

MASTER

Stimulation of recreational consumer visits in downtown shopping centers

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Stimulation of recreational consumer visits in downtown shopping centers

Graduation paper



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Colophon

Stimulation of recreational consumer visits in downtown shopping centers
Graduation paper

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Preface

This research was carried out in order to obtain a Master of Science degree at the Eindhoven University of Technology for the master track Real Estate Management and Development, part of the study Architecture Building and Planning. My research aims to stimulate recreational consumer visits in downtown shopping centers. The goal is to give information and insights into what attracts the recreational consumer towards downtown shopping centers in the Netherlands. The topic of this research was initially selected by myself in response to my interests in urban modeling and planning. Later on it also became part of a question posted by the Dutch Council of Shopping centers (*De Nederlandse Raad van Winkelcentra, NRW*) at the Eindhoven University of Technology.

I would like to thank a couple of people who made it possible for me to finish my thesis. First of all, I want to thank Dr. ir. A.D.A.M. Kemperman, Ir. A.W.J. Borgers and Dr. ir. I.I. Janssen for their cooperation and guidance throughout this research. I would also like to thank Drs.ing. P.J.H.J. van der Waerden for his cooperation by providing some of the accessibility-data for this research. And finally I would like to thank VGSA Urban Development for their cooperation during this research by providing some of the supply-data for this research. I have enjoyed working on this research and it has inspired me to further develop myself on the area of urban modeling and planning in my future career.

Peter Raijmakers,

Eindhoven, August 2012.

Abstract

Over the last few years the number of shopping trips in the Netherlands has declined while the total floor space nevertheless increases. The economic recession we find ourselves in right now only accelerates the decrease in demand. Also the booming trend of online shopping influences the number of physical store visits. All these developments have a negative effect on the vitality of downtown shopping centers in the Netherlands. The decreasing number of customers and relatively high land prices make it less interesting for developers to invest in downtown shopping centers. The increasing vacancy of stores within these centers is evidence for the negative trend in the retail sector. In order to turn this trend around and to revitalize the city centers, one type of consumer plays a key role: the recreational consumer (fun-shopper). This type of consumer goes to a shopping mall as a recreation activity and therefore is most likely to stay for a relatively long time. The motivation for them to visit a shopping center lies in the enjoyment and pleasure that they may receive from shopping and other leisure activities the center has to offer. Literature offers much information on shopping center and/or store attributes that are preferred by consumers but there is little known about which attributes specifically stimulates the recreational consumer to visit a shopping center. Therefore the main question of this research is:

- **How can the attractiveness of downtown shopping centers in the Netherlands for recreational consumers be improved?**

This research aims to give information and insights into what attracts the recreational consumer towards downtown shopping centers in the Netherlands, in order to give advice to developers, investors, governments, real estate managers and other actors involved in the development, decision making process and management of downtown shopping centers and leisure. In order to be able to answer the main question, the research is divided into two phases. First it is investigated which personal characteristics, time characteristics, and leisure supply characteristics are involved in the choice of the Dutch citizen to go for recreational shopping as a free-time activity in relation to other free time activities. The second phase continues primarily on the activity recreational shopping and focuses on the relation between the choice of shopping center to execute the recreational shopping activity and the shopping center attributes.

The first step after assessing the research goal and research question is collecting the data for all the variables involved in the process. The phase one variables, personal characteristics, time of the day characteristics, leisure supply in the area and choices made by the Dutch citizen, have been extracted from two datasets supplied by the *Rijkswaterstaat Dienst Verkeer en Scheepvaart (RWS DVS)* and the *Centraal Bureau voor statistiek (CBS)*. The phase 2 variables, shopping center supply, accessibility and atmospheric attributes, have mainly been collected by means of own research. This involved visiting downtown shopping centers and analyzing them by applying entry forms which allowed for an objective assessment of these attributes. There are nine downtown shopping centers in and around the eastern part of Noord-Brabant that have been included in the research. The marked area in figure 2 represents the area from which respondents have been selected. Data concerning these respondents has been extracted from the RWS DVS dataset. Next, the collected data is analyzed and prepared for statistical research. Variables with high correlations, for instance many of the shopping center supply attributes, have been merged and variables with little variation have been deleted. For this research a discrete choice model, called the Multinomial Logit Model has been applied for both phases. The aim of such a model is to understand and predict the choices made between alternative free-time activities and alternative downtown shopping centers. Estimation of the models has been conducted by using the software package Limdep/Nlogit 4.0.



Figure 1 Shopping centers and respondent involved in the research

The results of the phase one model show that women are more likely to choose recreational shopping than men. Furthermore, someone who is older than 55 has a higher probability to choose recreational shopping than someone younger than 30. The same goes for people who do not have a job or who work for less than 12 hours per week. For the education characteristic it is clear that people with a high education are more likely to go for recreational shopping than people with a low education. The afternoon (12 o'clock to 16 o'clock) is most likely the best time to start with the activity. The most important results of the second phase show that for three types of atmospheric attributes significant results have been found. First, People older than 55 put more value in the presence of warm colors in the streets than people younger than 30. Second, Women appear to put more value on the presence of historic buildings in the streetscape than men and therefore women are more likely to choose for the more historic downtown shopping centers. Third, men are more likely to go to large shopping centers in terms of the total surface area of streets than women. The education characteristic showed some interesting results in terms of the valuation of the supply of facilities in the main shopping area. On the one hand, people with a high education put more value on the presence of stores than people with a low education. On the other hand, people with a low education put more value on the presence of catering and leisure facilities than people with a high education.

The results have been linked to the main research goal and research question which leads to the following advice: Although people older than 55 are already more likely to choose to go for recreational shopping than people younger than 55, adding more warm colors in the street pavement could improve the attractiveness towards this target group. The importance of this conclusion is underlined when it is taken into account that the age groups of 45-65 and 65 and older, are increasing and will most likely become the biggest groups in terms of number of daytrips taken per year in the future. It is very difficult to alter the historic value of a shopping center to make it more historic. Because women are more sensitive towards the historic value of the shopping center than men, it could be sensible for a more historic shopping center like downtown s'Hertogenbosch to focus its supply more on women than on men. Men are more attracted to large shopping centers in terms of total square meters than women. This means that large shopping centers like downtown Eindhoven and downtown Nijmegen attract relatively more male recreational consumers than the smaller shopping centers like downtown Oss and downtown Helmond. For the smaller shopping centers it could be wise to focus their supply more on women than on men. Looking at the supply attributes, it seems possible to attract more people with a low education by increasing the supply in catering and leisure facilities within the downtown shopping center.

Many of the applied variables could not be used in the statistical research due to a lack of differentiation between the nine downtown shopping centers. Increasing the number of shopping centers could provide more differentiation and therefore more significant results. However, it should be considered to include peripheral shopping concentrations and large district shopping centers as well. Furthermore, it could be wise to use other research methods - like surveys - to further examine the effect of shopping center attributes on the choice behavior of recreational consumers. The data that has been collected for the nine shopping centers could be used in the future for other types of research. It could be possible to measure the effect of the attributes in terms of visitor flows on a smaller scale, for instance within one downtown shopping center and per street. To conclude, the people who are currently less likely to choose to go for recreational shopping as a free-time activity could be an opportunity for the future and therefore it could prove useful to investigate the preferences of these people more extensively.

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1. Introduction

1.1 Justification of the research project

Over the last few years the number of shopping trips in the Netherlands has declined while the total floor space nevertheless increases (Locatus, 2010). The economic recession we find ourselves in right now only accelerates the decrease in demand. Also the booming trend of online shopping influences the number of physical store visits (Zijlmans, 2010). All these developments have a negative effect on the vitality of downtown shopping centers in the Netherlands. The decreasing number of customers and relatively high land prices make it less interesting for developers to invest in downtown shopping centers. The increasing vacancy of stores within these centers is evidence for the negative trend in the retail sector (Locatus, 2010). In order to turn this trend around and to revitalize the city centers, one type of consumer plays a key role: the recreational consumer (fun-shopper). This type of consumer goes to a shopping mall as a recreation activity and therefore is most likely to stay for a relatively long time. The motivation for them to visit a shopping center lies in the enjoyment and pleasure that they may receive from shopping and other leisure activities the center has to offer (Hirschman and Holbrook, 1982). Currently almost 70 percent of all stores in inner city shopping areas are focused on fun-shopping (Evers, Hoorn and Oort, 2005). The addition of leisure activities within shopping centers is a relatively new trend, especially in the Netherlands. Implementing the right mix between shopping and leisure functions could revitalize the downtown shopping centers and attract more recreational consumers. Therefore the topic is relevant for further investigation.

