The empirical researches will form the basis of a comprehensive list of location factors. Some of these location factors will consequently be used in this research to investigate which location factors, maritime office users in the Rotterdam region value the most.

2.2.1 Jansen

Jansen (2009) has used various sources in his research to form a comprehensive list of location factors. This investigation has led to 91 location factors (appendix ii) which are subdivided into 10 different categories:

1. Building
2. Direct surrounding
3. Location – proximity
4. Location – accessibility
5. Socio-economic surrounding
6. Residential and living environment
7. Financial
8. Government
9. Subjectivity
10. Supply side

This list is created from a more theoretical perspective and which Jansen consequently used for his empirical research among nine office users in the Amsterdam region. One conclusion of this research was that in a number of cases, soft location factors were explicitly perceived as the most important location factor, especially at office locations where the surrounding area and the building have more charisma.

2.2.2 Korteweg

In the PhD thesis of Korteweg (2002) about the obsolescence of office buildings, he investigated the most important location factors for office users in Rotterdam. Korteweg subdivided the location factors into two broad categories, namely building specific characteristics and location characteristics (table 2.2).

Table 2.2 Location factors for office users in Rotterdam
Percentage of firms that indicates that the factor is important for the functioning of the firm

Building characteristics	**Survey 1993**	**Location characteristics**	**Survey 1993**
Size	36	Accessibility by car	83
Flexible use of space	40	Nearby exit roads and highways	27
Possibilities for expansion	33	Parking facilities	79
Single tenancy	16	Accessibility by public transport	84
Recognisability	48	Nearby train station	57
Representativeness	80	Nearby city centre	49
Appearance	55	Nearby other offices	25
Height	5	Nearby shops	26
Rent / purchase price	74	Nearby cafes and restaurants	33
Service and energy costs	61	Nearby clients	32
Facilities for automation	48	Nearby airport	12
Security	78	Representativeness of the surrounding area	70
Air-conditioning	45	Visibility of the highways	2

Source: Korteweg (2002)

From table 2.2 it can be concluded that the accessibility of an office – together with parking facilities – is a very important location characteristic. The rent/purchase price is a very important building characteristic. Furthermore, soft factors (such as the representativeness of both building and location, and security) are very important location factors as well.

2.2.3 Remøy et al.

The third research is a Delhi study by Remøy et al. (2007). The goal of this study was to test whether some location factors were important in the searching process for office space in Amsterdam. The participants consisted of 18 experts, of which 5 from the academic world, 11 from the business sector and 2 were employed at the government. In their study a distinction has been made between two types of office users, namely professionals who are sensitive for status and urban specialists. A general profile for office users has also been investigated. Just as Korteweg, Remøy et al. subdivided the location factors into building and location characteristics. The 18 experts had to rank 15 building characteristics and 6 location characteristics for each of the three profiles of office users, which has led to the results in figure 2.1.

Figure 2.1 Final ranking of the three profiles

General profile	
Building characteristics	**Rank**
Car parking	1
Exterior appearance	2
Layout flexibility	3
Space efficiency	4
Comfort	5
Interior appearance	6
User recognisability	7
Technical state	8
Building facilities	9
Building period	10
Security	11
Energy performance	12
Routing	13
Bike parking	14
Commodities logistics	15
Kendall's W *	0,64

Urban Specialists	
Building characteristics	**Rank**
Car parking	1
User recognisability	2
Exterior appearance	3
Layout flexibility	4
Interior appearance	5
Space efficiency	6
Building facilities	7
Comfort	8
Building period	9
Technical state	10
Security	11
Bike parking	12
Routing	13
Energy performance	14
Commodities logistics	15
Kendall's W *	0,67

Status sensitive professionals	
Building characteristics	**Rank**
Car parking	1
Exterior appearance	2
User recognisability	3
Space efficiency	4
Interior appearance	5
Layout flexibility	6
Building facilities	7
Comfort	8
Building period	9
Technical state	10
Security	11
Routing	12
Energy performance	13
Bike parking	14
Commodities logistics	15
Kendall's W *	0,79

General profile	
Location characteristics	**Rank**
Accessibility by car	1
Status	2
Accessibility by public transport	3
Facilities	4
Safety	5
Business cluster	6
Kendall's W *	0,50

Urban Specialists	
Location characteristics	
Accessibility by car	1
Status	2
Facilities	3
Business cluster	4
Accessibility by public transport	5
Safety	6
Kendall's W *	0,33

Status sensitive professionals	
Location characteristics	
Accessibility by car	1
Status	2
Accessibility by public transport	3
Business cluster	4
Facilities	5
Safety	6
Kendall's W *	0,51

* The reported Kendall coefficient of concordance is significant at the 99 % level.

Source: Remøy et al. (2007)

Again, accessibility and parking came forward as very important location factors in this research, as well as the soft factors: appearance, recognisability and status. The cost of accommodation was not addressed in this research.

2.2.4 "Het Nieuwe Werken"

The market for office space has a strong cyclical character, because offices are a robust product and construction requires several years. A downward going economy results in a growing number of vacant offices. In the past a recovery of the economy in the Netherlands has led to a reduction in the vacancy level. However, the vacancy of offices amounts currently 15 percent of the total supply of offices in the Netherlands and has a structural character. The need for office space is structurally declining due to several reasons: global economic shifts; ageing of the population; and the introduction of a new way of working ("Het Nieuwe Werken") as perhaps the most important reason (CBRE, 2011). This new way of working changes the qualitative demand of office users. The basic principle of "Het Nieuwe Werken" is that the individual office employee can work time- and place independent. New technologies has made working at a distance possible and it functions as an alternative for physical cooperation.

Twynstra Gudde – an independent organisation consultant – has investigated in 2010 the impact of "Het Nieuwe Werken" on the Dutch office market. They concluded that the office of the future is:

- situated at multifunctional locations, where working, living and leisure can be integrated with working
- suitable for various activities: workplace types and m^2-use should be determined for each activity
- suitable for new functions: space for creating, focussing, cooperation, learning, socialising and relaxing
- adaptable building sections
- excellent architectural quality: "Het Nieuwe Werken" implicates renewed interest in lay-out, charisma and quality of the exterior as well as the interior
- sustainable and efficient

CB Richard Ellis – world's biggest consultant for commercial real estate – has investigated what the influence of "Het Nieuwe Werken" is on the Dutch office market as well. In "What users want" (2011) comes forward that office users still attach great importance on accessibility by car and parking facilities. However, the accessibility by public transport and bike is becoming very important as well. Excellent accessibility is essential nowadays, in which time- and place independent working is central. Offices are going to function as a place to meet, because communication and cooperation is at the heart of many organizations. At the same time, the

awareness of sustainability and congestion on the Dutch highways has increased the need for public transport. A location is more attractive when it is situated near a big junction of public transport.

2.2.5 Summary

The empirical researches described in this paragraph has led to a comprehensive list of location factors. Location factors can be subdivided into categories. Jansen (2009) used 10 categories in his revision from various literature researches. However, in other empirical researches it is more common to subdivide the location factors into two categories, namely building and location characteristics. This is more clearer and easier to interpret and therefore also applied in this thesis. Based on the previous paragraphs, the most important location factors that can be identified for this research are summarised in table 2.3.

Table 2.3 Summary location factors from empirical research

Building characteristics	**Location characteristics**
Cost of accommodation	Accessibility by car
Layout flexibility	Accessibility by public transport
Exterior appearance	Accessibility by bike
Interior appearance	Status / representativeness
Representativeness	Parking facilities
Space efficiency	Facilities
User recognisability	Business cluster
Technical state	Multifunctional area
Security	Nearby city centre

The cost of accommodation will obviously be a very important factor in the location decision of firms, since it is a major head of expenditure. The quality of an office location is largely expressed in the price. However, the office market is far from transparent, due to many incentives to reduce the (rent) price.

It can also be assumed that an office accommodation should be functional for the business activities of the firm in the first place: sufficient amount of square metres, space efficiency, layout flexibility of the office floors and the ability to expand or even shrink. Rent contracts are concluded for mid-term periods (10 years in general). The current business location should therefore cope with changes (both internally as externally) in the short term period. The geographical location of an office could also be of importance for the business activities of a firm. The right business cluster can create economies of scale and leads to more efficiency.

It can be assumed that the chosen office accommodation should also fit within the core values of the firm. The building and surrounding area should be representative for the firm. For example, a very cost effective firm will never be located in a hypermodern and expensive office. Otherwise, it will emanate the wrong signal to its clients and competitors. Other soft factors,

such as the interior appearance and the user's recognisability on the facade of the building, can also be assumed as very important location factors.

From the empirical researches it came forward that accessibility and parking facilities is of great importance. In the Netherlands, the car is still the most used transport mode. Especially for port related firms it can be assumed that the car is most frequently used, since public transport is barely present in the (Rotterdam) port area. In general however, public transport with buses, trams and trains is gaining market share. Especially in a highly dense and urban area as the Rotterdam region, public transport is becoming more efficient. Even for port related firms, public transport can become a more attractive transport mode in the future, since the highway A15 is often congested. Especially transportation over the water could be a very attractive mode of transport for maritime office users.

Lastly, in many researches it came forward that a multifunctional area, where different activities can be integrated with working, is an important location factor for office users. Especially in an era where time- and place independent working is becoming the new way of working, proximity to shops, cafes, restaurants and other facilities is getting more important. These features of a multifunctional area are especially present in city centres.

3 PORT- AND INDUSTRY COMPLEX

Worldwide, different types of business models of ports exist: from only water with a quay to a whole region around a port. In this region many production- and business service activities are taking place, which are very often mutually connected with each other, like in Rotterdam. According to Van den Bosch et al. (2011), such a business model is defined as a "port- and industry complex". In table 3.1 some illustrative information about the port- and industry complex in Rotterdam is given and appendix iii provides a map.

Table 3.1 Illustrative information about the port- and industry complex in Rotterdam

Worldwide and European ranking	Worldwide: 4th port Europe: 1st port
Total port related direct and indirect added value and employment	Approx. 15,5 and 6,7 billion euro respectively Approx. 90.000 and 55.000 employees respectively
Role of the Rotterdam Port Autority	Responsible for infrastructure; long term planning and development; safety
Total surface and length of quay	10.570 hectare (Second Maasvlakte adds 2.000 hectare extra) and 90 km respectively
Number of port related firms	Approx. 1.315
Tank storage capacity and length pipelines	Approx. 30 million cubic metre and 1.500 km pipelines
Number of terminals	50
Number of firms in the petrochemical industry	Approx. 130
Number of firms in logistics	Aprrox. 1220
Number of firms in wholesale and business services	Approx. 650 and 270 respectively

Source: Van den Bosch et al. (2011)

The port of Rotterdam is the biggest port in Europe and is the gateway for more than 350 million consumers in Europe. Yearly, thousands of ships are mooring into this mainport. Some of these goods are further transported to the hinterland, especially to Germany. The trans-shipment of 430 million ton in 2011 was 1 percent higher than in 2010.[5] The port- and industry complex in Rotterdam has two main functions. First it serves as a node in a transport chain. Second, it facilitates a significant amount of production industry. The "Port Vision 2030" (Port of Rotterdam Authority, 2011a) has mentioned these functions as "Global Hub" and "Europe's Industrial Cluster". These are explained in paragraph 3.1 and 3.2 respectively. The business services to firms in the port- and industry complex are exemplified in paragraph 3.3. The trends and developments in this complex that are relevant for this thesis are elaborated in paragraph 3.4.

[5] Port of Rotterdam: http://www.portofrotterdam.com/nl/over-de-haven/Pages/default.aspx [accessed on 13 February 2012]

3.1 Global Hub

The primary function of a seaport is a node in a transport and logistical chain. This transport node is similar to other nodes in transport chains, such as airports and railway stations. According to De Langen et al. (2010) three sub-functions can be identified:

1. Transfer point in a transport chain
   In seaports most of the cargo is transferred from ships to trucks, barge or train. The cargo exchanges transport modes.
2. A place for temporary storage
   Some cargo has to wait for their connecting trans-shipment, and therefore has to be stored temporarily. This storage is required in order to overcome the difference in scale between the various transport modes.
3. Consolidation
   In seaports different kind of cargoes are combined. Transporting this consolidated cargo is more efficient, since scale economies can be realised.

The port of Rotterdam serves as an attractive node for various cargo flows. *"The port can handle the largest ships, has a large and diverse capacity for transfer and storage and is linked to an array of hinterland destinations, accessible by road, barge, rail and pipeline."* (Port of Rotterdam Authority, 2011a, p.31) The hub function of the Rotterdam port- and industrial cluster has made the seaport a market leader. It is the largest node in Europe for the trans-shipment of various commodities (table 3.3 on the next page).

The activities in the Global Hub are mainly tied to quays. Many different type of firms are involved in this node in a transport and logistical chain. The subsectors that belong to the Global Hub are given in table 3.2.

Table 3.2 Subsectors Global Hub

Maritime shipping
Inland waterway shipping
Road transport
Rail transport
Pipelines
Services for transportation
Trans-shipment
Storage

Source: Nijdam et al. (2009)

Chapter four gives a more detailed description of the firms active in the Global Hub in Rotterdam.

Table 3.3 Total throughput by commodity, 2010-2008
Unit: Gross weight x 1 million metric tons

	2010	2009	2008
Agribulk	8.4	8.3	10.4
Iron ore and scrap	39.8	23.3	44.0
Coal	24.1	24.8	28.6
Other dry bulk	12.3	10.2	12.0
Subtotal dry bulk	**84.6**	**66.6**	**95.0**
Crude oil	100.3	96.4	100.4
Mineral oil products	77.6	72.2	58.6
Other liquid products	31.5	29.5	35.0
Subtotal liquid bulk	**209.4**	**198.1**	**194.0**
Total bulk	**293.9**	**264.7**	**289.0**
Containers	**112.3**	**100.3**	**107.0**
Roll on/roll off	16.7	16.0	17.9
Other general cargo	6.9	6.0	7.3
Total breakbulk	**23.7**	**22.0**	**25.2**
Total throughput	**429.9**	**387.0**	**421.1**

Source: Port of Rotterdam Authority (2011b)

3.2 Industrial Cluster

Industrial activities from which a significant part of the commodities is incoming and/or outgoing via the port of Rotterdam belong to the Industrial Cluster. This applies only for firms that are in the geographical proximity of the port of Rotterdam. The German steel-industry for example, belongs therefore not to the Rotterdam Industrial Cluster, despite of the fact that they use the port of Rotterdam for their incoming and outgoing goods.

Rotterdam is the largest petrochemical and energy complex in Europe. It can be denominated as the electricity hub of North-West Europe (Port of Rotterdam Authority, 2011a). More than 45 chemical firms and 5 oil refineries are situated in Rotterdam. Among them is Shell, the biggest oil refining company in Europe (Van den Bosch et al., 2011).

The subsectors that belong to the Industrial Cluster are given in table 3.4.

Table 3.4 Subsectors Industrial Cluster

Food industry
Oil industry
Chemical industry
Metal industry
Transport industry
Electricity industry
Other industry

Source: Nijdam et al. (2009)

3.3 Advanced Producer Services

Besides added value and employment in transport-, logistical- and industrial sectors, the port- and industry complex demands high quality business services as described by Kuipers et al. (2011). For a port to function optimally, it depends for a significant part on local knowledge, which are provided by these high quality business services. These services are called Advanced Producer Services (APS), such as financing and insuring ships and terminals; handling damage to cargo; inspection of materials for trans-shipment; legal assistance; software and ICT; etc. All these services are not tied to quays and the location of these firms has a more urban character. Historically, these specialised services came into existence in close proximity of the trade and shipping industry. Nowadays, these agglomeration advantages still exist. However Jacobs et al. (2010 and 2011) has investigated that these APS firms have other localisation economies as well. The following conclusions can be observed:

- the location of maritime APS is largely determined by the presence of their clients in the port- and industry sector, and not by throughput flows
- "specialised APS tend to agglomerate near other APS service providers along the (global) urban hierarchy instead of in the proximity of the commodity flows that move through ports" (Jacobs et al. 2010, p. 108)

Furthermore, Jacobs et al. (2010) identified Rotterdam as a specific case: the high concentration of physical flows indeed coincides with the location of maritime APS, despite the relatively low ranking of Rotterdam on the (global) urban hierarchy. This suggests some co-location benefits of maritime APS in the Rotterdam port- and industry.

Table 3.5 Subsectors APS

Information technology
Information
Financial institutions
Insurance and pension funds
Judicial, accounting, tax
Technical design and advise
Research and development
Advertising and market research
Industrial design and other consultancy
Other Advanced Producer Services

Source: Kuipers et al. (2011)

It must be understood that not all the firms within these subsectors (table 3.5) have clients in the port- and industry complex. The desk research described in chapter four distinguishes the APS firms that are port related.