1.2 Research goal and problem definition

This research aims to give information and insights into what attracts the recreational consumer towards downtown shopping centers in the Netherlands, in order to give advice to developers, investors, governments, real estate managers and other actors involved in the development, decision making process and management of downtown shopping centers and leisure.

This research goal is captured in the following main question:

- **How can the attractiveness of downtown shopping centers in the Netherlands for recreational consumers be improved?**

In order to be able to answer this question, the research is divided into two phases. First it will be investigated which personal characteristics, time characteristics, and leisure supply characteristics are involved in the choice of the Dutch citizen to go for recreational shopping as a free-time activity in relation to other free time activities. The second phase continues primarily on the activity recreational shopping and focuses on the relation between the choice of shopping center to execute the recreational shopping activity and the shopping center attributes. The following sub-questions are developed:

Phase 1

1. What is the relation between the general characteristics of the Dutch citizen and the choice of a free-time activity?
2. What is the relation between the time of the day and the choice of a free-time activity?
3. What is the relation between the leisure supply in the area and the choice of a free-time activity?

Phase2

4. What is the relation between the accessibility attributes of a shopping center and the choice of a recreational consumer for the shopping center?
5. What is the relation between the atmospheric attributes of a shopping center and the choice of a recreational consumer for the shopping center?
6. What is the relation between the supply attributes of a shopping center and the choice of a recreational consumer for the shopping center?

1.3 Research design

Based on both a literature study and the research questions the model shown in figure 1.1, will be used to further conduct this research

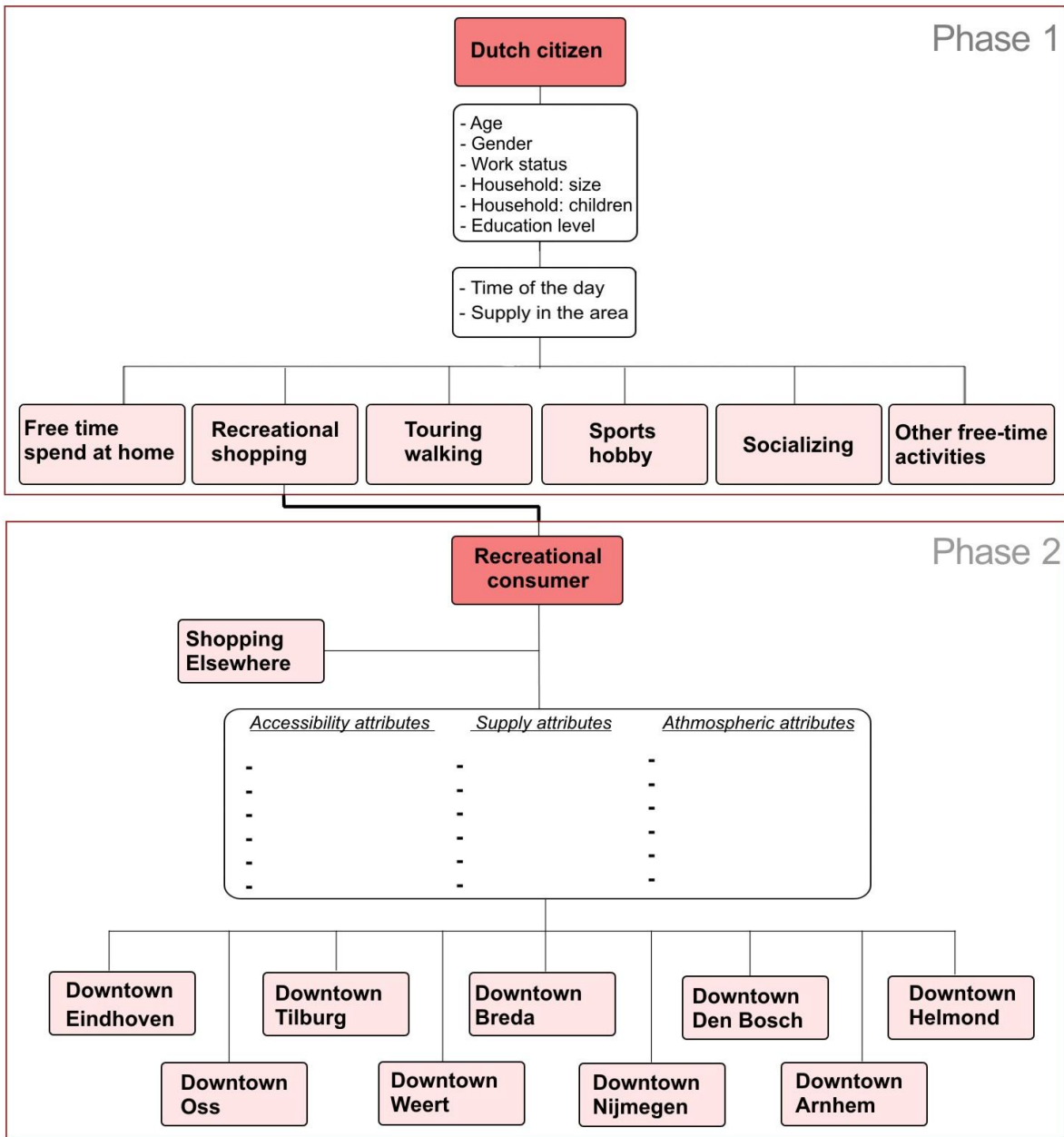


Figure 1.1 Research model for this project

The literature study is conducted on the topic of shopping centers, leisure and recreational consumers, in order to get a more detailed understanding of the subjects. This literature study is shown in chapters two to four. After taking into account what already has been investigated on the research subject and what still remains unclear the previously shown research goal and research questions are defined followed by the research model. The model clearly shows the two phases. In phase one, the choice behavior of the Dutch citizen towards preferences in free-time spending is researched. The activity recreational shopping in general is compared with other recreational activities. In the second phase the recreational consumer is the research subject and the choices are divided in nine shopping centers and one choice for recreational shopping elsewhere. All of the data that is needed to conduct this research is extracted from this model. The variables involved and the methods and sources for data collection are discussed in chapter five. This chapter also explains which shopping centers are involved in this research. The data is collected through a variety of sources and methods. Chapter 6 discusses how the data is analyzed and prepared for research. The statistical research which is conducted with the data is shown in chapter 7. This research is performed with the Limdep/Nlogit 4.0 software package, which is able to perform discrete choice modeling. For both phases of the research the multinomial logit model is applied. This model is explained, and the results of the statistical research are analyzed in chapter 7. Conclusions are drawn and recommendations are given in chapter 8.

2. Shopping centers

This chapter gives an overview of the retail sector in the Netherlands and abroad with the emphasis on downtown shopping centers. The aim of this chapter is to give a clear picture of the current problematic situation shopping centers in the Netherlands find themselves in and how similar situations abroad developed. First, definitions are given for the terms retail business and shopping center. The historic (inter)national developments in paragraph 2.2 show how the retail business evolved over the years and how the shopping centers were developed towards the current status they are in today (paragraph 2.3). Next, a number of trends and future developments on the area of shopping are discussed. These trends and future developments are in some way, negatively or positively, relevant towards the future development of downtown shopping centers. Paragraph 2.5 sums up some international shopping center concepts which could also be used as future concepts in the Netherlands. The last paragraph of this chapter draws conclusions towards the most important/relevant topics related to the main research question. The subject of leisure within shopping centers is further discussed in the next chapter.

2.1 Definitions & descriptions

Retail business

The retail business is an economic activity involving physical goods offered for sale to end users, the consumers (Van de Kind, 2004). Retail differs from wholesale trade, business services, hospitality business and leisure. The difference with wholesale trade is determined by the focus on the consumer. Wholesale trade also offers physical products, but these are offered towards producers and retailers. In the retail business the salesman positions himself in-between the consumer and producer. This allows him to bring together products from multiple companies in order to offer the consumer a broad spectrum of options. Due to the direct focus on the consumer, retail in general is placed under the services sector, but it cannot be related towards other types of business services for example juridical advice or security. This is due to the tangibility of products provided by retail. Other types of businesses sell intangible products and this makes that retail behaves in a whole different matter than them. Finally the retail business also differs from the hospitality business and leisure. In all these sectors the consumer mostly purchases tangible products but the main difference is that in retail this product is not consumed at the spot as it is for the hospitality business and leisure (Evers et al. 2005).

Shopping center

A shopping center in general is a building or a string of buildings in which multiple stores are located. These stores are connected with walkways which allow consumers to easily navigate from store to store. In retail marketing terms a shopping center is considered to be 'a planned retail development comprising at least three shops, under the freehold, managed and marketed as a unit with a minimum gross retail area of 5000m²' (Dennis, Newman and Marsland, 2005). A store and its location can be divided into four categories: Main shopping centers, supporting shopping centers, distributed stores and large-scale concentrations. A main shopping center is the center with highest catchment area mostly found in inner cities. The supporting shopping centers involve stores in neighborhood and district shopping centers and inner city shopping streets. Distributed stores are located solitary or within a center with a maximum of three stores and the large-scale concentrations refer to areas like an outer city mall for household articles like furniture (HBD 2012). Looking at the main shopping center and large-scale concentrations, a distinction can be made into two types: the unplanned business district and the planned shopping centers. The unplanned business districts are represented by most of current downtown shopping areas in the Netherlands and therefore this type is the most relevant towards for this paper. The shopping center further can be divided into these three types: the open air mall, the

covered walkways mall and the closed mall (Bruwer, 1997). The type of a shopping center can be of importance when researching consumer preferences towards shopping centers.

2.2 Historic developments

Retail sector developments in general and the Netherlands in particular

The birth of the historic downtown shopping centers as they are well known in many Dutch cities and other European cities, can be traced back all the way to the Middle Ages. The old walled cities had markets which were the center of the cities' urban and economic life. It also had a central position within the city map and infrastructure. The first markets were in the open air but due to increasing urbanization and diversity, and also due to increasing nuisance the covered market also called market hall was introduced. These market halls provided a sheltered place for all the people, animals and goods. Also it allowed the market to be open every day. In the seventeenth and eighteenth century stores were taking over complete inner cities. This tidal wave of stores was caused by a number of reasons. First, technological innovations accelerated the trading dynamics. Secondly, there was an urban and economical growth on the demand side. Third cause was the increasing use of credit which made it easier to buy a store. The fourth and last reason was the fact that retailers rather had their own fixed location in a store than a space on the market. These developments made competition between retailers rise tremendously. At this point there was hardly any form of fixed pricing. These characteristics began to change with the start of the first retail revolution (Evers et al. 2005).

Simple local shopping started to change in the 19th century and marked the start of the first retail revolution. This revolution followed the (political) French revolution and the (economic/technical) Industrial revolution (Kooijman, 2002). Population growth and concentration had produced mass demand. When the railway and the motor car brought mobility to both goods and the consumer, the development of packaging, food preservation and direct advertising from manufacturer and consumer accelerated problems for the retailer, i.e. stockholding and cash flow. This led to the development of the wholesaler who provided a distribution system between the manufacturer and the retailer. This growth also led to the development of the larger unit, one store with multiple types of products and services (late 19th century), later on called the department store. The Dutch retail revolution did not start until the early 20th century. The Industrial revolution took a while longer to find its way to the Netherlands and caused arrears in comparison with other European countries towards the development of new store types. The opening of the first department store in 1912 in Amsterdam marked the start of the retail revolution in the Netherlands (Evers et al. 2005).

The second retail revolution took place in the 50's and 60's of the last century. After the 1939-45 war multiple developments, including increased car ownership, the deep-freeze, increasing traffic problems in existing towns, involvement of major marketing and retailing companies, increased population and increased demand, all led to efforts to find solutions to 'shopping problems'. These culminated in urban developments which favored pedestrianisation of shopping and the planned shopping center (Beddington, 1991). Also the concepts of self-service and the supermarket were introduced. These new concepts increased the efficiency of the distribution chain and reduced the associated costs. Suppliers then began to compete with each other (Kooijman, 2002). After the Second World War, in the Netherlands and many other European countries there was a need for many buildings in order to meet the demand of an increasing population. In order to accurately connect supply and demand the Central Place Theory of Christaller was implemented in the Netherlands (Getis and Getis, 1966). This theory calculated an exact number of shopping floor space needed for any number of citizens. The location for this shopping space was divided into three types of shopping centers: the city-, district- and

neighborhood center. This theory was also applied by other European countries like England and Germany (Evers et al. 2005)

It can be said that we now find ourselves in the third retail revolution in which combining retail with leisure and urban entertainment is the new development because of the hybrid nature of the distribution center. There are new combinations of types of shops (for example, the mix of supermarket and department store), new consumer behavior (discussed in paragraph 4.3) and new suppliers (oil companies, telephone companies and so on) (Kooijman, 2002). The continuing retail dynamics by means of internationalization and concentration of the retail business due to fusions and takeovers are characteristic for the 90s'. It increases the competition level between stores and due to the law of the fittest only the major companies tend to survive. For the consumers this is shown in an increasing uniformity of shopping centers where the same brands are showing up everywhere. This trend of major-shopping-companies taking over is strongest in Sweden, followed by the Netherlands in comparison to the rest of Europe (Evers et al. 2005). The booming trend of online shopping is also part of the third revolution and will be further discussed in paragraph 2.4. Over the last years the market is showing signs of saturation. The traditionally demand-driven character of the sector therefore finds itself on a tipping point towards a supply driven market. The competition with other locations is expanding and vacancy of stores within shopping centers increases (NRW, 2011). The banking crisis of 2008 and the current European debt crisis triggered by the debt of Greece in 2011 have had a negative effect on the demand side and made it difficult to realize new retail projects.

Development of shopping centers in the USA

In the midst of the 1930's in Dallas, Texas, a shopping street was developed inside out: The Highland Park mall. Stores were turned away from the street and directed towards an inner space. This set-up found many followers and especially during the 50's and 60's the mall was booming and in this period it took its stereotype form which is still existent today (Poell, 2001). This form assumes the incorporation at inception of 'magnets' or 'anchor units', department stores, food supermarkets, chain stores, strategically situated with smaller specialized shopping units between. The center would have convenient car parking, but no vehicular traffic within the center. Other characteristics are attractive landscaping, high amenity standards, restaurants, sports centers, cinemas, etc. this was the typical American shopping center. Later on, due to developments in engineering, came the covered center or 'closed mall' (Beddington, 1991). These malls are the most dominant type of shopping in the USA. This is at the expense of the shopping function of actual inner cities which have a relatively low occupation of stores. The lack of a lively and diverse inner city and the attempts to draw more people towards malls has stimulated the development of leisure functions within malls. Most malls nowadays at least have a multiplex cinema, a food court and a carousel or mini train for kids. Its facilities with entertainment, restaurants and bars included are an imitation of European inner cities (Poell, 2001). It is clear that the American historic development of the retail sector shows great differences with the Netherlands. Main reason for these differences is the more liberal governmental regulations and policies on the development of retail which will be further discussed in paragraph 2.5.