3.4 Trends and developments

The port of Rotterdam has reached its limits from a spatial perspective. The current port- and industry area cannot facilitate the growth in space of current and new firms. Therefore, the second Maasvlakte is under construction since 2008. This is a 2.000 hectare westward extension of the port area into the sea and is necessary to accommodate the future growth of the port of Rotterdam. It provides space for three sectors, namely container trans-shipments, chemical industry and logistics. The containerships of the future will have a bigger draft than the most Europeans ports can handle. With the construction of a 20 meter depth second Maasvlakte, directly located to the sea, Rotterdam assures itself for a unique position in the container shipping market.[6] Container handling is a significant growth market for Rotterdam. In 2010 the throughput of containers was a quarter of the total throughput. The expectations for 2030 is that it will account for 42% of the total throughput (Port of Rotterdam Authority, 2011a). It can be assumed that this development will increase the demand for office space by firms in the container shipping market in the Rotterdam region.

The port- and industry complex in Rotterdam has become increasingly spatially disconnected from the city: *"the increased intensity of port-industrial activity, in combination with urban growth, lack of available land for further expansion, and environmental constraints have led to the move of port facilities away from city centres"* (Jacobs, 2009, p. 2). Port facilities that are now located directly to the west of the city centre of Rotterdam will move to the second Maasvlakte when it is finished in stages between 2013 and 2030.[7] The space they leave behind in this area, called "Stadshavens" (figure 3.1) can be used for other activities. Stadshavens is already in transition where regional planning and urban renewal opens opportunities. Three aspirations[8] can be identified: connecting port and city; sustainable development; and international allure.

Two recent real estate projects in Stadshavens (Projectbureau Stadshavens Rotterdam, 2010) need to be exemplified, since they are relevant for this research. The first project is Dockworks developed by OVG and located on Waalhaven East side: three multi tenant offices were build in 2007 in a reaction to the development of an office in that area by towage company Smit Internationale. Dock Works covers 20.000 m^2 in total and houses different maritime office users. Another project for port related firms is Port City, developed by the Rotterdam Port Authority. Two office building were developed in 2010, one in 2011 and the fourth one has currently been developed. These four office buildings are located on Waalhaven South side with the Rotterdam

[6] Second Maasvlakte: http://www.maasvlakte2.com/nl/generic/faq/category/25/ [accessed on 27 February 2012]
[7] Second Maasvlakte: http://www.maasvlakte2.com/nl/index/show/id/109/Aanleg [accessed on 27 February 2012]
[8] Stadshavens Rotterdam: http://www.stadshavensrotterdam.nl/doelstellingen [accessed on 27 February 2012]

skyline as unique selling point and each building covers 8.000 square metres. The real estate projects Dock Works and Port City has add quite some square metres to the supply of office space in the Waalhaven area and can be denoted as office buildings of high quality.

Figure 3.1 Stadshavens Rotterdam

Source: Projectbureau Stadshavens Rotterdam (2010)

3.5 Summary

The port- and industry complex in Rotterdam involves the whole region around the port where many production- and business service activities are taking place. Different (sub)sectors belong to the port- and industry complex in Rotterdam. Three broad sectors have been identified in the previous paragraphs: Global Hub, Industrial Cluster and Advanced Producer Services. The first two sectors reflect the two functions of the port- and industry complex. The latter sector provides business services to the other two sectors.

The port- and industry complex in Rotterdam is evolving continuously, both economically and spatially. Economically, it is assumed that the container shipping market will grow substantially the coming 20 years and that this consequently increases the demand for office space in the Rotterdam region of firms active in this market. The port- and industry complex in Rotterdam is also evolving spatially: port facilities that are tied to quays move away from the Rotterdam city centre to the second Maasvlakte. As a the result, space for other utilisations (e.g. offices) becomes available in Stadshavens.

4 DESK RESEARCH

In this chapter, the office users active in the port- and industry complex in the Rotterdam region are identified. This selection is based on some criteria, described in paragraph 4.1. The second paragraph maps the current location of the maritime office users in the Rotterdam region, and explores their distribution over the various districts in Rotterdam. This chapter concludes with the dynamics of the maritime office market.

4.1 Selection criteria

The port- and industry complex described in the previous chapter is quite complex and various different subsectors are involved. The location and the number of employees of the firms active in these subsectors on 1 January 2011 were requested at “Bedrijvenregister Zuid-Holland” (BRZ; business register South-Holland) based on a code. This code is a hierarchical classification of the firm’s economic activities: “Standaard Bedrijfsindeling” (SBI; standard business classification). The SBI codes are based on the “Nomenclature statistique des activités économiques dans la Communauté Européenne” (NACE) of the European Union and the “International Standard Industrial Classification of All Economic Activities” (ISIC) of the United Nations.[9] The SBI codes have several levels stated by 4 or 5 numbers. The first 4 numbers correspond more or less with the NACE and the fifth number is a Dutch particularisation. The first two numbers of the SBI and NACE correspond to the ISIC.

For the identification of the SBI codes that are relevant for this research, two sources were utilised. The subsectors identified in the Havenmonitor 2009 written by Nijdam et al. (2011) is used as the starting point. Table 4.1 on the next page provides these subsectors and their SBI codes. For a total overview of the SBI codes I refer to the website of the Dutch Chamber of Commerce.[10]

[9] Centraal Bureau voor de Statistiek: http://www.cbs.nl/nl-NL/menu/methoden/classificaties/overzicht/sbi/default.htm [accessed 1 March 2012]

[10] Kamer van Koophandel: http://www.kvk.nl/over-de-kvk/over-het-handelsregister/wat-staat-er-in-het-handelsregister/sbi-code/?refererAliasStat=sbi [accessed 1 March 2012]

Table 4.1 Subsectors and SBI codes

Subsector	SBI codes 2008
Global Hub	
Maritime shipping	5010, 5020
Inland waterway shipping	5030, 5040
Road transport	4941
Rail transport	4920
Pipelines	4950
Services for transportation	5222, 5229
Trans-shipment/Storage	5210, 5224
Industrial Cluster	
Food industry	03, 10
Oil industry	19
Chemical industry	20
Metal industry	24, 25
Transport industry	29, 30
Electricity industry	35
Other industry	06, 08, 09, 16, 17, 23, 26, 28, 38, 42
Advanced Producer Services	77, 80, 81, 84, 94

Source: Nijdam et al. (2011)

The sector Advanced Producer Services according to Nijdam et al. (2011) is quite limited. Their list is incomplete, since financing, insuring and inspection firms for example are absent. Therefore, some SBI codes stated by Kuipers et al. (2011) should be used as well in this research: 62, 63, 64, 65, 66, 69, 71, 72, 73, 74 and 82. A description of all the SBI codes used in this thesis can be found in appendix iv.

The firms with the earlier stated SBI codes and located in the Rotterdam region were requested at the Business Register of South-Holland. A data file with more than six thousand firms located in the Rotterdam region in 2011 came forward, including firms that cannot by typified as maritime office users. Three filters were subsequently used to reduce this list to a more relevant qualitative list of firms. A first filter was to remove all the business locations with less than 5 employees. This criteria of 5 employees was deliberately chosen, because an office with less than 5 employees will be of less value for the outcome of this research. A lot of firms in the Global Hub and Industrial Cluster are located on a so called “wet” or “industrial” site. These sites facilitate the primary income of the firm and should not be attributed to office space. This deficiency is tackled with the help of data from the “Centrum voor Onderzoek en Statistiek” (COS; centre for research and statistics). This institution possesses data about every real estate object in the city of Rotterdam. The intended purpose (e.g. office, industry, living, shopping, education, etc) of each real estate object when it was build is indicated according to the building regulations of 2003. For the real estate objects located outside Rotterdam the BAG-viewer[11] has been used to indicate whether it is an office or not. Another deficiency in the initial list of the

[11] The BAG-viewer is an application where data about addresses and real estate objects are registered: www.bagviewer.geodan.nl

requested SBI codes is that not all firms active in the APS sector are port related. Most of these firms do not provide any services to the port- and industry complex. This deficiency is tackled by investigating the activities of each firm at the company's website. The firms that provide a part of their total services to firms in the port- and industry complex remained.

Kuipers et al. (2011) used the World Shipping Register for their research. Via a cross-check with this register, some firms were still missing. The firms that hold an office were consequently added. Ultimately, a list of 290 maritime office users in the Rotterdam region was created, with 80 APS offices, 172 Global Hub offices and 38 Industrial Cluster offices. The relatively low number of offices in the Industrial Cluster can be explained by the fact that businesses in the Industrial Cluster are merely located on so called "wet" or "industrial" sites.

4.2 Current location

4.2.1 Distribution

A map of the current location of the 290 maritime office users in the Rotterdam region can be found in appendix v. The red marks correspond with the APS sector, whereas the blue and green marks correspond with the Global Hub and Industrial Cluster respectively. This map shows at first sight that the offices in the APS sector are located far away from the port of Rotterdam and more in urban areas. The firms are more or less evenly distributed over the north and south bank of the river (149 and 141 respectively). Almost 80 percent of the APS offices are represented at the north bank, whereas more than 63 percent of the Global Hub sector is located at the south bank. A Pearson Chi-square of 0,000 (appendix vi) indicates that the north and south bank significantly differ with respect to the distribution of the three sectors.

More than half of the total maritime office users are located in the centre of Rotterdam (87 firms) or in the Waalhaven/Eemhaven district (64 firms). In the other districts in the Rotterdam region, relatively few maritime office users are located. Therefore, some districts are combined, resulting in the following 7 regions (appendix vi):

Rotterdam Centre – 87
Waalhaven/Eemhaven – 64
South of the ring – 40
Port area – 31
North of the ring – 28
South (within the ring) – 23
North (within the ring) – 17

From a cross tab between the 7 regions and the 3 sectors (appendix vi), some conclusions can be drawn. Rotterdam Centre is a very popular region to located in. Especially for the APS offices, since almost half of these offices is located in Rotterdam Centre. However, Rotterdam

Centre is also the second most popular region for the Global Hub and Industrial Cluster. Of the maritime office users located in the Waalhaven/Eemhaven region, 85,9 percent belongs to the Global Hub and this region is therefore the most popular region for the Global Hub sector. The firms in the Industrial Cluster are mostly located in the Port area, but also south of the ring.

In table 4.2 the maritime office users located in the most dense regions – Rotterdam Centre and Waalhaven/Eemhaven – are compared to the total of business firms in these districts. It can be concluded that the Waalhaven/Eemhaven district houses relatively the most maritime office users in the Rotterdam region. This can, of course, be explained by the fact that Rotterdam Centre is a more multifunctional region where all sorts of businesses (e.g. shops, restaurants, retail, etc) are present.

Table 4.2 Share of total firms

	Total firms[12]	**Firms in this research**	**Share of total**
Rotterdam Centre	3799	87	2,3 %
Waalhaven/Eemhaven	490	64	13,1 %

Within Rotterdam Centre and Waalhaven/Eemhaven several distinct business areas can be identified. Rotterdam Central District (16 firms) and Scheepvaartkwartier (31) are the two main office areas in Rotterdam Centre. As already mentioned in chapter 3, Port City (7) and Dock Works (6) are two office projects located in the Waalhaven/Eemhaven district. Another distinct area in this district is Waalhaven Zuid (34). In appendix vii detailed maps of these two districts are provided.

The total number of employees working at the 290 maritime office users amount to 23.098, with data missing for 14 firms. It is important to note here that not all these employees are involved with office committed activities or with the provision of services to the port- and industry complex. It is therefore of less value to analyse the distribution of employment over the three sectors and over the various districts. Hence, the focus of this research will be more on qualitative location factors.

4.2.2 Firm migrations

In this paragraph the dynamics of the maritime office market in Rotterdam is elaborated based on the migrations of the firms addressed in this research. The municipality of Rotterdam possesses data about 91 maritime office users that moved at least once between 2001 and 2011. In table 4.3 these migrations are illustrated. For each region the number of firms that left that particular region, as well as the number of firms that moved to that region is provided. The

[12] Bedrijvenregister Zuid Holland

last column shows the firms that moved within the same region. In total 10 firms moved from the north bank to the south bank and 8 firms the other way around.

Table. 4.3 Firm migrations 2001-2011

Region	From	To	Within
Rotterdam Centre	6	8	20
Waalhaven/Eemhaven	8	11	9
North of the ring	3	12	1
South	3	3	1
South of the ring	7	7	2
Port area	8	6	1
North	15	3	2

Source: Stadsontwikkeling Gemeente Rotterdam, LISA[13]

Table 4.3 shows that Rotterdam Centre and Waalhaven/Eemhaven has always been a popular district for maritime office users the past 10 years. On balance, more firms moved to these districts and many firms stayed within these districts. Many maritime office users moved to the North of the ring, therefore it can be assumed that this region has become a more popular location for maritime office users. Many firms left North Rotterdam (within the ring) the past ten years, indicating a relatively less popular region.

Zooming in on the most important business areas in Rotterdam Centre and Waalhaven/Eemhaven, some statements can be made. From table 4.4 on the next page comes forward, that the firms currently located in Port City mainly came from the west of the Waalhaven area (Pernis and Hoogvliet), whereas the firms in Dock Works also came from the inner city of Rotterdam. In Scheepvaartkwartier the firms came either from the south bank of Rotterdam or from the remaining centre of Rotterdam.

[13] LISA is a database containing information on all branches in the Netherlands where paid work is performed

Table 4.4 Prominent business areas

Current location	Former location	Year of migration
Dock Works	Scheepvaartkwartier	2004
	Waalhaven Zuid	2006
	Pernis	2007
	Scheepvaartkwartier	2007
	Charlois	2007
	Albrandswaard	2007
Port City	Waalhaven Zuid	2010
	Pernis	2010
	Pernis	2010
	Hoogvliet	2010
	Hoogvliet	2010
Scheepvaartkwartier[a]	Rotterdam Centre	2001
	Rotterdam Centre	2001
	Barendrecht	2001
	Feijenoord	2002
	Rotterdam Centre	2003
	Rotterdam Centre	2003
	Schiedam	2005
	Waalhaven/Eemhaven	2007
	Spijkenisse	2008
	Rotterdam Centre	2010

Source: Stadsontwikkeling Gemeente Rotterdam, LISA

a. Four firms left Scheepvaartkwartier and two firms migrated within this district.

4.3 Summary

In this chapter the SBI codes that are relevant for this research were identified based on two other researches. To obtain a more relevant and qualitative list of maritime office users in the Rotterdam region, the following selection criteria were used:

- ≥ 5 employees
- "office" as intended purpose of real estate objects
- provision of services to the port- and industry complex

The desk research has resulted in 290 maritime office users in the Rotterdam region with 80 APS offices, 172 Global Hub offices and 38 Industrial Cluster offices. The districts Rotterdam Centre and Waalhaven/Eemhaven house more than half of the offices, in which the latter district houses merely firms that belong to the Global Hub. The APS firms are merely located on the north bank of the river and especially in Rotterdam Centre. Based on migrations between 2001 and 2011 of 91 maritime office users it can be concluded that Rotterdam Centre, Waalhaven/Eemhaven and Rotterdam North (outside the ring) are the regions that are quite popular, since many firms moved to or at least stayed within these regions.

5 FIELD RESEARCH

To investigate which location factors are considered important by the 290 office users active in the port- and industry complex in Rotterdam and which factors will influence their satisfaction level, a survey was carried out. This quantitative research method has been chosen so that much statistical data can be collected of many maritime office users. The results of the survey will say something about the economic geography of the total maritime office users in the Rotterdam region. Paragraph 5.1 describes the formation of the survey. The second paragraph exemplifies the hypotheses that will be tested in this research.

5.1 Survey

Preceding to the formation of the survey used in this research, interviews with three real estate experts in Rotterdam were performed. These real estate experts were asked what their experiences are concerning maritime office users in the Rotterdam region. Both Ooms and Schaub & Partners concluded that industrial- and logistics office users are quite aware of the costs, since their economic activities are marginal business. According to these experts, the cost of accommodation will be of greater importance than the quality of the office building. Ooms added two other characteristics of these office users. First, the firms require good accessibility, especially with the car. Accessibility by public transport seems to be of minor importance. Second, industrial- and logistics office users are still quite traditional and conservative. This can imply that “Het Nieuwe Werken” will be less applied by these firms than in other sectors. Moreover, DTZ Zadelhoff indicated that a location at the water can be assumed as an important location factor for maritime office users.