Development of (downtown) shopping centers in Europe

The earliest and still surviving concentrated shopping centers in Europe were the open or covered markets and bazaars. These developed in one direction into sophisticated 'arcades'. An arcade is a glass covered passageway connecting two busy streets, lined on both sides with shops (Beddington, 1991). The first recorded arcade was the Passage Delorme in Paris, France, which opened in 1809 (Dennis et al. 2005). In the other direction they developed into today's street markets which still operate in many countries. The alternative to the market was the shopping street. This was generally an organic

development where often the ground floors of domestic buildings were gradually transformed into shops. After the Second World War, Europe was giving attention to rebuilding its bombed cities and serving an increasingly urbanized population. Thus the classic early examples of planned European shopping were produced of which the Lijnbaan, Rotterdam is the celebrated pioneer pedestrian center. The Swedish small shopping centers were developed and planned as part of neighborhood units related to stations on the new transport system into Stockholm. In Germany, Dusseldorf rebuilt its bombed center as a glittering shopping complex, and Cologne pedestrianised its main shopping streets while rebuilding on its bombed sites, and retaining the existing street pattern. These are typical examples of what was happening all over Europe (Beddington, 1991). In Great Britain, early attempts at rebuilding town centers were less successful. The first successful planned covered shopping center was the Bull Ring in Birmingham which opened in 1964. With this the growth of shopping centers in the UK started (Dennis et al. 2005). The Bull Ring was an economic version of an American center. It did not have much resemblance to its transatlantic cousins but in their shopping center concepts, were the same essential ingredients. In 2005, there were approximately 225 shopping centers in the UK. These European historic developments show much more resemblance with the Dutch historic development of the retail sector. Identifying success factors of certain European shopping centers can provide interesting insights towards the main research question and therefore is of importance to further investigate in the upcoming research. In paragraph 2.5 some unique shopping center concepts are discussed.

2.3 Current Status

Retail sector in the Netherlands

The retail market is an important part of the Dutch economy and the Dutch culture. Of all consumer expenditures, approximately one third is made in the retail business (Evers et al. 2005). The rest is spent on vacations, entertainment, the hospitality business, education and health care. The sector is not only important as a goods market, but also as a source for employment: 10 percent of the working class is active in the retail business. In 2011 there were approximately 107.000 stores, 20.000 itinerant traders and 16.000 web stores in the Netherlands. With more than 800.000 employees, retail is one of the biggest commercial industries. More than half of all stores are located in the main shopping centers (such as inner cities) as shown in table 2.1. Approximately one quarter of the stores is referred to as distributed, that is, stores that are located solitary and for example not within a shopping center (HBD 2012). In 2011, Locatus identified 2.444 shopping areas in the Netherlands. Table 2.2 shows that there are 966 main shopping centers of which 17 are characterized as downtown shopping areas. The distributed store type is not counted as a shopping area (Locatus, 2011). Appendix 1 shows an extended typology of shopping areas and their general characteristics. Although 17 areas is a relatively small number in relation to the 966 main shopping areas, the downtown shopping centers have an average of 648 outlets per area and 114.464 square meters of shopping floor space per area. With a share of more than 10 percent the downtown shopping center is one of the biggest types of shopping areas in the Netherlands. This shows from an economic and real estate point of view the importance of downtown shopping centers for the retail market in the Netherlands and thus the whole economy. This research project will not only be limited

Table 2.1 distribution of stores and their location (HBD 2012)

	2005	2011
Main shopping centers	51%	52%
Supporting shopping centers	21%	21%
Distributed stores	26%	25%
Large-scale concentrations	2%	2%
Total	100%	100%

Table 2.2 distribution type of shopping areas (Locatus 2011)

	Number
Main shopping centers	966
Supporting shopping centers	1.294
Distributed stores	-
Large-scale concentrations	184
Total	2.444

to the 17 downtown centers identified by Locatus because many of the main shopping areas can also be viewed as downtown shopping centers capable for attracting recreational consumers. Therefore also shopping areas of this category are taken into account. Paragraph 5.3 describes all the shopping centers that have been involved in this research.

Supply and demand

The Dutch retail sector is rapidly changing, both on the supply side as on the demand side. Due to a continuous expansion of the supply side, especially in the last two decades, the market is showing signs of saturation. The traditionally demand-driven character of the sector therefore finds itself on a tipping point. From a situation where scarcity was dominant, often forcing retailers having to wait for years until the preferred location became available, now a situation is emerging in which competition with other locations is expanding and vacancy of stores increases. On the demand side there are fundamental developments on the area of the amount of free time of potential consumers and the way this free time is used (NRW, 2011). This subject is further discussed in paragraph 3.6. Most important development is the decline in leisure shopping as a free time activity. Leisure shopping involves all types of shopping that is not related to personal care. This and the rise of online shopping (discussed in paragraph 2.4) leads to a decline in overall store visits as shown in figure 2.1. This



Figure 2.1 Index store visits and floor space 2000-2011 (Locatus 2010)

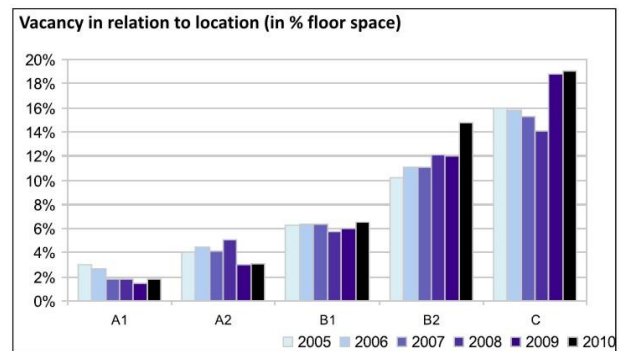


Figure 2.2 Vacancy in relation to location (Locatus 2010)

decline has its effect on the vacancy on primarily stores located on lower type locations. The location typology refers to the quality of the location. An A1 location is a location with the highest visitors flow and often is the core of a downtown shopping center (Vastgoedmarktplaats.nl, 2012). An A2 location has a smaller visitor flow and is often located in the extension of A1 locations, just outside the core shopping center. Both A1 and A2 locations have stores with a (supra)regional catchment area and are mostly found in main shopping centers. The B1 and B2 locations have even smaller visitor flows and the stores are mostly focused on a local catchment area. This type of location is mostly found in supporting shopping areas. The C-type location has the smallest visitor flow and mainly consists of distributed stores. The vacancy rate has risen over the last couple of years for the B1, B2 and C locations (figure 2.2). A1 and A2 locations show very limited changes within the vacancy rate. The branches clothing & fashion, household & luxury goods and living show the highest increases in vacancy rates over the last few years (NRW, 2011). The current European debt crises which started in 2011 when it became clear that Greece and possible other European countries were not able to finance their debts, will most likely increase the negative trends of increasing vacancy rates and decreasing store visits.

Run-shopping versus fun-shopping

Over the years, main shopping centers in the Netherlands started focusing more on fun-shopping than run-shopping. This conversion was triggered by the rise of recreational shopping as a leisure activity mainly after the Second World War, although there are also examples of recreational shopping areas before the war, and the increasing free-time per consumer in general (Poell, 2001). This is further discussed in paragraph 4.2. In downtown shopping areas almost 70 percent of all stores are focused on fun-shopping. Run-shopping dominates in the supporting shopping centers and distributed stores. Although most stores in the Netherlands are fun orientated, the run orientated stores have the biggest overall ground surface (Evers et al. 2005). In 2008/2009, 86 percent of the Dutch population went fun-shopping. Although fun-shopping still is the number one free time activity in the Netherlands, the total number visitors declined over the period 2006/2007 and 2008/2009 with more than 20 percent as shown in figure 2.3. In the last few years the number of visitors appears to stabilize around 540 million visitors. The economic crisis of 2008 is partly to blame for the decline but nevertheless the figures are concerning in relation to the vitality of downtown shopping centers. The main goal of the research therefore is focused on how to raise this number in the future. The term fun-shopping as a leisure activity and its position towards other leisure activities will be further discussed in chapter 3.



Figure 2.3 Total number of visitors for recreational shopping (x 1 million), (NBTC-NIPO 2007, 2009 and 2011)

Governmental policies

Since the Second World War, the location of stores in the Netherlands has been strongly influenced by government policies, particular by the spatial planning policy. This policy determined the placement of stores by the Chistaller theory as previously discussed in paragraph 2.2. Not long after the completion of a planned and ordered retail-structure, there were signs that this structure already did not conform to the demands in practice. In 1973 the Peripheral Retail Policy was introduced which allowed the development of branches like furniture-department stores, car shops and mail order companies on peripheral locations. In 1985 the policy was extended by also adding the branches do-it-yourself stores, garden centers and furniture stores. In the early 90's complaints arose that the Peripheral Retail Policy limited the retail dynamics. Therefore the Large-Retail-Concentrations Policy was formed. This policy allowed the allocation of peripheral retail areas almost without branch limitations. It still contained some restrictions towards allowed branches and the policy was limited to a selected number of cities. The Arena Boulevard in Amsterdam, Alexandrium in Rotterdam, the MegaStores in Den Haag and the Designer Outlet Roermond are concrete results of this policy (Evers, 2011). As part of the *Nota Ruimte* (a policy document on spatial planning) in 2004 the Dutch government delegated retail decisions to the municipalities and abolished the restrictions on peripheral shopping developments (Borgers and Vosters, 2011). Its consequences will be further discussed paragraph 2.3. Latest development in retail policy is the introduction of the Resolution Spatial Planning in 2010 which puts the provinces completely in charge of retail developments. The provinces have mostly continued the regulations as they were determined in the *Nota Ruimte*. Although a province is allowed to add their own regulations and limitations, the nine guidelines given in table 2.3 are generally used.