The three experts were also asked which office accommodation belongs to the top-segment for maritime office users. They responded unanimously with Port City at Waalhaven South side. This real estate project distinguishes itself from other office locations with respect to the following characteristics:

- good parking facilities (1:50 m^2 lettable floor space is a highway-location standard)
- location at the water with a unique experience (great view at the skyline of Rotterdam)
- high quality of the building (modern, new), but not as expensive as in Rotterdam Centre
- relatively bad accessibility with public transport

Based on the list of location factors identified in chapter two and the performed interviews with real estate expert, the survey has been formulated (appendix viii). The survey consists of two main parts. In the first part the respondents had to indicate on a Likert scale from 1 to 10 how

important each location factor is to them, where 1 is the least level of importance and 10 the highest level. In the second part, the respondents were asked about their satisfaction level with regard to their current business location. Again a Likert scale from 1 to 10 has been used, where 1 corresponds with the least level of satisfaction and 10 with the highest level. This Likert scale ranging from 1 to 10 has been deliberately chosen, since a rating from 1 to 10 is generally accepted and well-understood in the Netherlands. A grade of 5,5 or lower is generally known as an insufficient rating and makes the Likert scale symmetrical. Therefore, this ordinal Likert scale approximates an interval-level measurement, under the assumption that the distance between the Likert items is equal. An interval as level of measurement will provide more opportunities to do statistical analyses.

As earlier mentioned in this thesis, the location factors are subdivided into location and building characteristics. In the survey the location characteristics are called environment characteristics, since I assumed that the respondents will better understand what is meant by this latter term.

For the APS firms a slightly different survey has been sent: the location factor *"Proximity to clients in the port sector"* has been added. Furthermore, the two versions differ with respect to question two which is asked for some more background information and can be used as control variable. The firms in the Global Hub and Industrial Cluster were asked what percentage of the workforce at their business location is involved with office committed activities. Since, we can assume that APS firms are only involved with office committed activities, question two in their survey is replaced with the following question: *"What percentage of the turnover can you approximately ascribe to clients in the port sector?"* This question is added because many APS firms do not provide services solely to clients in the port sector.

Question 6 *"Would you recommend your current business location to a good friendly entrepreneur?"* was added to this survey to control the overall stated satisfaction of the current business environment and building. The answer to this question can be perceived as the revealed preference.

Each survey was provided with a number, so that the current business location of each firm could be identified. This has led to a minimisation of the amount of questions in the survey. It can be assumed that the shorter the survey, the higher the expected response rate. Despite of the identification number on each survey, the anonymity of the respondents will still be guaranteed, since the data will not be used to trace any information back to the individual firms.

5.2 Hypotheses

In this paragraph the hypotheses that will be tested in this research are formulated. The outcome of these hypotheses will provide an answer to the research question addressed in this thesis. First, some hypotheses are formulated that relate to the first part of the research question: *"What location factors are important for office users in the Rotterdam port- and industry complex...?*

Hypothesis 1 *Maritime office users consider accessibility by car more important than accessibility by public transport*

Hypothesis 2 *Maritime office users consider the cost of accommodation more important than the quality of the office building*

Hypothesis 3 *APS office users consider a location in a multifunctional urban area more important than office users in the Global Hub and Industrial Cluster*

Hypothesis 4 *There is a positive relation between the percentage of turnover that APS firms ascribe to clients in the port sector and the importance of the proximity to these clients*

Subsequently, for the municipality of Rotterdam it is also useful to test some hypotheses that address the satisfaction level of maritime office users. The following hypotheses mainly relate to the environment of the business location instead of the building itself. The reason for this is that insights into the satisfaction level of the environment is more valuable for the municipality, since it has more implications for their policy.

Hypothesis 5 *The various regions in Rotterdam differ with respect to the satisfaction level of the overall environment*

Hypothesis 6 *Maritime office users are in Rotterdam Centre more satisfied with the characteristics of a multifunctional urban area than the office users in the remaining regions*

Finally, hypothesis 7 relates to the second part of the research question: *"...and which factors influence the satisfaction level of their current office accommodation?"*

Hypothesis 7 *Soft factors have a greater influence on the satisfaction level of the current office accommodation of maritime office users, than hard factors*

The first two hypotheses are formulated based on the interviews with the real estate experts in Rotterdam. Hypothesis 3, 5 and 6 merely came forward from the desk research. The remaining hypotheses (4 and 7) are formulated based on the location theories and previous empirical researches into the locational preferences of office users.

6 RESEARCH RESULTS

This chapter provides the results of the research into the economic geography of maritime office users in the Rotterdam region. The results of the background analyses of the respondents will be reported first and the data will be screened before any statistical analysis can be performed. Hereafter, the results of the quantitative research will be analysed with the statistical programme SPSS to test the earlier formulated hypotheses. Paragraph 6.2 provides the results that relate to the importance levels, whereas paragraph 6.3 relates to the satisfaction levels. Paragraph 6.4 provides three statistical regression models in which hypothesis 7 can be tested. The last paragraph of this chapter is a discussion about the interpretation of the results.

6.1 Data

6.1.1 Respondents

In total 290 surveys were carried out of which 92 responded. This response rate of 31,7 percent is very satisfactory. One survey was returned because the firm apparently moved to another location.

The distribution of the respondents over the sectors and regions is illustrated in table 6.1. It can be concluded that the firms in the APS sector were relatively more willing to participate in this research. None of the firms in Hillegersberg/Schiebroek (3), Spijkenisse (8) and Vondelingenplaat (1) participated in this research. Maritime office users at the south bank (except Waalhaven/Eemhaven) responded relatively less than the north bank.

Table 6.1 Distribution over the sectors and regions

	Sample frequency	Sample percentage	Population frequency	Participation percentage
Advanced Producer Services	31	33,7	80	38,8
Global Hub	51	55,4	172	29,7
Industrial Cluster	10	10,9	38	26,3
Rotterdam Centrum	31	33,7	87	35,6
Waalhaven/Eemhaven	21	22,8	64	32,8
North of the ring	11	12,0	28	39,3
Port area	10	10,8	31	32,3
North	7	7,6	17	41,2
South of the ring	7	7,6	40	17,5
South	5	5,4	23	21,7

6.1.2 Screening the data

The quality of the dataset is of key importance before any statistical analyses can be performed. Therefore, the data is screened for errors, outliers, missing values, inconsistencies and normal distributions. Since the respondents had to indicate on a scale from 1 to 10 their level of importance or satisfaction for various location factors, outliers due to mistakes of the respondent could not occur. No missing values for the importance and satisfaction levels of the location factors was discovered. However, question 6 *"Would you recommend your current business location to a good friendly entrepreneur?"* was only answered by 70 respondents. One reason for this many missing values could be that the phrasing of the question was unclear. Another reason could be that the respondents were reluctant to answer this question because it is sensitive information to them.

With the use of graphs (boxplots and histograms) all variables were screened for a normal distribution. It can be concluded that all variables, except the importance of a location at the water, are at least slightly skewed to the left. A left-tailed distribution indicates that the mass of the distribution is concentrated on the right of the graph and with relatively few low values. The graphs showed that the distribution of the variables are not completely normal. However, histograms cannot tell whether a distribution is close enough to normality to be useful. Therefore, the Shapiro-Wilk test is performed to investigate if the distribution of every variable is significantly different from a normal distribution. For only one variable, the importance of proximity of clients in the port sector, the null-hypothesis (H0: the data of the sample is normally distributed) cannot be rejected. For the Shapiro-Wilk test statistics I refer to appendix ix.

6.2 Importance levels[14]

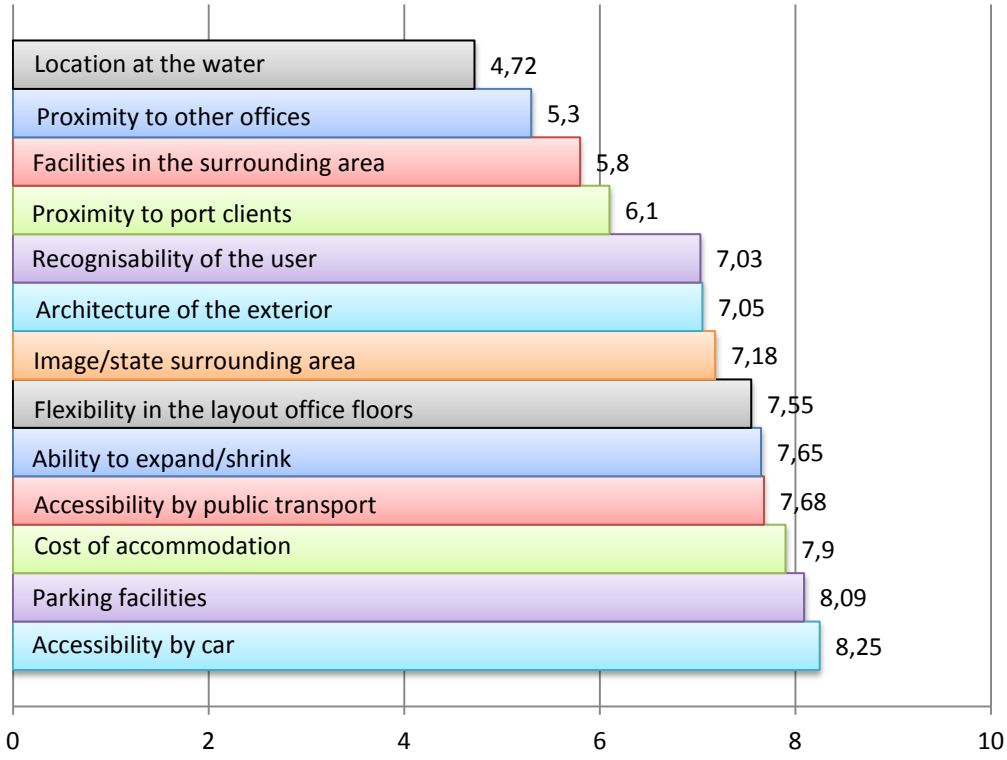
In this paragraph the hypotheses that relate to the importance levels are tested. Various statistical methods are designed to make statistical decisions of a hypothesis using experimental data. Every hypothesis has a null-hypothesis which indicates the reverse possibility: that the prediction of the researcher is wrong and that the predicted effect does not exist. In statistical analyses, a statistically significant result is a result which is unlikely to have occurred by chance. Every statistical test provides a P-value, which is the probability of obtaining the observed result by chance, assuming the null-hypothesis is true. The lower the P-value, the higher the probability that the hypothesis is true, the more significant the result. In this research , a test statistic is significant when the P-value is smaller than the most common used critical value of 5%. In that case, the null-hypothesis should be rejected and the formulated

[14] For the original data output of SPSS I refer to Appendix x

hypothesis should be assumed. Non-parametric tests in SPSS should be used in this research, due to the fact that almost every variable is not normally distributed.

The respondents were asked to indicate on a scale from 1 to 10, their level of importance for various location factors, where 1 is the least level of importance and 10 the highest level. Figure 6.1 provides the importance levels ranked from low to high. Most of the importance levels are between 7 and 9. The accessibility by car and parking facilities are on average the most important location factors for maritime office users and even more important than the cost of accommodation. Maritime office users consider an office location at the water the least important. The river Maas, often perceived as a unique selling point by policymakers in Rotterdam, seems to be the least important factor in this research for the attraction of maritime office users.

Figure 6.1 Importance levels location factors



6.2.1 Hypothesis 1

For the first hypothesis in this research: *Maritime office users consider accessibility by car more important than accessibility by public transport*, two measured variables should be compared in the same sample. To test whether the importance level of accessibility by car (mean=8,25) is significantly higher than the importance level of accessibility by public transport (mean=7,68), a Wilcoxon's signed-rank test is necessary. This test is the non-parametric equivalent of the dependent t-test (Field, 2005). The exact one-tailed significance of this test is ,009 which is

smaller than ,05. The negative ranks (importance of accessibility by public transport < importance of accessibility by car) implicates the direction of the result. Therefore, we can reject the null-hypothesis that the importance levels for accessibility by car and accessibility by public transport are the same. Hence, it can be assumed that maritime office users consider accessibility by car significantly more important than accessibility by public transport.

6.2.2 Hypothesis 2

To test the second hypothesis in this research: *Maritime office users consider the cost of accommodation more important than the quality of the building,* the Wilcoxon's signed-rank test should be used again. However, some sub-hypotheses should be formulated first, since the importance of the quality of the building is measured by various location factors in this research. In this research three variables (architecture and charisma of the exterior; recognisability of the user at the exterior; flexibility in the layout office floors) can all be attributed to the quality of an office building, under the assumption that these factors drive up the cost of accommodation.

Each sub-hypothesis has the following form:

- H0: the importance level of cost of accommodation is the same as for the importance level of architecture and charisma / recognisability of the user / flexibility in the layout office floors
- Ha: the level of importance of cost of accommodation (mean=7,90) is higher than for the importance of architecture and charisma (mean=7,05) / recognisability of the user (mean=7,03) / flexibility in the layout office floors (mean=7,55)

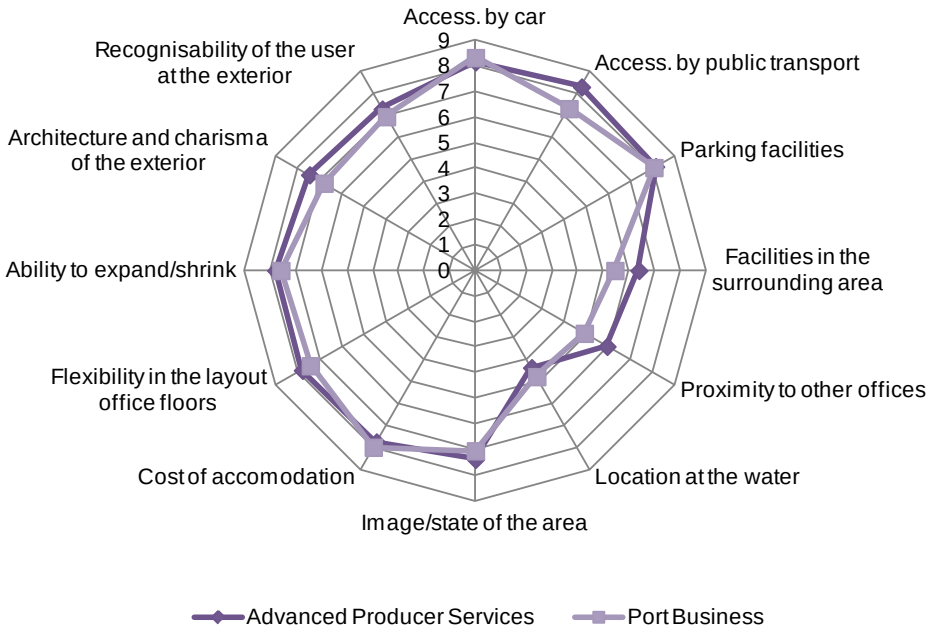
The output of the Wilcoxon's signed-rank tests can be found in appendix x. The exact one-tailed significance is smaller than ,05 for each test. This leads to the conclusion that the importance level of cost of accommodation significantly differs from the importance levels of architecture and charisma, recognisability of the user and flexibility in the layout office floors. Hence, in this research maritime office users consider the cost of accommodation more important than the quality of the building. It should be noted that there are several other location factors that can be attributed to the quality of an office building. However, these variables were not addressed in this research.

6.2.3 Hypothesis 3

In the coming section the differences between the three sectors will be investigated. Since only 10 firms in the Industrial Cluster responded and it can be assumed that these firms have more or less the same location preferences as firms in the Global Hub, these two sectors are combined as "Port Business" in the remainder of this thesis. Figure 6.2 gives a graphical presentation of the mean importance levels of the various location factors, distinguished for the two sectors. It can be concluded that the two sectors score almost the same for every building

characteristics. Only for the architecture of the building a small difference can be noticed. With respect to the environment characteristics, it seems that the importance levels only differ for accessibility by public transport, facilities in the surrounding area and proximity to other offices.

Figure 6.2 Importance of location factors



To test the third hypothesis: *APS office users consider a location in a multifunctional urban area more important than office users in the Port Business (Global Hub and Industrial Cluster)*, the Mann-Whitney test should be used. This test compares two conditions when different participants take part in each condition. To measure the importance level for a multifunctional urban area in this research, various location factors can be used. In this research five variables should be investigated in order to test this hypothesis. The characteristics of a multifunctional urban area are the following:

a. Good accessibility by public transport
b. Less accessibility by car
c. Less parking facilities
d. Many facilities in the area
e. High proximity to other offices

For each variable a sub-hypothesis should be formulated and consequently tested with a Mann-Whitney test. The descriptive statistics of the five variables distinguished for the two groups are shown in table 6.2.

Table 6.2 Descriptive statistics for hypothesis 3

Variable	Sector	Mean	Median
Importance of accessibility by public transport	APS	8,29	8,00
	Port Business	7,38	8,00
Importance of accessibility by car	APS	8,16	8,00
	Port Business	8,30	8,00
Importance of parking facilities	APS	8,13	8,00
	Port Business	8,07	8,00
Importance of facilities in the surrounding area	APS	6,39	7,00
	Port Business	5,51	6,00
Importance of proximity to other offices	APS	5,94	6,00
	Port Business	4,98	5,00

For each variable the number of cases for APS and Port Business is n=31 and n=61 respectively. The means of accessibility by public transport, facilities in the surrounding area and proximity to other offices are higher for APS firms than for Port Business firms. The mean of accessibility by car is on the contrary lower for APS firms. These descriptive statistics indicate that APS firms consider a business location in a multifunctional urban area more important than Port Business firms. However, the relative means of parking facilities is not in line with the hypothesis that APS firms consider a location in a multifunctional urban area more important.