Table 2.3 Retail development guidelines applied by the provinces (IPO, 2006)

General guidelines

- 1** The position of existing shopping areas has first priority. Changes in the current structure are allowed under the condition that the existing supply-structure is not affected.
- 2** Renewal or expansions have to take place within or directly adjacent to the existing shopping areas. Only when there are no suitable areas available, it is possible to develop new shopping locations in urban areas.
- 3** Establishment of retail in the outer city area (The so called “meadow stores”) is not allowed.
- 4** Large-scale retail stores are preferably accommodated on inner city locations. Facilities that cannot be placed there are, under the consideration of guideline 9, accommodated on peripheral locations.

Peripheral branch orientated

- 5** Retail for non-frequent targeted purchases is only allowed on peripheral locations when they are difficult to implement in existing shopping areas due to the voluminous nature, fire and explosion hazard and daily supply.
- 6** Themed developments are allowed (for instance living, outdoors) when existing centers have no room and the theme is specifically attached to the peripheral location.

Peripheral size orientated

- 7** Large-scale retail with a interregional function/scope should be consistent with existing retail concentrations and easily accessible with public transport and by car. When no suitable locations are available, it is possible to implement new locations within the urban area.
- 8** Clusters of large-scale retail facilities (possibly in combination with leisure) can only be implemented in urban networks and urban centers near centers/nodes with an interregional function.
- 9** The development of (a cluster of) large-scale retail facilities should not disrupt the existing retail structure. This has to be investigated by means of a study.

Although the policies of the provinces under the Resolution Spatial Planning allow for the development of large-scale peripheral retail projects, to this day there have not been any new projects realized in addition to the previously mentioned peripheral retail areas. Although several plans were formed over the past few years, none of them reached the point of actual development. Main reason for the plans to fail was the great amount of objections that arose against the plans. Also, the shopper preferences regarding these mega malls were never thoroughly assessed and therefore were difficult to implement in the plans (Borgers and Vosters, 2011). Furthermore, the economic crisis of 2008 and the current crisis had influence on the feasibility of new developments. Although the new regulations have not led to new peripheral developments yet, it does withhold a threat towards the downtown shopping centers. The potential extra competition that can be realized in the future could further infect the vitality of the downtown shopping center.

2.4 Trends & future developments

Online shopping (e-shopping)

The last couple of years the market for online shopping has seen enormous growths. Over the period of 2000 to 2010 the number of online product investments in the Netherlands grew with an average of 35 percent per year. In 2010 these investments covered 4,6 percent of all non-food retail investments. This growth can be explained due to the increasing number of internet connections in the Netherlands. This allows more consumers to do their shopping online. Also, consumers who were already familiar with online shopping tend to use this more often and with bigger spending than before (Zijlmans, 2010). The number of frequent e-shoppers increased from 33 percent to 55 percent in the period from 2005 to 2010. More than 7 in 10 e-shoppers is a frequent shopper. A frequent shopper makes a purchase online

at least once every three months. The Netherlands is positioned alongside the UK and Denmark as one of the countries where online shopping is most established in the society with approximately 77 percent of all citizens between the age of 12 and 74 having purchased products online (Sleijpen, 2011). Given the history of online shopping and today's technological developments it's most likely that the popularity of online shopping will only increase over the coming years.

Next to the web-store, like bol.com, who do their business solitarily online, there is the cross-channel retailer. This retailer has an online store on the one hand and a physical store on the other. Fears that offering products online would negatively affect the catchment of the physical store seem to be unjustified. Research shows that retailers gain in online sales volume when they also have a physical store within their catchment. The store in this case acts as a marketing tool and a service point towards the customer. Also it gives the customer the certainty that they have a physical contact point when necessary (HBD, 2011). This development offers opportunities towards the vitality of downtown shopping centers. It means that online shopping does not erase the need for physical stores but it does have its effect on the number of consumers.

Social media & mobile technology

The relatively new developments in social media and mobile technology will play a large part in the development of online shopping and the development of the physical shopping location. Consumers are becoming better informed than they ever were due to (mobile) sources like product reviews, store reviews and comparisons sites. These sources allow consumers to exactly pinpoint which product they want, where it can be purchased at the lowest price and why they should purchase this particular product there. Consequence of these developments is that the number of customers that visit stores will drop, but the number of paying customers will rise under the condition that a store has the right assortment at the right time. The 'click and pick' principle in which customers choose their product online and pick it up at the physical store also increases the number of paying customers. Social media like facebook plays an important role in the rating of products and stores and therefore the generation of customers. Recommendations by facebook friends and the like/dislike ratings are a key factor in consumer choices. All in all it is clear that online marketing is an important aspect for the sales volume of physical stores. The store itself more or less becomes a pick-up-point. Due to a better alignment of supply and demand, stocks within stores are decreasing and therefore the size of a store can decrease. Reducing the physical range within stores will vary considerably over the different branches. Especially low-frequency purchases like household electronics or bicycle stores will see a large decrease in necessary store volume (HBD, 2011). Where the decreasing number of customers forms a threat towards the vitality of shopping centers, this trend also offers opportunities because it shows that the physical store is still very important. The decrease in necessary store volume makes it possible to add new functions/stores in the vacant spaces to increase the diversity of a shopping center.

Mega shopping centers in the Netherlands

As previously discussed, in 2004 the restrictions on peripheral shopping developments were abolished and important retail decisions were delegated to the municipalities in the *Nota Ruimte*. The Resolution Spatial Planning in 2010 put the provinces completely in charge of retail development. This stimulated the development of plans for mega shopping malls in the Netherlands. As previously mentioned there still does not exist a peripheral mega shopping mall in the Netherlands today next to the earlier realized areas the Arena Boulevard in Amsterdam, Alexandrium in Rotterdam, the MegaStores in Den Haag and the Designer Outlet Roermond. Recent research performed by Borgers and Vosters (2011) concerning preferences regarding attributes of mega shopping malls shows that from a set of ten predetermined mall attributes, the parking tariff and design style of the mall are the most important attributes in terms of influencing the attractiveness of a mega shopping mall. Somewhat less effective attributes are type of

anchor stores and type of traffic allowed in the shopping centre. Moderate effective attributes are scale and total length of the shopping streets and accessibility by car. Finally, the levels of the attributes type of shopping supply, accessibility by public transport, and type of entertainment activities in the shopping centre appear to be less differentiating. Note that this list is made from a predetermined set of attributes. Attributes in terms of supply for example have not been taken into account but they are most likely of great importance. These and more important shopping center attributes are discussed in paragraph 4.3.

Diversity in shopping centers

The diversity in types of stores in shopping centers in the Netherlands is declining. Over the period from 2004 to 2008 the top 15 shopping areas showed an increase of stores with a more general range (food, clothing, books, office supplies etc.) and a large decrease in stores with a more specialized range (handicraft, building materials, major electrical household appliances etc.). The latter two types have moved towards the edge of the city due to a demand of space or they have been relocated to large-scale concentrations outside the city. City centers of large cities in the Netherlands do not appear in the top 15 of the most diverse shopping centers. This is due to the fact that big cities show an increasing trend of clustering of the same types of stores in shopping centers and large-scale concentrations (Beunen, 2008). This is a remarkable development because as paragraph 4.3 will show, diversity within shopping centers is an important attribute for the recreational consumer. Especially when the main motivation of visiting a shopping center is window shopping, looking for new trends and products without purchasing. The diversity therefore could be an important subject to research in relation to the main question.

2.5 International shopping center concepts

Looking at other nations it is clear that some retail developments have not been implemented in the Netherlands yet. History has taught us that successful concepts eventually will find their way here, if laws and policies allow for these concepts. Now, when the retail dynamics are more and more getting a global perspective with suppliers of retail concepts from America, Asia and Europe, this paragraph will show that the Dutch retail regulations often are unique. By understanding the global dynamics, the Netherlands will be better prepared for the future (Evers et al. 2005). Therefore this paragraph zooms in on retail concepts abroad which differ from the Dutch retail structure and which could also be of importance towards the attraction of the recreational shopper.

The USA

The United States has more shopping centers than high schools, and in the last forty years, shopping center space has increased by a factor of twelve. By 2000, there were more than 45,000 shopping malls with 5.47 billion square feet of gross leasable space in the United States. Currently, America's shopping centers (most of which are strip malls) generate more than a trillion dollars in annual sales (Farrell, 2003). The American inner cities have suffered a lot under the explosive growth of peripheral shopping centers as already was mentioned. Despite or because of the dominant position of malls they appear to be at the end of their lifecycle, the concept is showing that it is losing its unique attractiveness. They are losing market share to each other due to saturation and scale magnification. Important reason for the current status the American retail sector finds itself in is the liberal policy environment. The nation can be seen as a laboratory for new developments. Retailers are free to settle themselves wherever they want. Restrictions on this policy are given by the American competition authorities who preserve the retail market from the development of monopoly positions. Also large-scale developments can be stopped by citizen initiatives. Furthermore there is the Big Box Ordinances, which draws limitations on the size of individual stores. These limitations though are still very liberal in comparison with European

regulations. The results of spatial planning in the USA give an indication what could happen in the Netherlands if the market would be liberalized although, as previously discussed, the latest more liberalized regulations did not have its effect yet. An important learning point for the Netherlands towards the development of peripheral shopping centers is that it is not a single one-time project. Over the years demands might rise and change. Therefore expansion towards other activities or changes within the current center will be necessary (Evers et al. 2005). It is clear that the implementation of the American mall concept in the Netherlands would form a threat towards downtown shopping centers. The concept itself could provide information on certain attributes that made the mall so successful and which could also be implemented in downtown shopping centers. This will be further discussed in paragraph 4.3.

France

France is well known for its *hypermarchés*. These hypermachés have a very broad assortment, low pricing and large free-parking areas. It is in most cases even virtually impossible to reach the location without a car. The total shopping floor space of hypermarchés represents almost half of all retail sales in the category food in France. Large scale retail developments were for a long time encouraged through regulation by the French government. Therefore the hypermarché was free to grow to the proportions it has today, in which the market is fully saturated. Since the 70's, regulations have been implemented to counter the growth. Most important result of these regulations is that the supermarché branch has moved its activities towards Spain. Also there have been experiments with smaller formulas which do align with the new legislation but, due to the saturation by the current hypermarchés, it has not been a success. The enormous size, assortment and variety in stores in hypermarchés cause a large influx of visitors who tend to stay there for a relatively long time. This makes the addition of bars and restaurants essential. Also the large influx allows for the addition of leisure oriented attractions (Evers et al. 2005). Although it seems unlikely that the concept will be implemented in the Netherlands, it could also contain some interesting attributes towards recreational shopping.

Germany

With over 80 million citizens, Germany has the biggest national retail dynamics of Europe. There are great differences in the retail structure of West- and East Germany, but there are also elements which share the same characteristics. Just like most other European countries, for the last decades there has been a trend of scale magnification in Germany. Stores and retail companies are growing bigger while the number of organizations is declining. The country has multiple forms of peripheral retailing. Both the east as the west part have many peripheral shopping malls and strip malls, but they were much earlier developed in the west (in the seventies and eighties) than in the east (mostly during the nineties). These developments have always been labeled as unwanted due to the governmental spatial planning system which was based on the Christaller theory. Over the years multiple regulations have been introduced which preserved the hierarchy of (downtown) shopping centers as it was intended by German government. These regulations greatly slowed down the peripheral retail developments. One important regulation on this area is the 1.200 square meters norm. Stores with a floor space higher than this norm can only be developed within existing shopping areas. Effects of these regulations are that downtown shopping centers are flourishing in comparison with the peripheral shopping areas; these are in most cases showing signs of decay (Evers et al. 2005). This scenario is not unlikely to also occur in the Netherlands. Over the last years the Dutch government loosened regulations towards peripheral developments but in order to preserve the hierarchical structure, with its downtown shopping centers, it is not unlikely that the same type of regulations like in Germany could be implemented in the future.

Belgium

The retail structure in Belgium is differently organized than in the Netherlands. Although there are differences between Flanders and Wallonia, in general the country has more stores but a smaller average floor space per store (Evers et al. 2005). Looking at the region Flemish-Brabant, there are some interesting differences to be found with the Dutch retail structure. The region has the same number of stores per citizen compared with the Netherlands but these stores are on average smaller and much more spread over the region. The number of distributed stores is much larger. These distributed stores are mostly run by independent small business owners and often located on unexpected peripheral locations. Also the (downtown) shopping centers in Belgium show much less cohesion than they do in the Netherlands. They contain fewer stores and the borders of these shopping centers are often indistinct. The retail structure in Belgium therefore can be characterized as chaotic and it resembles the Dutch retail structure of 30 years ago. There is room for dynamics in the Belgium retail structure and this is already showing in the closure of many proprietary stores and the rise of store chains over the last two decades. The characterization of Belgium having a chaotic retail structure does not necessarily mean that it performs worse than the Netherlands, especially from a recreational consumer point of view. The differences between Belgium and the Netherlands therefore could be of importance in assessing the effect of the commercialization of the retail sector on the recreational consumer.

2.6 Conclusions

Looking at the historic developments of the retail sector in the Netherlands it is clear that the downtown shopping center plays an important role in the Dutch retail landscape. It mainly originated after the Second World War when many inner cities had to be rebuilt. Today the country counts a total of 17 fully grown downtown shopping centers which represents over 10 percent of the total floor space of shopping areas in the Netherlands. Due to multiple reasons the downtown shopping centers vitality has come under pressure the last decades. One important reason is the market saturation which changes the demand driven market into a supply driven market in which competition with other locations is expanding and vacancy of stores increases. The competition is also driven to higher levels due to governmental policy changes over the last decade which has made the development of peripheral shopping centers more accessible although it has not led to the realization of new peripheral shopping centers. Furthermore the rise of online shopping and new social media and mobile technologies also threatens the vitality. The recreational shopper (fun-shopper) is an important type of consumer which offers opportunities to revitalize the downtown shopper center and therefore is a relevant subject for further research. The shopping mall concept as it is well known in the USA is a good example of recreational shopping driven retail concepts. This and the hypermarchés concept of France, the retail structure in Germany and Belgium are interesting concepts to compare with the Dutch shopping centers. The research goal of the second phase of this project focuses on defining the most important shopping center attributes of the Dutch shopping centers which could lead to the conclusion that these attributes are in line with international shopping center concepts.

3. Leisure

This chapter gives an overview of the leisure sector and its developments in the Netherlands and abroad. Leisure is a broad definition and therefore the main focus of this chapter is narrowed down to leisure functions in the downtown area and/or within shopping centers which will mostly be looked at with a real estate point of view. The aim of this chapter is to show how leisure over the years has grown into an important business and how this business provides both opportunities and threats towards the revitalization of downtown shopping centers. In paragraph 3.1 definitions are given for the main aspects of this chapter. This is followed by an overview of historic developments of leisure in general and leisure combined with the retail sector. Next, a number of relevant trends and future developments are given towards leisure and its possible influence on shopping (centers). In paragraph 3.4 an overview is given of parties involved and the role that these parties play in the development of leisure. In the last paragraph conclusions are drawn towards the most important findings of this chapter.

3.1 Definitions and descriptions

Leisure

The term leisure does not have a general definition which is used worldwide. For instance free-time sciences and real estate sciences tend to have different views on the term. Looking at some of the definitions used, leisure can roughly be divided into four components (De Jong, 2006).