To test whether these differences are significant, several Mann-Whitney tests are performed with SPSS. The Mann-Whitney test works on the principle of ranking the data: *"that is, finding the lowest score and giving it a rank of 1, then finding the next highest score and giving it a rank of 2, and so on."* (Field, 2005, p. 521). High scores in one group will be represented by large ranks and for low scores the opposite. The statistical analysis will consequently be carried out on the ranks instead of the actual scores. The mean ranks (appendix x) for the importance of parking facilities is lower for APS firms than for Port Business firms, whereas in table 6.2 the means were in the opposite direction. The explanation for this contradiction is that the Mann-Whitney test compares medians instead of means (Field, 2005).

The result to the five sub-hypotheses will say something about the third hypothesis in this research. The Mann-Whitney test statistic U is only significant for the importance of facilities in the surrounding area and the importance of proximity to other offices ($p < ,05$). The importance of accessibility by public transport is only significant at a 10% significance value. Hence, it seems that APS office users only consider a location in a multifunctional urban area significantly more important than the other office users with respect to the level of importance of facilities in the surrounding area, proximity to other offices and accessibility by public transport (albeit on a critical value of 10%). For the other two variables the test failed to reject the null-hypothesis, so the two sectors score the same on the accessibility by car and parking facilities.

6.2.4 Hypothesis 4

To test whether there is a positive relation between the percentage of turnover that APS firms ascribe to clients in the port sector and the importance of the proximity to these clients, the Spearman's correlation coefficient should be investigated: "*Spearman's correlation coefficient, r_s, is a non-parametric statistic and so can be used when the data have violated parametric assumptions such as non-normally distributed data"* (Field, 2005, p. 129). It can be concluded that there is a significant positive relationship between the importance of proximity to clients in the port sector and the percentage turnover: the Spearman's correlation coefficient amounts ,426 and the significance value is ,017 (two-tailed). This correlation coefficient implies a medium to large effect.[15]

6.3 Satisfaction levels[16]

In this paragraph the hypotheses that relate to the satisfaction levels are tested. The respondents were also asked to indicate on a scale from 1 to 10, their level of satisfaction for each individual location factor, for their overall business environment and building. It can be concluded that the respondents in this research are on average quite satisfied, since the means for the satisfaction level of the overall environment and building are 7,41 and 7,26 respectively. With the results of question 6 in the survey: *"Would you recommend your current business location to a good friendly entrepreneur?"*, the real satisfaction of the respondents is revealed. With this question the overall satisfaction of the current business environment and building can be controlled. Of the 70 respondents who answered this question, only 8 answered with "no". This implies that the respondents are indeed quite satisfied with their current business location. The respondents that do not recommend their current business location are located in Waalhaven/Eemhaven (3), Schiedam (2), Rotterdam Centrum (2) and Capelle a/d IJssel (1). This group of respondents gave a lower satisfaction level for every location factor than the respondents who do recommend their current office location. Hence, no specific location factor can be identified as the cause for this real unsatisfaction.

6.3.1 Hypothesis 5

For the municipality of Rotterdam it is useful to compare satisfaction levels between the various regions in Rotterdam. The focus in this research will be more on the environment characteristics, since Stadsontwikkeling Rotterdam has a greater influence with their policies on these location factors than on building characteristics. To test hypothesis 5: *The various regions in Rotterdam differ with respect to satisfaction level of the overall environment*, a Kruskal-Wallis test is used. The test failed to reject the null-hypothesis, so the satisfaction levels of the overall

[15] ±0.1 represents a small effect, ±0,3 is a medium effect and ±0.5 is a large effect (Field, 2005)

[16] For the original data output of SPSS I refer to Appendix x

environment does not significantly differ between the 7 regions. The reliability of this Kruskal-Wallis test could be questioned, since 5 regions have a maximum of only 11 respondents, which is quite low for statistical analyses.

The satisfaction levels itself can be meaningless if the respondents encounter different importance levels. For instance, if a respondent is very satisfied with a location factor, but this factor is not really important to him, than it should be corrected for this. One way to correct for this phenomenon is to compute the "weighted satisfaction", the interaction of the importance and satisfaction levels. The minimum of the total interval of the weighted satisfaction becomes 1 (1 times 1) and the maximum will be 100 (10 times 10). The computed weighted satisfaction variables are even more in line with an interval-level measurement, because the distance between the Likert items can assumed to be equal. With the computation of the weighted satisfaction, the following assumption has been made: when a respondent finds a location factor very important, he will be more critical about his satisfaction and thus less easily satisfied. Conversely, when a location factor is not really important for a particular respondent, then this respondent will be quickly satisfied. Hence, in every research on satisfaction it is essential to know the importance levels encountered by the respondents. In the subsequent section, possible differences between the regions with respect to the corrected satisfaction levels are investigated.

6.3.2 Hypothesis 6

The most frequently mentioned bottlenecks (open question 8 in the survey) in Rotterdam Centre are problems with parking, but also delays and congestion due to the construction of central station. In Waalhaven/Eemhaven the most frequently mentioned bottlenecks with respect to the environment are the lack of facilities in the surrounding area, the image of the area and poor public transport connections and frequency. Maritime office users on the whole south bank indicated that congestion on highway A15 is also a great bottleneck. Congestion is also perceived as a bottleneck for the maritime offices users located North of the ring. For North Rotterdam (within the ring), the most frequently mentioned bottleneck is insufficient parking facilities.

In table 6.3 on the next page it is indicated which regions have a weighted satisfaction above average (green) or below average (red) with respect to a particular environment characteristic. The Port area scores below average on all environment characteristics, except for the weighted satisfaction of the accessibility by car. On the contrary, the South of the ring scores mainly above average, except for the weighted satisfaction of the image of the surrounding area. The two most popular regions – Rotterdam Centre and Waalhaven/Eemhaven – score exactly in the opposite direction.

Table 6.3 Weighted satisfaction environment characteristics

	Access. by car	Access. by public transport	Parking facilities	Facilities	Proximity to offices	Image surrounding area	Satis-faction environ-ment
Rotterdam Centre	55,81	67,13	50,00	50,35	36,68	57,52	7,58
Waalhaven/ Eemhaven	68,62	43,38	68,19	26,24	44,76	48,95	7,14
North of the ring	64,18	51,64	52,36	34,73	40,55	51,00	7,45
Port area	69,10	37,20	47,00	25,60	25,30	47,00	7,20
North	76,43	51,71	73,29	35,43	32,86	47,14	7,14
South of the ring	66,43	67,43	60,71	44,29	40,00	44,43	7,57
South	62,60	61,20	75,20	44,80	36,40	53,00	8,00
Total	**63,92**	**55,13**	**58,07**	**38,39**	**37,70**	**51,61**	**7,41**

To test hypothesis 6: *Maritime office users are in Rotterdam Centre more satisfied with the characteristics of a multifunctional urban area than the office users in the remaining regions,* it is assumed that Rotterdam Centre can be most characterised as a multifunctional urban area. Five sub-hypothesis can be formulated and they all refer to the weighted satisfaction levels:

- H6.a. Maritime office users in Rotterdam Centre are more satisfied with the accessibility by public transport than the office users in non-centre regions
- H6.b. Maritime office users in Rotterdam Centre are less satisfied with the accessibility by car than the office users in non-centre regions
- H6.c. Maritime office users in Rotterdam Centre are less satisfied with the parking facilities in the surrounding area than the office users in non-centre regions
- H6.d. Maritime office users in Rotterdam Centre are more satisfied with the facilities in the surrounding area than the office users in non-centre regions
- H6.e. Maritime office users in Rotterdam Centre are more satisfied with the proximity to other offices than the office users in non-centre regions

The centre and non-centre of Rotterdam have 31 and 61 respondents respectively for each location factor. The output of the Mann-Whitney tests for hypothesis 6 is provided in appendix x. The first four sub-hypotheses can assumed to be true, since their null-hypothesis should be rejected (P-values are lower than the 5% critical value). The hypothesis that maritime office users in Rotterdam Centre are significantly more satisfied with the proximity to other offices than the office users in the non-centre regions cannot be accepted. The mean rank is actually higher in non-centre regions, albeit not significant.

6.4 Regression analysis

Regression analysis in SPSS will lead to a linear combination of some predictor variables that correlate maximally with an outcome variable. With regression analysis the location factors that have an influence on the satisfaction level of the current office accommodation of maritime office users can be investigated. To test hypothesis 7, three regression models are investigated with the satisfaction levels of the environment, building and overall satisfaction as dependent variable (DV) respectively. Some assumptions should be met in order to generalize the findings of the regressions outside the sample (Field, 2005). The independent variables (IV's) should be quantitative or categorical (with maximum two categories) and with non-zero variance. Between two or more IV's there should be no perfect linear relationship. Correlations greater than |0,8| is used as a standard for multicollinearity in this research. Doing a regression analysis in SPSS, the assumption that the errors are independent should be met, which can be tested with the Durbin-Watson test. This test statistics is not disturbing if it ranges between one and three. It the statistic is exactly two, than the residuals are uncorrelated. A value smaller than two indicates a positive correlation, whereas a value greater than two indicates a negative correlation.

6.4.1 Satisfaction level environment

The first regression model has the satisfaction level of the environment as dependent variable. The independent variables are the weighted satisfaction levels of the location factors that relate to the office environment. The number of observations is 92 for this regression analysis, so it is justified to include maximum 9 independent variables.[17] A hierarchical method is used based on the importance levels of each individual location factor; the individual location factor that scores the highest on importance (figure 6.1) is put into the regression model first. Furthermore, two control variables (CV's) are included into this regression model, namely the type of the region (centre vs. non-centre) and the type of sector (PB vs. APS). Previous analyses namely showed that the weighted satisfaction levels of accessibility by car and public transport; parking facilities, and facilities in the surrounding area significantly differ between the centre of Rotterdam and non-centre regions. The type of sector could also have an influence on the satisfaction level of the environment. Table 6.4 provides the results of this hierarchical regression analysis with "Satisfaction level environment" as DV.

[17] 10 to 15 cases of data for each predictor (Field, 2005)

Table 6.4 Regression model with "Satisfaction level environment" as DV

	Model 1a	Model 1b	Model 1c	Model 1d	Model 1e	Model 1f
Constant	7,357****	5,897****	5,785****	5,453****	4,837****	4,715****
Centre vs. non-centre	-,150	-,499*	-,543*	-,355	-,184	-,116
PB vs. APS	,463*	,374	,337	,213	,085	,065
Accessibility by car	-	,027****	,024***	,021**	,014*	,014
Parking facilities	-	-	,006	,004	,006	,006
Accessibility by public transport	-	-	-	,009	,006	,005
Image/state surrounding area	-	-	-	-	,022***	,022***
Facilities in the surrounding area	-	-	-	-	-	,005
Proximity to other offices	-	-	-	-	-	-,002
F test	1,842	5,809***	4,546***	4,145***	5,261****	3,926***
R-square change	,040	,126****	,008	,021	,077***	,004
Adjusted R-square	,018	,137	,135	,147	,219	,205
Observation #	92	92	92	92	92	92

** p<0.1, ** p<0.05, *** p<0.01, **** p<0.001*

The highest correlation coefficient (,530) is between facilities and public transport. Hence, the assumption of no multicollinearity is met. In this regression analysis the Durbin-Watson statistic (2,051) is very close to 2, meaning that the residuals are uncorrelated. The coefficient of control variable "Centre vs. non-centre" is significant when "Accessibility by car" is added in model 1b and consequently becomes insignificant when the IV "Accessibility by public transport" is added in model 1d. The inclusion of "Parking facilities" in model 1c; "Accessibility by public transport" in model 1d, and "Facilities in the surrounding area" plus "Proximity to other offices" in model 1f does not lead to a significant change in R-square. The adjusted R-square indicates how much variance of the DV would be accounted for if the model had been derived from the population. Model 1e explains most of the variance (21,9%) and the best predictors are IV's "Image/state surrounding area" and "Accessibility by car". The "importance" of these two significant positive contributors in predicting the satisfaction level of the environment, can be compared by using the standardised beta values. These values do not depend on the units of measurement of the variables. The standardised beta value of the image (,320) is greater than the beta of the accessibility by car (,197). Hence, the image of the surrounding area (which is a soft factor) is of greater importance in predicting the satisfaction level of the environment, than the accessibility by car (hard factor).

6.4.2 Satisfaction level building

The output for the second regression analysis with the satisfaction level of the building as DV is provided in table 6.5 on the next page. The same procedure and method as for the first regression model is used. Besides the type of sector as CV, two other control variables are

used in this regression model as well, namely the size of the firm and their growth expectations for the coming three years. The size of the firm is expressed in the number of employees and is computed with the use of question 2 in the survey: *"What percentage of employees is involved with office committed activities?"* For the firms in the Port Business this percentage should be used to compute the relevant number of (office) employees. It is assumed that all employees at APS firms are doing office committed activities. It can be expected that both the number of employees and the growth expectation has an influence on the satisfaction level of the building. However, from regression model 2a it can be concluded that their coefficient does not significantly differ from zero, because the P-values are even greater than ,74. Therefore, in the remaining models these two CV's are excluded.

Table 6.5 Regression model with "Satisfaction level building" as DV

	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e	Model 2f
Constant	6,894****	6,143****	5,374****	5,246****	4,418****	4,416****
Size	,000	-	-	-	-	-
Expected growth	,024	-	-	-	-	-
PB vs. APS	,572*	,468	,408	,396	,089	,103
Cost of accommodation	-	,019**	,010	,007	,007	,006
Ability to expand/shrink	-	-	,025***	,016	,007	,007
Flexible layout in office floors	-	-	-	,014	,007	,006
Architecture of the exterior	-	-	-	-	,035****	,033***
Recognisability of the user	-	-	-	-	-	,003
F test	1,058	3,671**	5,419***	4,439***	8,444****	6,992****
R-square change	,036	,076**	,080***	,014	,160****	,001
Adjusted R-square	,002	,055	,127	,131	,290	,283
Observation #	88	92	92	92	92	92

** p<0.1, ** p<0.05, *** p<0.01, **** p<0.001*

Again, the assumptions for no multicollinearity and independent errors are met. Though, the Durbin-Watson statistic of 1,633 (for model 2b-2f) is lower than two, which indicates some positive correlation. The inclusion of IV's "Flexible layout office floors" and "Recognisability of the user" does not lead to a significant change in R-square with respect to their previous models. However, the inclusion of "Architecture of the exterior" explains 16,0% more of the variance in the satisfaction level of the building than model 2d. The adjusted R-square of model 2e is ,290, which means that almost 30% of the variance in the satisfaction level of the building is explained in this model. Only the "Architecture of the exterior" has a significant positive contribution in predicting the satisfaction level of the building.

6.4.3 Overall satisfaction level

The third regression model in this research has the overall satisfaction (environment and building) as DV. The weighted satisfaction levels of the in total 11 location factors should be reduced to a more manageable size. Factor analysis is a statistical technique for identifying groups of variables, while retaining as much of the original information as possible. Several variables that are interrelated could be all influenced by the same underlying dimension, therefore a factor can be seen as a latent variable. "*By reducing a data set from a group of interrelated variables into a smaller set of factors, factor analysis achieves parsimony by explaining the maximum amount of common variance in a correlation matrix using the smallest number of explanatory concepts" (Field, 2005 p. 620).*

To reduce the number of 11 weighted satisfaction variables, principle component analysis has been used as extraction method in this factor analysis. The varimax method will be used, because this type of orthogonal rotation attempts to maximise the dispersion of loadings within factors. *'Therefore, it tries to load a smaller number of variables highly onto each factor resulting in more interpretable clusters of factors"* (Field, 2005 p. 637).

Before any factors can be extracted, some preliminary analysis should be investigated (Field, 2005). The correlation matrix should be scanned for variables that do not correlate too highly (r>,9) with any other variable. The highest correlation (r = ,689) has been detected between the flexibility in the layout office floors and the ability to expand/shrink. The Determinant (,021) of this Correlation Matrix is bigger than ,00001, so multicollinearity will not be a problem in this analysis. Furthermore, the Kaiser-Meyer-Olkin measure must be greater than ,5 as a bare minimum, which is the case in this factor analysis (KMO = ,729). A value closer to one suggests that the patterns of correlations are relatively compact so that factor analysis should yield distinct and reliable factors. The last preliminary analysis is the Bartlett's Test of Sphericity with null-hypothesis: the original correlation matrix is proportional to an identity matrix. In an identity matrix the off-diagonal correlations are zero, indicating that there are no relationships between the variables. Fortunately, the null-hypothesis can be rejected (with sig. = ,000), so factor analysis is appropriate, since there are some significant relationships between the variables.

The principle component analysis results in as many factors as variables, but not all factors should be retained in the factor analysis. To decide how many factors to extract from the analysis, the criterion of Kaiser is used (Field, 2005). He recommends that all factors with eigenvalues greater than 1 should be retained in the analysis. The eigenvalue represent the amount of variation explained by a factor and a eigenvalue of 1 represents a substantial amount of variation according to Kaiser. Another way to decide how many factors should be extracted is to look at the scree plot: the cut-off point for the selection of factors should be at the point of inflexion of the curve. In this factor analysis is can be concluded that three factors should be

extracted, because their eigenvalues are greater than 1 and the point of inflexion is at factor number 3 in the scree plot as well (appendix x). The factor loadings of the three factors are illustrated in 6.6. According to Stevens (1992) only factor loadings with an absolute value greater than ,4 should be interpreted. These loadings explain at least 16% (squaring the factor loading) of the variance in the factor and is therefore of substantive importance.

Table 6.6 Rotated Component Matrix[a] of Weighted Satisfaction variables

	Component		
	1	2	3
Accessibility by car	**,646**	,304	-,083
Accessibility by public transport	,200	,102	**,782**
Parking facilities	**,692**	-,005	,126
Facilities in the surrounding area	-,059	-,016	**,865**
Proximity to other offices	,190	,261	**,638**
Image of the surrounding area	-,047	**,723**	**,434**
Cost of accommodation	**,714**	-,026	,133
Flexibility layout office floors	**,702**	,284	,147
Ability to expand/shrink	**,704**	,323	,046
Architecture of the exterior	,215	**,858**	,104
Recognisability of the user at the exterior	,324	**,731**	-,004

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

From table 6.6 it can be concluded that the factor loadings that are of substantive importance to component 1, all have to do with the “functionality” of an office location. Accessibility by car, parking facilities, the costs, a flexible layout in the office floors and the ability to expand/shrink all directly contribute to the functioning of the core business activities of the firm. Therefore, the first component can be seen as a hard factor. The second component is mainly composed by the image of the surrounding area, the architecture of the building and the recognisability of the user at the exterior. These three soft variables all relate to the “representativeness” of an office location. The last component that was extracted in this factor analysis can be seen as a variable that measures the “urbanity” of an office location. Like earlier mentioned in this thesis a (multifunctional) urban area has several characteristics and it distinguishes itself among others with good accessibility by public transport, many facilities in the surrounding area and proximity to other offices. The image of the surrounding area also explains almost 19% of the variance in this factor. This last component consists of hard and soft factors.

The three components of the previous factor analysis are put into a regression model to predict the overall satisfaction of the respondents. Unfortunately, the survey did not ask for a satisfaction level for the overall office location. Therefore, the satisfaction levels of the environment and building should be combined. The ratio between these satisfaction levels is

based on the average importance of the building characteristics and environment characteristics. The mean for the importance of the environment characteristics is 7,0525 and for the building 7,4391. This results in almost equal ratio of 1:1,055.

The effect of the four earlier used CV's is investigated first. From table 6,7 it can be concluded that the coefficient of "Size" (model 3a) does not significantly differ from zero. The coefficient itself is ,000 and the P-value is ,873, so this CV is excluded in the remaining models with "Overall satisfaction" as DV. A hierarchical method is used where "Representativeness" is put into the model first, because the variables that comprise this factor came forward as good predictors in the previous two regression models: "Image/state surrounding area" and "Architecture of the exterior". The correlation coefficients between the components are all ,000, albeit not significant. Hence, there is no multicollinearity, since the components are measuring different things. The assumption that the errors are independent is met, since the Durbin-Watson statistic is 1,625.

Table 6.7 Regression model with "Overall satisfaction" as DV

	Model 3a	Model 3b	Model 3c	Model 3d	Model 3e
Constant	6,777****	6,723****	7,015****	7,174****	7,152****
Size	,000	-	-	-	-
Expected growth	,028	,040	,013	,014	,016
PB vs. APS	,602**	,583**	,385	,312	,288
Centre vs. non-centre	,243	,267	,167	-,044	-,014
Representativeness	-	-	,554****	,564****	,565****
Functionality	-	-	-	,318***	,314***
Urbanity	-	-	-	-	,037
F test	1,448	1,951	8,362****	9,050****	7,477****
R-square change	,065	,062	,215****	,067***	,001
Adjusted R-square	,020	,030	,244	,307	,299
Observation #	88	92	92	92	92

** p<0.1, ** p<0.05, *** p<0.01, **** p<0.001*

From table 6.7 it becomes clear that the third component "Urbanity", is not making a significant contribution in predicting the overall satisfaction of maritime office users. The change in R-square when "Urbanity" is added to the model is also not significant. Independent variable "Representativeness" explains 21,5% more of the variance in DV, than the three control variables in model 3b. Model 3d explains the highest variance in "Overall satisfaction", with "Representativeness" and "Functionality" as significant predictors. The coefficients are both positive, indicating a positive relationship between the predictor and the outcome. If the satisfaction of the representativeness variables increases with one unit, then the overall satisfaction increases with ,564 on a scale from 1 to 10. When the respondents score 1 unit higher on the functionality variables, then it results in a ,318 increase in overall satisfaction. These interpretations are only true if the effect of the other predictors is held constant. In model

3d the standardised beta of “Representativeness” (,483) is higher than the beta of “Functionality” (,254), which implies a greater importance of the first component in predicting the overall satisfaction level than the latter component.

The last hypothesis in this research: *Soft factors have a greater influence on the satisfaction level of the current office accommodation of maritime office users, than hard factors,* was tested with three regression models. From the first model, it can be concluded that both the “Image/state of the surrounding area” and “Accessibility by car” have a significant positive contribution in predicting the satisfaction level of the environment. However, the image as soft factor is of greater importance in predicting the DV, than the accessibility by car, which can be merely seen as a hard factor. The satisfaction level of the building, which was used as DV in the second regression model, was only significantly influenced by “Architecture of the exterior”. Again, a soft factor has the greatest influence on the satisfaction level. The results from the last regression model can also accept the hypothesis that soft factors have a greater influence on the satisfaction level, than hard factors. From this model, it came forward that “Representativeness” is of greater importance in predicting the overall satisfaction level than “Functionality”. The first component mainly consists of soft factors, whereas the latter component consists mainly of hard factors.

6.5 Discussion

The highest adjusted R-square that was obtained with the regression analyses was ,307; only 30,7% of the variance of the dependent variable was explained by the predictors. This explanatory power should not be perceived as relatively low, since many (location) factors are involved in the locational choice and preference of office users. These factors will all contribute a little bit in the satisfaction level of the current office accommodation. In this research only a small number of all possible location factors are investigated, and still circa 30% of the variance in DV could be explained.

From paragraph 6.2 it came forward that the cost of accommodation and accessibility (especially by car) are considered one of the most important location factors for maritime office users in the Rotterdam region. The ability to expand (or even shrink in this economic crisis) as well as a flexible layout in the office floors are also considered as the most important factors. These location factors can be perceived as hard factors, since they are relatively objective and directly contribute to the functioning of the firms’ business activities. On the contrary, the satisfaction level of maritime office users with regard to their current office accommodation is merely influenced by soft factors, which came forward in the regression analyses in paragraph

6.4. One might expect that the satisfaction levels of the most important factors would also have the most decisive power in the level of overall satisfaction, but this is clearly not the case.
An explanation for this striking phenomenon could be that maritime office users perceive the hard factors as the preconditions of an office location. These factors should be met in order to be satisfied with the overall business location. However, higher satisfaction levels of these individual hard factors (expressed in the component “Functionality”) result in a relatively lower impact of the overall satisfaction, than higher satisfaction levels of the soft factors (as expressed in “Representativeness”). This theory, that hard factors are perceived by maritime office users as the preconditions of an office location should, of course, be still investigated in practice.

Furthermore, the variables that are considered the most important by maritime office users can be perceived as pull factors. These factors will attract maritime office users to a particular office accommodation in the first place. Dissatisfaction about the soft factors could induce the firms to search for a different office accommodation. These reasons to leave the current accommodation can be perceived as push factors.

7 CONCLUSIONS AND RECOMMENDATIONS

The main purpose of this research was to investigate the economic geography of maritime office users in the Rotterdam region. For Stadsontwikkeling Gemeente Rotterdam this information is useful for their policies to provide suitable office space for (international) firms in the industrial-, logistical-, transport- and other port related sectors. Suitable office accommodations for these firms is vital for the improvement of the economic synergy between the port and the city of Rotterdam. The research question central in this thesis, was formulated as follows:

> *"What location factors are important for office users in the Rotterdam port- and industry complex and which factors influence the satisfaction level of their current office accommodation?"*

First, some conclusions are provided that relate to the first part of the research question: "*What location factors are important for office users in the Rotterdam port- and industry complex...?"* With this research, the experiences of the real estate experts with maritime office users in the Rotterdam region can be confirmed: accessibility by car is perceived more important than accessibility by public transport, and the cost of accommodation is perceived more important than the quality of the building. In this research the quality of the building is measured with three variables, under the assumption that these factors drive up the cost of accommodation: architecture and charisma of the exterior; recognisability of the user at the exterior, and flexibility in the layout office floors.

From the desk research it came forward that almost 80% of the APS firms is located at the north bank and especially in Rotterdam Centre. From the results of the survey it can be concluded that APS office users consider a location in a multifunctional urban area significantly more important than the other maritime office users with respect to the level of importance of facilities in the surrounding area, proximity to other offices and accessibility by public transport. The two sectors – Advanced Producer Services and Port Business – scored the same on accessibility by car and parking facilities. Apparently, public transport does not completely replace the car as transport mode for APS firms. Another conclusion about APS firms is that the more port-related the firm (i.e. the higher the turnover that can be ascribed to clients in the port sector), the more important the proximity to these port clients.

The second part of the research question: "*...and which factors influence the satisfaction level of their current office accommodation?"* was investigated by analysing three regression models. The weighted satisfaction levels of the location factors were used in these linear models, since it

was necessary to correct the satisfaction level with the assigned importance levels by the respondents. The first model concluded that the satisfaction level of the environment is significantly influenced by the image of the surrounding area and the accessibility by car. The positive contribution of the first variable is of greater importance than the positive contribution of the latter variable. In the second model it came forward that the architecture of the exterior building is the only independent variable that has a significant positive contribution in predicting the satisfaction level of the building perceived by maritime office users. The third regression model in which the second part of the research question was investigated, concluded that the "Representativeness" component has a greater positive influence on the overall satisfaction level than the "Functionality" component. In short, it can be concluded that the satisfaction level of the current office accommodation of maritime office users in the Rotterdam region is more influenced by the soft factors used in this research, than the hard factors.

Some (possible) differences in the weighted satisfaction levels of the environment characteristics between the various regions was investigated, since these insights could be useful for Stadsontwikkeling Gemeente Rotterdam. It can be concluded that the 7 regions in Rotterdam do not significantly differ from each other with respect to their overall environment satisfaction. However, the maritime office users are in Rotterdam Centre more satisfied with the following two location factors than the maritime office users in the non-centre regions: accessibility by public transport and the facilities in the surrounding area. On the contrary, in Rotterdam Centre, they are less satisfied with the accessibility by car and parking facilities.

In order for Stadsontwikkeling Gemeente Rotterdam to attract maritime office users to the city of Rotterdam, the focus should be more on the hard factors, such as possible problems with accessibility and parking. These location factors relate to the office environment and could be perceived by maritime office users as the preconditions of an office location (albeit not directly tested in this research). If these hard factors do not meet a certain standard, maritime office users will not even take these locations into consideration. The focus should lie more on soft factors of an office accommodation in order to retain the 290 maritime office users currently located in the Rotterdam region. Stadsontwikkeling should translate this into a policy in which the image of certain regions in Rotterdam can be enhanced. Especially, in the Waalhaven/Eemhaven district a most frequently mentioned bottleneck is the poor image of the area. Further research should investigate if this poor image is a result of a feeling of insecurity, poor appearance of the public space, or other causes.

Another frequently mentioned bottleneck by the maritime office users in whole Rotterdam is delays due to congestion. The widening of highway A15 on the south bank and the construction of highway A4 between Delft and Schiedam on the north bank could provide some solace in the flow of traffic. However, if these measures are not sufficient, the municipality should consider to

improve public transport even though this transport mode plays (currently) a subordinate role for maritime office users. In a globalised world where mobility is critical, one can expect that public transport will even become more efficient for port related firms. Especially in Waalhaven/Eemhaven – a popular district to locate among maritime office users – the poor public transport connections and frequency will need to be addressed in the policies of Stadsontwikkeling Gemeente Rotterdam, to remain popular in the future.

Overall, the conclusions of this research are not very disturbing news for Stadsontwikkeling Gemeente Rotterdam; the maritime office users in the Rotterdam region are quite satisfied with their current office building and environment.

8 LIMITATIONS

Every scientific research has some limitations which should be kept in mind while interpreting the results. A first limitation of this research relates to the desk research. A lot of firms in the Port Business sector are not located in an office, but on an “industrial” or “wet” site instead. This deficiency was tackled with data of the centre for research and statistics (COS) in Rotterdam. This institution possesses data about every real estate object in the city of Rotterdam. Based on the intended purpose of each real estate object when it was build, the offices could be distinguished. However, the intended purpose when it was build does not necessarily has to be same as the current use of the real estate object. Therefore, it can be expected that some office users active in the Rotterdam port- and industry complex are still missing in this research.

The other limitations of this research all relate to the field research. This thesis focused on location factors that could be of importance for the locational decision of maritime office users. However, there was no substance given for each individual location factors. Every person could have its own definition of the “image” of an area for instance. Therefore, I highly recommend for further research to let the respondents denote what they perceive with each individual location factor and to what standards it must meet. Another limitation is that the survey used in this research did not ask for a satisfaction level for the overall office location. The overall satisfaction was now computed with an almost equal proportion of building and environment satisfaction. In practice, one of the satisfaction levels could be of more decisive power in the overall satisfaction level. The last limitation in this research is that the four control variables seem to have not much decisive power on the overall satisfaction levels. Perhaps, other variables should have been used to control for the effect of the independent variables on the outcome. One can think of the following control variables: turnover of the firms; the duration at the current office accommodation; the life cycle of the firm; headquarter vs. regional office, or the country of origin of the parent company.

Moreover, a study into the maritime office users that moved at least once between 2001 and 2011 can provide more insights into the type of location factor: push, pull of keep. The theory that hard factors are perceived as the preconditions of an office accommodation, could consequently be investigated as well. Furthermore, it will be very interesting to investigate the policies of the municipality of Rotterdam, that relate to the provision of office space, of the past years. This research can provide insights into the influence of these policies on the economic geography of maritime office users. Comparisons with other policies in Dutch or even foreign cities will also be worth knowing.

This research could be further expanded by broadening its geographical scope. Many maritime office users are located in The Hague, Amsterdam and the Drechtsteden for instance. An international comparison between other port cities, such as Hamburg, London or even Shanghai could also provide some interesting conclusions. By broadening the geographical scope, more relevant location factors could be investigated. Especially some location factors that came forward in the institutional location theory will be very interesting to investigate, since it can be expected that these factors differ between regions and countries.

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Interviewees

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Dhr. drs. M. Gommers, partner, *DTZ Zadelhoff v.o.f.*, Rotterdam, 18-1-2012

Dhr. M.E.B.M. Schaub, director, *Schaub & Partners Bedrijfshuisvesting*, Rotterdam, 22-2-2012

APPENDICES

Appendix i Defining an office

Van Dale: *Kantoor*
kan·toor het; o -toren 1 schrijf- of werkkamer 2 bureau ve notaris, advocaat enz. 3 bedrijfsgebouw ve dienstverlenend bedrijf

Cambridge dictionary[18]: *Office*
a room or part of a building in which people work, especially sitting at tables with computers, telephones, etc., usually as a part of a business or other organization

The abovementioned definitions has led to the following definition used in this thesis:
"An office is a physical space mainly used for desk activities. Office space that is physically situated at another business site – that cannot be defined as office space – and in which this business site facilitates the primary income of the firm are not attributed to office space".