- *Leisure as (free) time.* This definition is used for instance by 'het Centraal Bureau voor de Statistiek' (CBS) and 'het Sociaal Cultureel Planbureau' (SCP). In this form the term leisure can be described as the time that remains after 'obligational time' like work, study, taking care of the household and 'personal time' like hygiene, eating and sleeping.
- *Leisure as an activity.* In this view leisure is seen as the activities that are taken within a person's free time and which are chosen by this person with a relatively large degree of freedom in order to gain intrinsic satisfaction.
- *Leisure as an experience.* The third component views Leisure as an experience in which the motivation to gain knowledge, entertainment, satisfaction or other types of personal developments is the main goal.
- *Leisure as an object or service.* The last component is one which is mainly used from a real estate point of view. In this case a distinction is made in leisure as an activity and leisure as an object/accommodation or service which provides the supplies to perform this activity.

The research aim is to give insights and advice to developers, investors, governments and other actors involved in the development and decision making process concerning shopping centers and leisure. Therefore the final results concerning leisure will be translated towards leisure as an object or service. In order to get these results it will be necessary to look at all the four components of leisure.

Types of leisure

Also in the types of leisure it is not possible to make a clear distinction into different categories. Different organizations/people use different distinctions which mutually show both overlapping as unique categories. Table 3.1 gives an overview of categories used by three organizations: CBS, SCP and NBTC-NIPO (A joint venture specialized in research on holidays, free-time and business travels in the Netherlands).

Table 3.1 Leisure categories used by different organisations

Organization	NBTC-NIPO	SCP	CBS
Categories	Going out	Watching TV	Media
	Outdoor recreation	Reading	Going out
	Recreational shopping	Listening Radio/Music	Vacation
	Visiting attractions	Computers and games	Culture
	Culture	Hobbies and games	Sports
	Visiting events	Sports	
	Own sports	Culture and entertainment	
	Water recreation and sports	Resting	
	Other hobbies/activities		
	Visiting sports games		
	Wellness/beauty		
Source	<i>NBTC-NIPO (2011)</i>	<i>SCP (2011)</i>	<i>CBS (2011)</i>

It is clear that the types of leisure used in a research are mostly chosen by the goal of that research. Because this research will be mostly conducted from a real estate point of view, the activities which are conducted at home and/or without the use of leisure services/objects might be less of interest and therefore can be summarized into one or two categories with a broader spectrum. The types of leisure which do involve visiting accommodations or using services are of greater importance and therefore will be more specifically categorized. The exact categorization used in this research is discussed in paragraph 6.2.

Leisure shopping centers

Although all shopping centers are to some degree leisure centers, according to Howard (2007) a distinction can be made into three models of leisure shopping centers:

- Ambient leisure, no commercial leisure at all, but the facilities and environment present are intended to make shopping a pleasant or less stressful experience, from seats to crèches to catering. Ambient leisure is required to increase the attractiveness of any trip or place.
- Magnet leisure in a mall, designed to attract its own incremental traffic or dual purpose visits to both commercial leisure facilities and retail outlets. Magnet leisure activities added to the retail mix attract more leisure-oriented trips which may or may not also be shopping trips.
- Heritage-destination leisure: where the heritage or tourist environment is the real draw and the retail trade derives its footfall from this. This can be extended to include purpose built leisure centers and parks, where sports or leisure activities are the main draw. Destination leisure may produce a mix of leisure and shopping or mixed trips.

These three types are interesting to keep in mind when evaluating the Dutch downtown shopping areas. The upcoming research might prove that working towards a certain type of leisure shopping center is the answer for the revitalization of the shopping centers.

3.2 Historic developments

The rise of leisure within modern society is explained through the four stages of the economy. First there was the agrarian economy followed by the industrial economy. The postindustrial society starts with the services economy and according to Pine and Gilmore (1999) we now find ourselves in the fourth stage: the experience economy. In this stage the customer wants more than just a product or service, they are willing to pay for an experience. Of course leisure was also present in the previous economic eras but it was due to the experience economy that the leisure sector became one of the most important economic pillars of modern society.

The Netherlands

In the Netherlands, there already exist built services which explicitly and accessibly offer an active or passive way to spend time in a pleasurable manner for over a hundred years. A good example is the cinema which became popular during the 20s and 30s of last century. Also dance schools and music kiosks were permanent services which would now be classified as leisure. Also within the retail sector leisure exists for a long time through recreational shopping. The arcade, which was first built in France as previously discussed in paragraph 2.2, differentiated itself from traditional shopping streets due to the pedestrian area, the luxurious vibe and the planned origin. These arcades and the first department stores which found their origin in Germany are the first examples of retail which allows recreational shopping. The large shopping centers which were later on developed, starting with the Lijnbaan in Rotterdam which opened in 1953, further intensified recreational shopping as a leisure activity. The development of leisure functions in the Netherlands was almost completely taking place within cities until the last few decades. Only rarely there were developments in outer city areas (Poell, 2001). After the 1973 Peripheral Retail Policy, large scale shopping concentrations were realized in outer city areas but these were not directly focused on leisure, by means of recreational shopping, due to the limited set of branches that were allowed to be developed. In the 90s' the Large-Retail-Concentrations Policy erased almost all branch limitations which led to the development of The Arena Boulevard in Amsterdam, Alexandrium in Rotterdam, the MegaStores in Den Haag and the Designer Outlet Roermond which all are mostly oriented on recreational shopping (Evers, 2011). Although these developments have increased the competition with inner city leisure developments, the Dutch inner city can still be viewed as a 'leisure center'. It is a concentration of public oriented services like shopping, museums, cinemas, restaurants, etc. in a pleasant environment. The city centers of today have mostly had an organic type of growth instead of a planned and gradually development. Shopping has always been the biggest mainstay for the leisure function of inner cities (Poell, 2001).

The USA

In the historic overview for the retail business in paragraph 2.2 it has already been discussed that the American shopping mall is the most important form of recreational shopping. Today, a mall has a wide variety of leisure functions next to shopping. The mall has become a 'leisure paradise' where the entertainment function has become just as important as the shopping function. Due to the success of the mall, inner cities in America became less lively and divers. In order to revitalize the inner city a new concept has been introduced in the 1990's: the Urban Entertainment Center (UEC). It is a hybrid product with different components. It offers 'experience' by means of a mix of stores, hospitality functions and entertainment. All of this fitted within some type of theme which makes it recognizable towards customers. The goal is to develop a mix which distinguishes itself from the region and which is capable of drawing a wide range of target groups. A UEC in general does not have major anchors but it is also not anchorless (Poell, 2001). The Urban Entertainment center concept could also be implemented in the Dutch downtown shopping centers and therefore will be further discussed in paragraph 3.3.

England

In the 90's the leisure sector in England has seen a large increase in importance. Consumer spending on leisure rose in the period 1990 to 1996 with 28 percent. This was more than in every other real estate sector. The growth within the supply side manifested itself mainly in out-of-town developments in the form of the Family Entertainment Center (FEC). This is a more modest version of the Urban Entertainment Center. A FEC mainly consists of a collection of traditional games like bowling, pool or snooker and videogames. These activities are supplemented with hospitality functions. All the out-of-town developments, including the shopping centers as discussed in paragraph 2.2, had the same effect on the inner cities as they had in the USA: a decrease in the vitality and quality of the inner city. During

the mid 90's the government decided to turn this trend around by putting restrictions on out-of-town developments and by stimulating inner cities with the Urban Entertainment Concept (Poell, 2001). It shows that yet again the UEC concept is used to revitalize the downtown area of a city which underlines the possible potential of the concept for the Dutch downtown shopping centers.

3.3 Trends and future developments

The size and form of leisure has changed over the course of time. The supply has become more commercial and it has become more trend sensitive. This trend related function of leisure withholds risks due to the fluctuating popularity of certain functions or concepts. What is 'cool' now, can be 'un-cool' a couple of years later. A good example is the activity skating and skateboarding which has seen large fluctuations in popularity in the last decades. There are also functions like cinemas, bowling and gyms which are less trend-sensitive. These functions have slowly evolved over the years into well functioning leisure concepts. Nevertheless these functions also need to continuously update themselves to keep up with changing trends in the leisure market (Van Dam, 2008).