[18] Cambridge dictionary: http://dictionary.cambridge.org/ [accessed 13 March 2012]

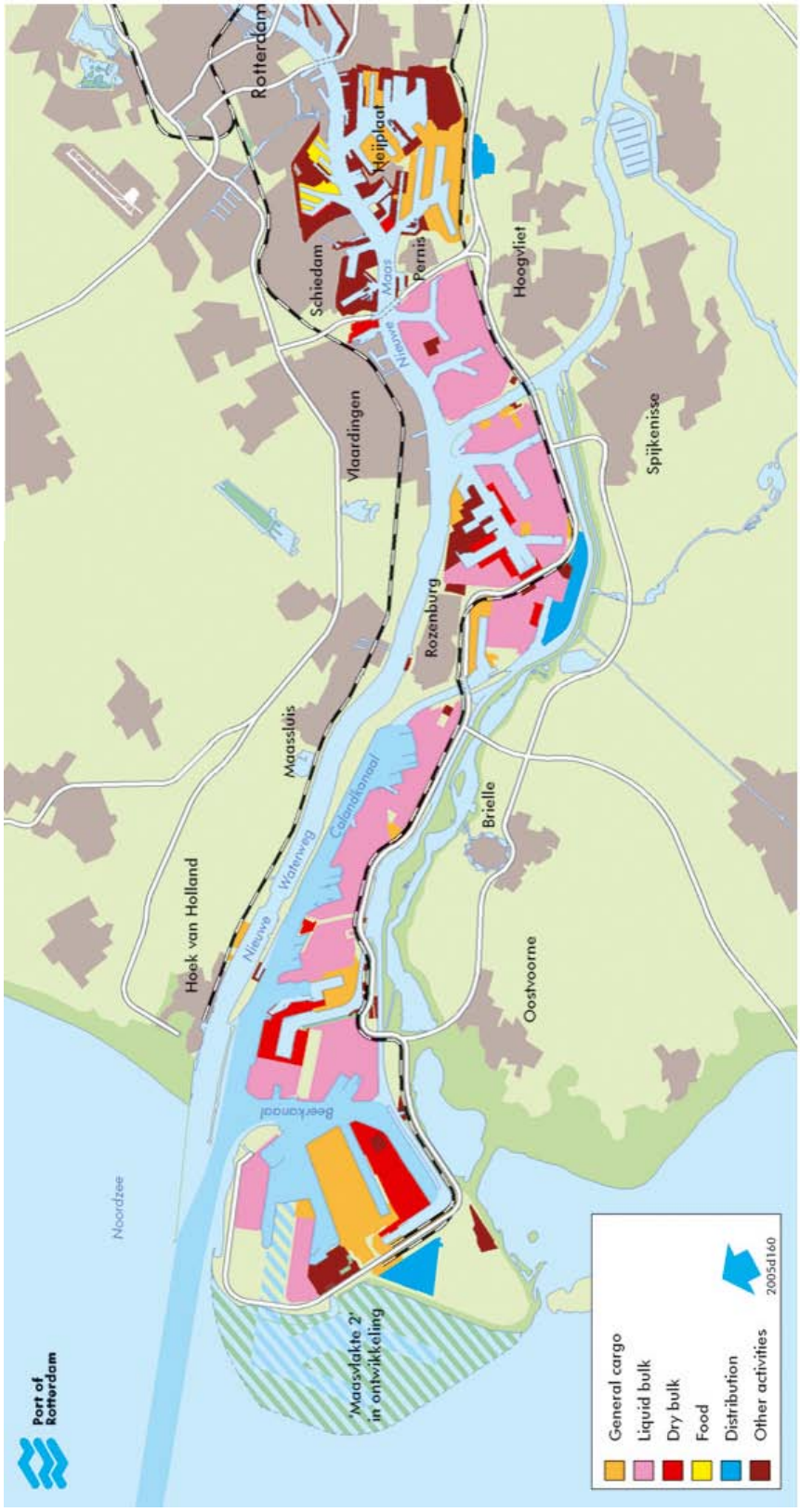
Appendix ii Location factors

1. Building	
Functional	Gross/net floor space
	Possibilities for expansion
Exterior	Building type
	Prestige/status/representatively/charisma/architecture/recognisabilty building
	Quality of the building
	Visibility
	Single use / multi use
Interior	Internal logistical structure
	Layout office floors
	Flexible use of office space
	Interior appearance
Accessibility	Parking facilities
	Accessibility (micro-level)
Ownership	Ownership position
Facilities	Facilities for automation
	Climate control
	Lightning
	Facilities for antinoise
2. Direct surrounding	
Attractiveness	Attractive / lively surrounding
	Quality of the surrounding
Safety	Safety
	Criminality
	Vandalism
Restraints	e.g. noise, fire, stink
3. Location – proximity	
Conduct of business	Proximity of clients
	Proximity of suppliers
	Nearby other business units
	Proximity of core activity business
	Competitive considerations
Agglomeration	Proximity of related businesses
	Proximity of supportive business services
	Proximity of institutions
Facilities	Nearby shopping facilities
	Nearby cafes and restaurants
	Nearby sports activities
	Nearby cultural activities
	Nearby recreational activities
	Nearby urban facilities
4. Location – accessibility	
Accessibility	Accessibility by car
	Accessibility by public transport
	Accessibility by train
	Accessibility regional and local public transport
	Accessibility airport
	Accessibility by other transport modes (foot, bicycle)
Digital accessibility	Digital accessibility (capacity, speed, etc)
Travel time	Travel time of the employees
5. Socio-economic surrounding	
Size and dynamics	Size region

	Economic development
	Unemployment
	Production structure
	Knowledge structure
	Availability of qualified employees
Orientation and reputation	Mentality of the population
	International orientation of the region
	Reputation of the region
6. Residential and living environment	
Residence and living	Supply of residences
	Cost of living
	Safety
Facilities	Education facilities (families)
	Education facilities (training employees)
	Shopping facilities
	Sport/recreation/leisure
	Cultural facilities
	Religious facilities
	Medical facilities
	Other public facilities
	Parks and other green areas
Attractiveness	Beautiful landscape
	General visual attractiveness / interesting architecture
7. Financial	
Building costs	Rent / purchase price
	Adaptation possibilities rent price
	Variable costs (service, energy, maintenance)
	Land price
	Construction costs
Restraints	Duration rent contract
	Restraints / stipulations rent contract
Labour costs	Labour costs
Willingness to invest	Presence of investors
Charges and premiums	Charges on accessibility (road tax, parking, etc)
	Taxes
	Premiums and subsidies
	Pricing of water, gas, electricity, etc
8. Government	
Cooperation	Direct measures of the government
	Approachability, strength and reliability
	Quality of the information
	Building regulations and permits
9. Subjectivity	
Emotional ties	Emotional ties with the region
Personal	Personal motives
10. Supply side	
Supply	Supply that matches the desires and demands of the prospective users

Source: Jansen (2009)

Appendix iii Port of Rotterdam map



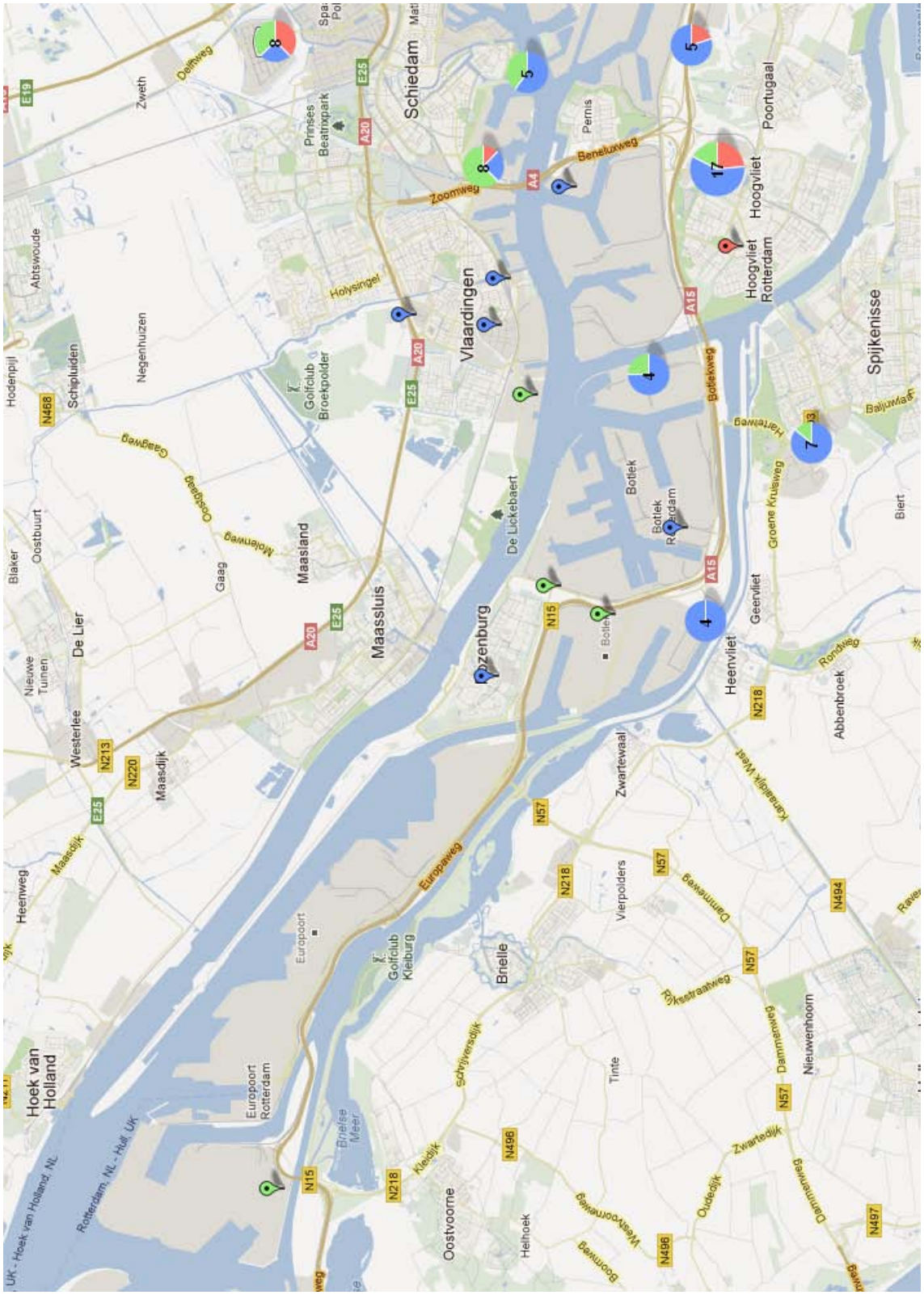
Source: Port of Rotterdam: www.portofrotterdam.com [accessed on 16 February 2012]

Appendix iv SBI codes port- and industry complex

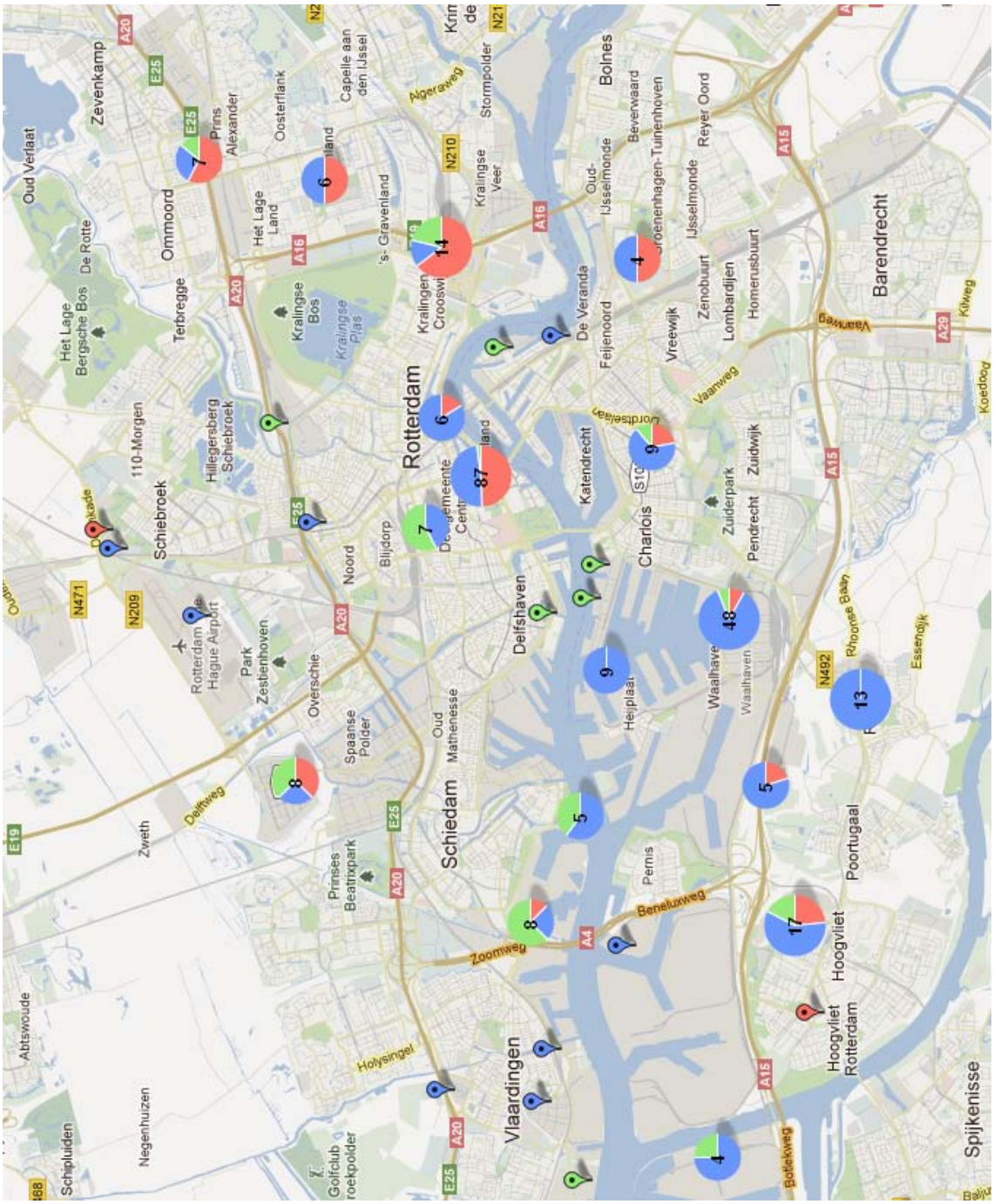
SBI codes 2008	Description
03	Fishing and aquaculture
06	Extraction of crude petroleum and natural gas
08	Mining and quarrying (no oil and gas)
09	Mining support activities
10	Manufacture of food products
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computers, electronic and optical products
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
35	Electricity, gas, steam and air conditioning supply
38	Waste collection, treatment and disposal activities; materials recovery
42	Civil engineering
4920	Freight rail transport
4941	Freight transport by road (no removal services)
4950	Transport via pipeline
5010	Sea and coastal passenger water transport and ferry-services
5020	Sea and coastal water transport (cargo and tank ships, tug boats)
5030	Inland passenger water transport and ferry-services
5040	Inland freight water transport
5210	Warehousing and storage
5222	Support activities for water transport
5224	Cargo handling
5229	Forwarding agencies, ship brokers and charterers; weighing and measuring
62	Support activities in the field of information technology
63	Information service activities
64	Financial institutions, except insurance and pension funding
65	Insurance and pension funding (no compulsory social security)
66	Other financial services
69	Legal services, accounting, tax consultancy, administration
71	Architects, engineers and technical design and consultancy; testing and analysis
72	Research and development
73	Advertising and market research
74	Industrial design, photography, translation and other consultancy
77	Renting and leasing of motor vehicles, consumer goods, machines and other tangible goods
80	Security and investigation
81	Facility management
82	Other business services
84	Public administration, public services and compulsory social security
94	World view and political organizations, interest and ideological organizations, hobby clubs

Source: Kamer van Koophandel Nederland (2012), SBI-codering 2008 met Engelse vertaling

Appendix v Map of maritime office users



1/2



Source: revision of www.batchgeo.com *2/2*

Advanced Producer Services

Global Hub

Industrial Cluster

Appendix vi Analysis total data

Distribution of sectors over north and south bank

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sectors (3) * North or south bank	290	100,0%	0	,0%	290	100,0%

Sectors (3) * North or south bank Crosstabulation

			North or south bank		
			North	South	Total
Sectors (3)	Advanced Producer Services	Count	63	17	80
		% within Sectors (3)	78,8%	21,3%	100,0%
		% within North or south bank	42,3%	12,1%	27,6%
	Global Hub	Count	63	109	172
		% within Sectors (3)	36,6%	63,4%	100,0%
		% within North or south bank	42,3%	77,3%	59,3%
	Industrial Cluster	Count	23	15	38
		% within Sectors (3)	60,5%	39,5%	100,0%
		% within North or south bank	15,4%	10,6%	13,1%
Total		Count	149	141	290
		% within Sectors (3)	51,4%	48,6%	100,0%
		% within North or south bank	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40,246[a]	2	,000
Likelihood Ratio	42,073	2	,000
Linear-by-Linear Association	12,095	1	,001
N of Valid Cases	290		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 18,48.

Distribution of firms over districts in the Rotterdam region

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Regions * Branche	290	100,0%	0	0,0%	290	100,0%

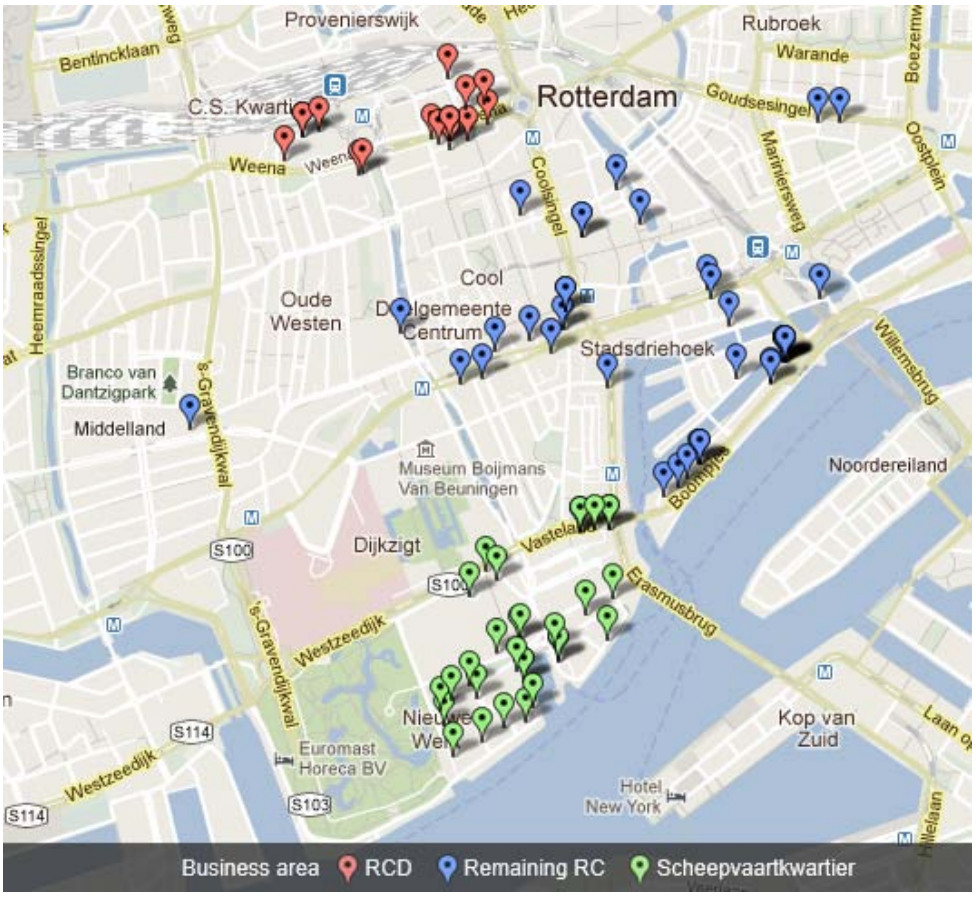
Regions * Branche Crosstabulation

			Branche			Total
			Advanced Producer Services	Global Hub	Industrial Cluster	
Regions	Rotterdam Centre	Count	38	43	6	87
		% within Regions	43,7%	49,4%	6,9%	100,0%
		% within Branche	47,5%	25,0%	15,8%	30,0%
		% of Total	13,1%	14,8%	2,1%	30,0%
	Waalhaven/Eemhaven	Count	4	55	5	64
		% within Regions	6,2%	85,9%	7,8%	100,0%
		% within Branche	5,0%	32,0%	13,2%	22,1%
		% of Total	1,4%	19,0%	1,7%	22,1%
	South of the ring[a]	Count	6	29	5	40
		% within Regions	15,0%	72,5%	12,5%	100,0%
		% within Branche	7,5%	16,9%	13,2%	13,8%
		% of Total	2,1%	10,0%	1,7%	13,8%
	North of the ring[b]	Count	13	11	4	28
		% within Regions	46,4%	39,3%	14,3%	100,0%
		% within Branche	16,2%	6,4%	10,5%	9,7%
		% of Total	4,5%	3,8%	1,4%	9,7%
	Port area[c]	Count	2	15	14	31
		% within Regions	6,5%	48,4%	45,2%	100,0%
		% within Branche	2,5%	8,7%	36,8%	10,7%
		% of Total	0,7%	5,2%	4,8%	10,7%
	South[d]	Count	6	15	2	23
		% within Regions	26,1%	65,2%	8,7%	100,0%
		% within Branche	7,5%	8,7%	5,3%	7,9%
		% of Total	2,1%	5,2%	0,7%	7,9%
	North[e]	Count	11	4	2	17
		% within Regions	64,7%	23,5%	11,8%	100,0%
		% within Branche	13,8%	2,3%	5,3%	5,9%
		% of Total	3,8%	1,4%	0,7%	5,9%
Total		Count	80	172	38	290
		% within Regions	27,6%	59,3%	13,1%	100,0%
		% within Branche	100,0%	100,0%	100,0%	100,0%
		% of Total	27,6%	59,3%	13,1%	100,0%

- *Albrandswaard, Hoogvliet, Spijkenisse,*
- *Capelle a/d IJssel, Hillegersberg/Schiebroek, Overschie, Prins Alexander, Spaanse Polder*
- *Botlek, Delfshaven (1 office), Europoort, Pernis, Vondelingenplaat, Schiedam, Vlaardingen*
- *Charlois,Feijenoord, IJsselmonde*
- *Delfshaven, Kralingen/Crooswijk, Noord, Vlaardingen (1 office)*

Appendix vii Maps of two districts

Rotterdam Centre



Waalhaven/Eemhaven

Gemeente Rotterdam
Stadsontwikkeling

Ideal business location

Investigation into maritime office users

This survey comprises of 4 pages (including this one).

Because the survey is provided with a number, the current business location of your company can be identified. This has minimized the amount of questions for you. Therefore, filling in the survey takes only five minutes. All data will be processed anonymously.

I would kindly ask you to fill in this survey and return it with enclosed envelope before March 16.

For further inquiries please contact:

Willemien van der Windt
email: 313457ww@eur.nl
tel.: +31 (0)10 2052796 / +31 (0)6 11299009

Thank you beforehand!

The blue questions are only for APS firms

1 Please indicate on a scale from 1 to 10, how much you agree with each of the following statements, where 1 corresponds with strongly disagree and 10 strongly agree: (circle the correct number)

	Strongly disagree									*Strongly agree*
My business location will grow the coming three years	1	2	3	4	5	6	7	8	9	10
The place of residence of my employees plays an important role in the location decision of my company	1	2	3	4	5	6	7	8	9	10

2 Global Hub and Industrial Cluster

What percentage of your workforce at this business location is involved with office committed activities? (mark the best suitable answer)

0 0 %
0 25 %
0 50 %
0 75 %
0 100 %

2 APS

What percentage of the turnover can you approximately ascribe to clients in the port sector?

0 0 – 25 %
0 25 – 50 %
0 50 – 75 %
0 75 – 100 %

3 Please indicate on a scale from 1 tot 10 how important each of the following characteristics are, where 1 corresponds with very unimportant and 10 very important: (circle the correct number)

Environment:	*Very unimportant*									*Very important*
Accessibility by car	1	2	3	4	5	6	7	8	9	10
Accessibility by public transport	1	2	3	4	5	6	7	8	9	10
Parking facilities	1	2	3	4	5	6	7	8	9	10
Facilities in the surrounding area (shops, restaurants, parks, etc.)	1	2	3	4	5	6	7	8	9	10
Proximity to other offices	1	2	3	4	5	6	7	8	9	10
Location at the water	1	2	3	4	5	6	7	8	9	10
Image / state of the surrounding area	1	2	3	4	5	6	7	8	9	10
Proximity to clients in the port sector	1	2	3	4	5	6	7	8	9	10

Building:	*Very unimportant*									*Very important*
Cost of accommodation	1	2	3	4	5	6	7	8	9	10
Flexibility in the layout office floors	1	2	3	4	5	6	7	8	9	10
Opportunities for expansion / shrinkage	1	2	3	4	5	6	7	8	9	10
Architecture and charisma of the exterior	1	2	3	4	5	6	7	8	9	10
Recognisability of the user at the exterior (logos, signs, single tenant)	1	2	3	4	5	6	7	8	9	10

4 Please indicate on a scale from 1 tot 10 how satisfied you are with each of the following characteristics with respect to your current business location, where 1 corresponds with very unsatisfied and 10 very satisfied: (circle the correct number)

Environment:	*Very unsatisfied*									*Very satisfied*
Accessibility by car	1	2	3	4	5	6	7	8	9	10
Accessibility by public transport	1	2	3	4	5	6	7	8	9	10
Parking facilities	1	2	3	4	5	6	7	8	9	10
Facilities in the surrounding area (shops, restaurants, parks, etc.)	1	2	3	4	5	6	7	8	9	10
Proximity to other offices	1	2	3	4	5	6	7	8	9	10
Image / state of the surrounding area	1	2	3	4	5	6	7	8	9	10
Proximity to clients in the port sector	1	2	3	4	5	6	7	8	9	10

Building:	*Very unsatisfied*									*Very satisfied*
Cost of accommodation	1	2	3	4	5	6	7	8	9	10
Flexibility in the layout office floors	1	2	3	4	5	6	7	8	9	10
Opportunities for expansion / shrinkage	1	2	3	4	5	6	7	8	9	10
Interior appearance	1	2	3	4	5	6	7	8	9	10
Architecture and charisma of the exterior	1	2	3	4	5	6	7	8	9	10
Technical state of the building	1	2	3	4	5	6	7	8	9	10
Recognisability of the user at the exterior (logos, signs, single tenant)	1	2	3	4	5	6	7	8	9	10

5a Please rate your current business environment and building from 1 tot 10, where 1 corresponds with the lowest rate and 10 the highest: (circle the correct number)

Environment:	1	2	3	4	5	6	7	8	9	10
Building	1	2	3	4	5	6	7	8	9	10

5b Which rate would your workforce give on average? (circle the correct number)

Environment:	1	2	3	4	5	6	7	8	9	10
Building	1	2	3	4	5	6	7	8	9	10

6 Would you recommend your current business location to a good friendly entrepreneur?
0 yes 0 no

7a My business location is own property:
0 yes → *continue with question 8*
0 no
7b When my rent contract expires my business location will move to another location:
0 yes 0 n0
7c What is the remaining duration of your rent contract?
…….year

8 Lastly, you can define the bottlenecks you encounter with regard to your current business location
Environment:…….
……..…….
……..…….
……..…….
……..…….

Building:…….
……..…….
……..…….
……..…….
……..…….

Interested in the research results?

If you want the research results to be forwarded to you, please fill in your e-mail address below.

E-mail address:……

Are you willing to participate in further research via a personal interview?
0 yes
0 no

Appendix ixShapiro-Wilk test statistics

Statistics

	N		Mean	Median	Std. Deviation
	Valid	Missing			
Imp. of accessibility by car	92	0	8,25	8,00	1,272
Imp. of accessibility by public transport	92	0	7,68	8,00	1,892
Imp. of parking facilities	92	0	8,09	8,00	1,457
Imp. of facilities in the surrounding area	92	0	5,80	6,00	2,018
Imp. of proximity to other offices	92	0	5,30	5,00	2,137
Imp. of proximity to clients in the port sector	31	61	6,10	6,00	2,271
Imp. of location at the water	92	0	4,72	5,00	2,914
Imp. of image/state of the surrounding area	92	0	7,18	7,00	1,596
Imp. of cost of accomodation	92	0	7,90	8,00	1,399
Imp. of flexibility in the layout office floors	92	0	7,55	8,00	1,633
Imp. of opportunities for expansion/shrinkage	92	0	7,65	8,00	1,394
Imp. of architecture and charisma of the exterior	92	0	7,05	7,00	1,613
Imp. of recognisability of the user at exterior	92	0	7,03	7,00	2,109
Sat. of accessibility by car	92	0	7,68	8,00	1,497
Sat. of accessibility by public transport	92	0	7,01	8,00	2,221
Sat. of parking facilities	92	0	7,16	8,00	2,066
Sat. of facilities in the surrounding area	92	0	6,34	7,00	2,034
Sat. of proximity to other offices	92	0	6,78	7,00	1,568
Sat. of proximity to clients in the port sector	32	60	6,44	7,00	1,585
Sat. of image/state of the surrounding area	92	0	7,03	7,00	1,640
Sat. of cost of accomodation	92	0	6,41	7,00	1,780
Sat. of flexibility in the layout office floors	92	0	6,85	7,00	1,630
Sat. of opportunities for expansion/shrinkage	92	0	6,48	7,00	1,860
Sat. of interior appearance	92	0	7,02	7,00	1,904
Sat. of architecture and charisma of the exterior	92	0	6,98	7,00	1,887
Sat. of technical state of the building	92	0	6,62	7,00	2,032
Sat.of recognisability of the user at the exterior	92	0	6,62	7,00	1,999
Rate for the environment	92	0	7,41	8,00	1,233
Rate for the building	92	0	7,26	8,00	1,540

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Growing the coming three years	,131	92	,001	,956	92	**,004**
Residence personnel is important	,139	92	,000	,954	92	**,003**
Imp. of accessibility by car	,226	92	,000	,892	92	**,000**
Imp. of accessibility by public transport	,229	92	,000	,861	92	**,000**
Imp. of parking facilities	,204	92	,000	,868	92	**,000**
Imp. of facilities in the surrounding area	,136	92	,000	,958	92	**,005**
Imp. of proximity to other offices	,150	92	,000	,943	92	**,001**
Imp. of location at the water	,127	92	,001	,914	92	**,000**
Imp. of image/state of the surrounding area	,204	92	,000	,905	92	**,000**
Imp. of cost of accomodation	,202	92	,000	,919	92	**,000**
Imp. of flexibility in the layout office floors	,260	92	,000	,879	92	**,000**
Imp. of opportunities for expansion/shrinkage	,240	92	,000	,911	92	**,000**
Imp. of architecture and charisma of the exterior	,193	92	,000	,912	92	**,000**
Imp. of recognisability of the user at exterior	,211	92	,000	,903	92	**,000**
Sat. of accessibility by car	,268	92	,000	,826	92	**,000**
Sat. of accessibility by public transport	,226	92	,000	,900	92	**,000**
Sat. of parking facilities	,179	92	,000	,908	92	**,000**
Sat. of facilities in the surrounding area	,171	92	,000	,934	92	**,000**
Sat. of proximity to other offices	,196	92	,000	,928	92	**,000**
Sat. of image/state of the surrounding area	,209	92	,000	,912	92	**,000**
Sat. of cost of accomodation	,194	92	,000	,914	92	**,000**
Sat. of flexibility in the layout office floors	,184	92	,000	,925	92	**,000**
Sat. of opportunities for expansion/shrinkage	,174	92	,000	,926	92	**,000**
Sat. of interior appearance	,202	92	,000	,906	92	**,000**
Sat. of architecture and charisma of the exterior	,184	92	,000	,905	92	**,000**
Sat. of technical state of the building	,165	92	,000	,932	92	**,000**
Sat.of recognisability of the user at the exterior	,162	92	,000	,944	92	**,001**
Rate for the environment	,226	92	,000	,880	92	**,000**
Rate for the building	,217	92	,000	,877	92	**,000**
Rate of personnel for the environment	,214	92	,000	,902	92	**,000**
Rate of personnel for the building	,224	92	,000	,882	92	**,000**
Imp. of proximity to clients in the port sector	,128	31	,200	,939	31	,079
Sat. of proximity to clients in the port sector	,168	31	,025	,893	31	**,005**

a. Lilliefors Significance Correction

Appendix x Output SPSS hypothesis testing

Hypothesis 1

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Imp. of accessibility by car	92	8,25	1,272	5	10
Imp. of accessibility by public transport	92	7,68	1,892	1	10

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Imp. of accessibility by public transport - Imp. of accessibility by car	Negative Ranks	32[a]	31,63	1012,00
	Positive Ranks	22[b]	21,50	473,00
	Ties	38[c]		
	Total	92		

a. Imp. of accessibility by public transport < Imp. of accessibility by car
b. Imp. of accessibility by public transport > Imp. of accessibility by car
c. Imp. of accessibility by public transport = Imp. of accessibility by car

Test Statistics[a]

	Imp. of accessibility by public transport - Imp. of accessibility by car
Z	-2,347[b]
Asymp. Sig. (2-tailed)	,019
Exact Sig. (2-tailed)	,018
Exact Sig. (1-tailed)	,009
Point Probability	,000

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Hypothesis 2

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Imp. of cost of accomodation	92	7,90	1,399	5	10
Imp. of architecture and charisma of the exterior	92	7,05	1,613	1	10
Imp. of recognisability of the user at exterior	92	7,03	2,109	1	10
Imp. of flexibility in the layout office floors	92	7,55	1,633	1	10

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Imp. of architecture and charisma of the exterior - Imp. of cost of accomodation	Negative Ranks	47[a]	36,51	1716,00
	Positive Ranks	19[b]	26,05	495,00
	Ties	26[c]		
	Total	92		
Imp. of recognisability of the user at exterior - Imp. of cost of accomodation	Negative Ranks	39[d]	34,32	1338,50
	Positive Ranks	20[e]	21,58	431,50
	Ties	33[f]		
	Total	92		
Imp. of flexibility in the layout office floors - Imp. of cost of accomodation	Negative Ranks	33[g]	31,11	1026,50
	Positive Ranks	23[h]	24,76	569,50
	Ties	36[i]		
	Total	92		

a. Imp. of architecture and charisma of the exterior < Imp. of cost of accomodation
b. Imp. of architecture and charisma of the exterior > Imp. of cost of accomodation
c. Imp. of architecture and charisma of the exterior = Imp. of cost of accomodation
d. Imp. of recognisability of the user at exterior < Imp. of cost of accomodation
e. Imp. of recognisability of the user at exterior > Imp. of cost of accomodation
f. Imp. of recognisability of the user at exterior = Imp. of cost of accomodation
g. Imp. of flexibility in the layout office floors < Imp. of cost of accomodation
h. Imp. of flexibility in the layout office floors > Imp. of cost of accomodation
i. Imp. of flexibility in the layout office floors = Imp. of cost of accomodation

Test Statistics[a]

	Imp. of architecture and charisma of the exterior - Imp. of cost of accomodation	Imp. of recognisability of the user at exterior - Imp. of cost of accomodation	Imp. of flexibility in the layout office floors - Imp. of cost of accomodation
Z	-3,941[b]	-3,477[b]	-1,897[b]
Asymp. Sig. (2-tailed)	,000	,001	,058
Exact Sig. (2-tailed)	,000	,000	,058
Exact Sig. (1-tailed)	,000	,000	,029
Point Probability	,000	,000	,000

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Hypothesis 3

Mann-Whitney Test

Ranks

	APS or Port	N	Mean Rank	Sum of Ranks
Imp. of accessibility by car	Advanced Producer Services	31	43,45	1347,00
	Port Business	61	48,05	2931,00
	Total	92		
Imp. of accessibility by public transport	Advanced Producer Services	31	52,37	1623,50
	Port Business	61	43,52	2654,50
	Total	92		
Imp. of parking facilities	Advanced Producer Services	31	45,60	1413,50
	Port Business	61	46,96	2864,50
	Total	92		
Imp. of facilities in the surrounding area	Advanced Producer Services	31	54,73	1696,50
	Port Business	61	42,32	2581,50
	Total	92		
Imp. of proximity to other offices	Advanced Producer Services	31	55,11	1708,50
	Port Business	61	42,12	2569,50
	Total	92		

Test Statistics[a]

	Imp. of accessibility by car	Imp. of accessibility by public transport	Imp. of parking facilities	Imp. of facilities in the surrounding area	Imp. of proximity to other offices
Mann-Whitney U	851,000	763,500	917,500	690,500	678,500
Wilcoxon W	1347,000	2654,500	1413,500	2581,500	2569,500
Z	-,815	-1,540	-,238	-2,133	-2,233
Asymp. Sig. (2-tailed)	,415	,124	,812	,033	,026
Exact Sig. (2-tailed)	,418	,125	,815	,033	,025
Exact Sig. (1-tailed)	,209	,062	,408	,016	,013
Point Probability	,001	,000	,002	,000	,000

a. Grouping Variable: APS or Port

Hypothesis 4

Correlations

			Percentage sales port clients	Imp. of proximity to clients in the port sector
Spearman's rho	Percentage sales port clients	Correlation Coefficient	1,000	,426*
		Sig. (2-tailed)	.	,017
		N	31	31
	Imp. of proximity to clients in the port sector	Correlation Coefficient	,426*	1,000
		Sig. (2-tailed)	,017	.
		N	31	31

*. Correlation is significant at the 0.05 level (2-tailed).

Hypothesis 5

Ranks

	Region	N	Mean Rank
Rate for the environment	Rotterdam Centre	31	48,21
	Waalhaven/Eemhaven	21	41,21
	North of the ring	11	47,68
	Port area	10	45,10
	North	7	44,07
	South of the ring	7	47,79
	South	5	59,90
	Total	92	

Test Statistics[a,b]

	Rate for the environment
Chi-Square	2,579
df	6
Asymp. Sig.	,860

a. Kruskal Wallis Test
b. Grouping Variable: Region

Hypothesis 6

Ranks

	Centre vs non-centre	N	Mean Rank	Sum of Ranks
WS_car	Rotterdam Centre	31	34,21	1060,50
	non-centre regions	61	52,75	3217,50
	Total	92		
WS_publictransport	Rotterdam Centre	31	60,47	1874,50
	non-centre regions	61	39,40	2403,50
	Total	92		
WS_parking	Rotterdam Centre	31	35,47	1099,50
	non-centre regions	61	52,11	3178,50
	Total	92		
WS_facilities	Rotterdam Centre	31	62,26	1930,00
	non-centre regions	61	38,49	2348,00
	Total	92		
WS_offices	Rotterdam Centre	31	44,90	1392,00
	non-centre regions	61	47,31	2886,00
	Total	92		

Test Statistics[a]

	WS_car	WS_publictransport	WS_parking	WS_facilities	WS_offices
Mann-Whitney U	564,500	512,500	603,500	457,000	896,000
Wilcoxon W	1060,500	2403,500	1099,500	2348,000	1392,000
Z	-3,173	-3,590	-2,834	-4,041	-,410
Asymp. Sig. (2-tailed)	,002	,000	,005	,000	,682
Exact Sig. (2-tailed)	,001	,000	,004	,000	,685
Exact Sig. (1-tailed)	,001	,000	,002	,000	,343
Point Probability	,000	,000	,000	,000	,002

a. Grouping Variable: Centre vs non-centre

Factor Analysis

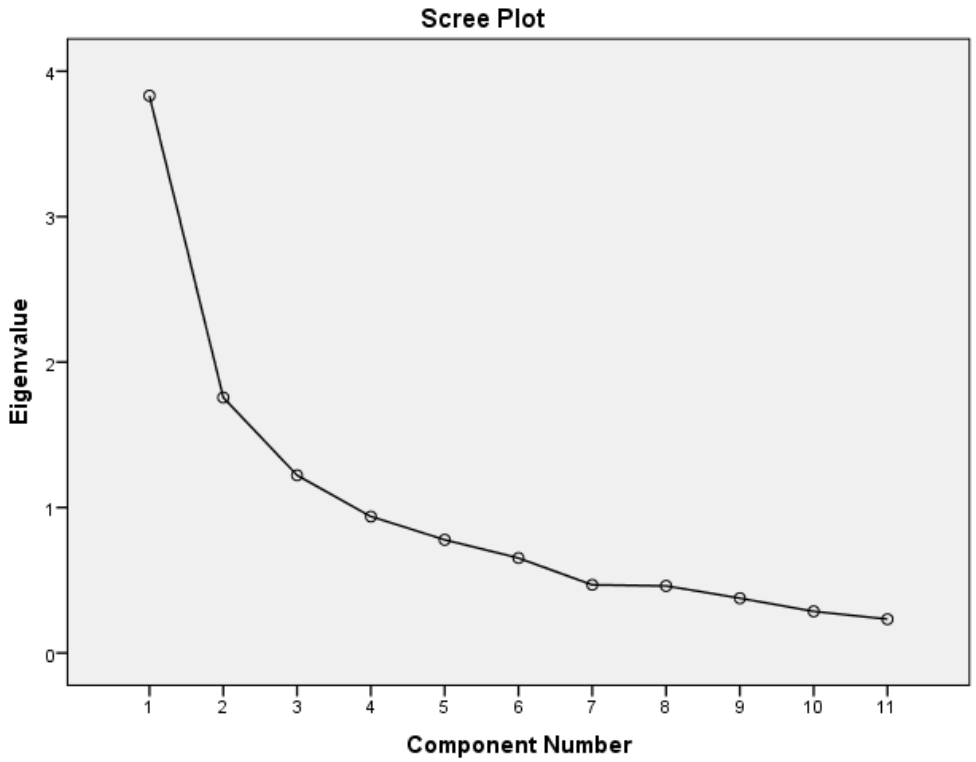
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,729
Bartlett's Test of Sphericity	Approx. Chi-Square	333,906
	df	55
	Sig.	,000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,831	34,828	34,828	3,831	34,828	34,828	2,628	23,894	23,894
2	1,756	15,966	50,794	1,756	15,966	50,794	2,151	19,551	43,444
3	1,221	11,104	61,897	1,221	11,104	61,897	2,030	18,453	61,897
4	,938	8,524	70,421						
5	,778	7,072	77,493						
6	,653	5,932	83,426						
7	,468	4,256	87,682						
8	,461	4,189	91,872						
9	,376	3,420	95,292						
10	,286	2,598	97,890						
11	,232	2,110	100,000						

Extraction Method: Principal Component Analysis.



Rotated Component Matrix[a]

	Component		
	1	2	3
WS_car	,646	,304	-,083
WS_publictransport	,200	,102	,782
WS_parking	,692	-,005	,126
WS_facilities	-,059	-,016	,865
WS_offices	,190	,261	,638
WS_image	-,047	,723	,434
WS_costs	,714	-,026	,133
WS_flexibility	,702	,284	,147
WS_expansion_shrinkage	,704	,323	,046
WS_architecture	,215	,858	,104
WS_recognisability	,324	,731	-,004

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Regression model 1

Model Summary[g]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,199[a]	,040	,018	1,222	,040	1,842	2	89	,164	
2	,407[b]	,165	,137	1,145	,126	13,235	1	88	,000	
3	,416[c]	,173	,135	1,147	,008	,799	1	87	,374	
4	,441[d]	,194	,147	1,138	,021	2,273	1	86	,135	
5	,520[e]	,271	,219	1,089	,077	8,933	1	85	,004	
6	,524[f]	,275	,205	1,100	,004	,211	2	83	,810	2,051

a. Predictors: (Constant), PB vs APS, Centre vs non-centre
b. Predictors: (Constant), PB vs APS, Centre vs non-centre, WS_car
c. Predictors: (Constant), PB vs APS, Centre vs non-centre, WS_car, WS_parking
d. Predictors: (Constant), PB vs APS, Centre vs non-centre, WS_car, WS_parking, WS_publictransport
e. Predictors: (Constant), PB vs APS, Centre vs non-centre, WS_car, WS_parking, WS_publictransport, WS_image
f. Predictors: (Constant), PB vs APS, Centre vs non-centre, WS_car, WS_parking, WS_publictransport, WS_image, WS_offices, WS_facilities
g. Dependent Variable: Satisfaction level environment

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7,357	,257		28,634	,000
	Centre vs non-centre	-,150	,276	-,058	-,544	,588
	PB vs APS	,463	,276	,178	1,675	,097
2	(Constant)	5,897	,468		12,599	,000
	Centre vs non-centre	-,499	,276	-,193	-1,808	,074
	PB vs APS	,374	,260	,144	1,439	,154
	WS_car	,027	,007	,378	3,638	,000
3	(Constant)	5,785	,485		11,928	,000
	Centre vs non-centre	-,543	,281	-,209	-1,934	,056
	PB vs APS	,337	,264	,130	1,275	,206
	WS_car	,024	,008	,336	2,954	,004
	WS_parking	,006	,007	,101	,894	,374
4	(Constant)	5,453	,529		10,299	,000
	Centre vs non-centre	-,355	,306	-,137	-1,160	,249
	PB vs APS	,213	,274	,082	,778	,439
	WS_car	,021	,008	,302	2,615	,011
	WS_parking	,004	,007	,072	,635	,527
	WS_publictransport	,009	,006	,176	1,508	,135
5	(Constant)	4,837	,547		8,843	,000
	Centre vs non-centre	-,184	,298	-,071	-,617	,539
	PB vs APS	,085	,266	,033	,320	,750
	WS_car	,014	,008	,197	1,705	,092
	WS_parking	,006	,006	,101	,923	,359
	WS_publictransport	,006	,006	,106	,929	,356
	WS_image	,022	,007	,320	2,989	,004
6	(Constant)	4,715	,584		8,077	,000
	Centre vs non-centre	-,116	,322	-,045	-,359	,721
	PB vs APS	,065	,271	,025	,239	,811
	WS_car	,014	,009	,198	1,656	,102
	WS_parking	,006	,007	,107	,935	,353
	WS_publictransport	,005	,006	,088	,705	,483
	WS_image	,022	,008	,324	2,831	,006
	WS_facilities	,005	,008	,079	,636	,527
	WS_offices	-,002	,007	-,038	-,323	,748

a. Dependent Variable: Satisfaction level environment

Regression model 2

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,276[a]	,076	,055	1,496	,076	3,671	2	89	,029	
2	,395[b]	,156	,127	1,439	,080	8,312	1	88	,005	
3	,412[c]	,169	,131	1,435	,014	1,420	1	87	,237	
4	,574[d]	,329	,290	1,297	,160	20,488	1	86	,000	
5	,575[e]	,330	,283	1,304	,001	,150	1	85	,699	1,633

a. Predictors: (Constant), WS_costs, PB vs APS
b. Predictors: (Constant), WS_costs, PB vs APS, WS_expansion_shrinkage
c. Predictors: (Constant), WS_costs, PB vs APS, WS_expansion_shrinkage, WS_flexibility
d. Predictors: (Constant), WS_costs, PB vs APS, WS_expansion_shrinkage, WS_flexibility, WS_architecture
e. Predictors: (Constant), WS_costs, PB vs APS, WS_expansion_shrinkage, WS_flexibility, WS_architecture, WS_recognisability
f. Dependent Variable: Satisfaction level building

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,143	,472		13,027	,000
	PB vs APS	,468	,331	,144	1,411	,162
	WS_costs	,019	,009	,223	2,180	,032
2	(Constant)	5,374	,526		10,219	,000
	PB vs APS	,408	,319	,126	1,278	,205
	WS_costs	,010	,009	,117	1,115	,268
	WS_expansion_shrinkage	,025	,009	,303	2,883	,005
3	(Constant)	5,246	,535		9,799	,000
	PB vs APS	,396	,319	,122	1,242	,217
	WS_costs	,007	,009	,081	,741	,461
	WS_expansion_shrinkage	,016	,011	,201	1,481	,142
	WS_flexibility	,014	,011	,167	1,192	,237
4	(Constant)	4,418	,517		8,539	,000
	PB vs APS	,089	,296	,028	,302	,763
	WS_costs	,007	,008	,079	,801	,425
	WS_expansion_shrinkage	,007	,010	,088	,701	,485
	WS_flexibility	,007	,010	,082	,635	,527
	WS_architecture	,035	,008	,454	4,526	,000
5	(Constant)	4,416	,520		8,492	,000
	PB vs APS	,103	,299	,032	,344	,731
	WS_costs	,006	,008	,074	,744	,459
	WS_expansion_shrinkage	,007	,010	,086	,685	,495
	WS_flexibility	,006	,010	,076	,585	,560
	WS_architecture	,033	,009	,429	3,603	,001
	WS_recognisability	,003	,008	,045	,388	,699

a. Dependent Variable: Satisfaction level building

Regression model 3

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,250[a]	,062	,030	1,15002	,062	1,951	3	88	,127	
2	,527[b]	,278	,244	1,01514	,215	25,937	1	87	,000	
3	,587[c]	,345	,307	,97246	,067	8,805	1	86	,004	
4	,588[d]	,345	,299	,97765	,001	,089	1	85	,767	1,625

a. Predictors: (Constant), Centre vs non-centre, Expected growth , PB vs APS
b. Predictors: (Constant), Centre vs non-centre, Expected growth , PB vs APS, Representativeness
c. Predictors: (Constant), Centre vs non-centre, Expected growth , PB vs APS, Representativeness, Functionality
d. Predictors: (Constant), Centre vs non-centre, Expected growth , PB vs APS, Representativeness, Functionality, Urbanity
e. Dependent Variable: Overall_satisfaction

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,723	,389		17,303	,000
	Expected growth	,040	,053	,079	,758	,450
	PB vs APS	,583	,260	,237	2,240	,028
	Centre vs non-centre	,267	,261	,109	1,026	,308
2	(Constant)	7,015	,348		20,173	,000
	Expected growth	,013	,047	,026	,287	,775
	PB vs APS	,385	,233	,157	1,652	,102
	Centre vs non-centre	,167	,231	,068	,723	,471
	Representativeness	,554	,109	,474	5,093	,000
3	(Constant)	7,174	,337		21,262	,000
	Expected growth	,014	,045	,028	,318	,751
	PB vs APS	,312	,225	,127	1,391	,168
	Centre vs non-centre	-,044	,232	-,018	-,190	,850
	Representativeness	,564	,104	,483	5,415	,000
	Functionality	,318	,107	,272	2,967	,004
4	(Constant)	7,152	,348		20,577	,000
	Expected growth	,016	,046	,032	,353	,725
	PB vs APS	,288	,240	,117	1,203	,232
	Centre vs non-centre	-,014	,255	-,006	-,055	,957
	Representativeness	,565	,105	,483	5,389	,000
	Functionality	,314	,108	,269	2,896	,005
	Urbanity	,037	,124	,032	,298	,767

a. Dependent Variable: Overall_satisfaction