Urban Entertainment Centers

In paragraph 3.2 it has already been discussed that the urban entertainment center (UEC) concept has already been implemented in the USA and England. UEC's combine a cinema anchor with a wide range of leisure related uses, aiming to create a one-stop entertainment destination of regional magnitude. By offering a critical mass of activities in the same location, such centers provide an opportunity for customers to optimize the use of their leisure time and spend a night or afternoon out with the family or a group of friends without a particular choice of activity in mind. Compatibility and synergy drive the composition of the ideal function mix in UEC's. In general the following function categories are of importance for an ideal mix: cinemas, restaurants and bars, other leisure uses, sport-related activities, retail and a lively animation policy. New-generation multiplex cinemas usually play the role of the anchor, generating an ample customer flow. The retail function consists mainly of culture and sports-related retail concepts like mega-bookstores, record and video stores, sports clothing or apparel or hi-fi/computer stores. These stores perform well in the context of UEC's. This can be extended with the so called 'lifestyle' retailers such as the Gap or Niketown. Purely convenience shopping, including food, does not hold any synergy with entertainment (Doury, 2000).

Commercialization of leisure

According to Kooijman (2002) there are two categories of real estate leisure. First, there are the indoor ski-centers, theme parks and fitness centers. These are the independent leisure facilities. The second category is connected with existing facilities and buildings, like stores. The store shows a clear trend of more leisure-related services. It is not just about offering products anymore, it is about offering an experience. This trend is also visible the other way around in the first category where a 'machinery' of retail is developed around leisure facilities. In general the term leisure is commercializing. This commercialization is shown in two developments on the supply side. First there is the trend of chain formation. This is best shown in the rise of fitness chains like Fitness First which can be found mostly on peripheral areas in the proximity of large-scale shopping concentrations. This chain formation is already well known in the retail sector. The second trend is the increasing number of indoor facilities. For instance, many (recreational) sports nowadays are practiced within buildings. This shows a clear tilt with recreation in the past which was in general seen as an outdoor activity. According to Kooijman this indoor trend is also a sign of the individualization of free-time spending (Luijten, 2007).

3.4 Conclusions

It is clear that the addition of leisure to a shopping center can play an important role in the performance of a shopping center. The American mall concept and the Urban Entertainment Center concept are proof of the potential contribution of leisure activities towards the performance and possible revitalization of shopping centers. The trend sensitivity of certain leisure activities could form a threat to its performance but all in all the mix of leisure activities and retail will benefit the attraction of recreational consumers. For this research it will need to be identified if and to what extent the addition of leisure activities, alongside existing activities, will help the Dutch downtown shopping areas in their attraction towards the recreational consumer.

4. The recreational consumer

This chapter focuses on the recreational consumer and therefore the demand-side of the retail and leisure dynamics. As previously discussed the recreational consumer is the main target group in relation to the revitalization of the downtown shopping area in this research. First, the various types of consumers, according to their reasons for visiting a shopping center, will be discussed. This is followed by an overview of the free time development of the Dutch citizen. Next, an overview is given of research conducted on consumer behavior/preferences on the area of shopping(centers). The last paragraph sums up the most important conclusions that can be drawn from this chapter with regards to the research.

4.1 Types of consumers

The shopping consumer can be divided into different groups according to their reasons for visiting a shopping center (Dirks and Janssen, 2003):

- *The targeted shopping consumer.* This type of consumer has only one goal, and that is to get as easy and fast as possible the product they came for. Targeted shopping implies a rational way of shopping which is mainly applicable for the primary needs. Accessibility and qualitative parking services are essential to this consumer. This type of consumer is often also called the *run-shopper* or the *utilitarian-shopper*. Utilitarian shopping means the acquisition of products in a purposeful and efficient process (Hirschman and Holbrook, 1982). In this research the term targeted shopping consumer will be used.
- *The recreational consumer.* Consumers of this type go to a shopping mall for a fun day out and therefore are most likely to stay for a relatively long time. There is a need for a broad variety of functions, for instance restaurants and leisure next to shopping. Accessibility and parking services are also of importance. More preferences of this type of consumer towards shopping centers is further discussed in paragraph 4.3. This type of consumer is often also called the *fun-shopper* or *hedonic-shopper*. Hedonic shopping refers to the enjoyment and pleasure that consumers may receive from shopping (Hirschman and Holbrook, 1982). In this research the term recreational consumer will be used. The tourist in relation to shopping is generally also categorized as a recreational consumer.
- *Passers.* These are the consumers who pass through the shopping center on their way to another destination. They did not intend to buy anything but could be tempted to purchase something while they are there.
- *Contact focused consumer.* These consumers are people who go to the shopping center with a goal other than shopping, for example meeting with a friend to talk.
- *Residing consumer.* The residing consumer did not intend to visit the shopping center but is 'forced' to go there due to external causes. Most probable cause is rain or storm outside. During the time that it's raining the consumer will be tempted to make purchases.

In another view, Peeters (2008), states that there are only three groups of shopping individuals: goal directed shoppers, pure entertainment seekers and those who do both. In this case the goal directed shopper obviously is the run-shopper and the pure entertainment seeker is the fun-shopper. The recreational consumer is the main focus group within this literature study as stated in the main question. Therefore all research conducted in this chapter is oriented on this type of consumer.

4.2 Free time development

Current time spending in general

Overall, in the Netherlands people spend less time than the European average on obligations. This involves activities like education, paid work, housekeeping and child care. 'Obligated' means that the possibilities for postponing or canceling these activities are very limited. The Dutch spend relatively much time on traveling and they also have more free time than the European inhabitant average. Free time does not only involve leisure activities but also social activities like voluntary community service. In the Netherlands, a person has an average of 5 hours and 24 minutes free time for every day of the week. This is less than people from Norway, Belgium, Germany and Finland. But it is considerably more than any east-European country where the amount of free time is relatively low (SCP, 2011).

Social activities

There are four types of social activities that can be defined. First there is keeping up social contacts, for example visiting friends and family. The second type is offering informal practical help to other households. The third is voluntary community service and the fourth and last type is attending (religious) meetings. The comparison of the Netherlands with 15 other European countries shows that the overall time spent on social activities is in line with the average of Europe. Approximately 1 hour and 22 minutes a day is spent on social activities. The activities keeping up social contacts and voluntary community service are above average. The activity of offering informal help is average and attending meetings is below average. The comparison between men and women shows that women spend most time on social activities (SCP, 2011).

Leisure activities

The Dutch spend about 4 hours and 3 minutes on leisure activities in one day. This includes the following activities: watching television, listening to music, reading, computer activities, gaming, sports, practicing hobbies, resting and the last one is participating in events for entertainment and culture. In the Netherlands quite some time is spent on leisure activities. Only Belgium and Finland have a higher average of respectively 4 hours and 26 minutes and 4 hours and 25 minutes. Most time is spent on watching television, followed by reading, sports and resting. The activity culture and entertainment includes visiting a cinema, theatre, concert, art exposition and a museum. Also activities like visiting a soccer match, theme park, zoo, beach or carnival are counted as entertainment. Note that the activity recreational shopping is not counted as a leisure activity in this research conducted by SCP (2011). On average about 10 minutes a day is spent on entertainment and culture. Most of this time is spent during the weekend due to the fact that weekends in general contain less obligatory activities. The climate of the different countries appears to have a very limited effect on how free time is spent (SCP, 2011). The research institute NBTC-NIPO, has performed studies concerning the free time spending on out-of-home leisure activities. The results are divided over three periods as shown in figure 4.1. It shows that in these statistics recreational shopping is, alongside individual sporting, the second most attended leisure activity after outdoor recreation. It takes up about 17 percent of all our leisure activities. The total number of leisure activities participated in shows a decline over the last years. In the period 2006-2007 a total of approximately 4 billion activities were reported. In 2008-2009 this declined towards 3.6 billion and in the last period, 2010-2011, the total number was 3.4 billion. Interesting development is that despite the overall decline of free time activities, the number of recreational shopping activities virtually did not decline in the last period with a total of 546 million activities in 2008-2009 and 540 million in 2010-2011.

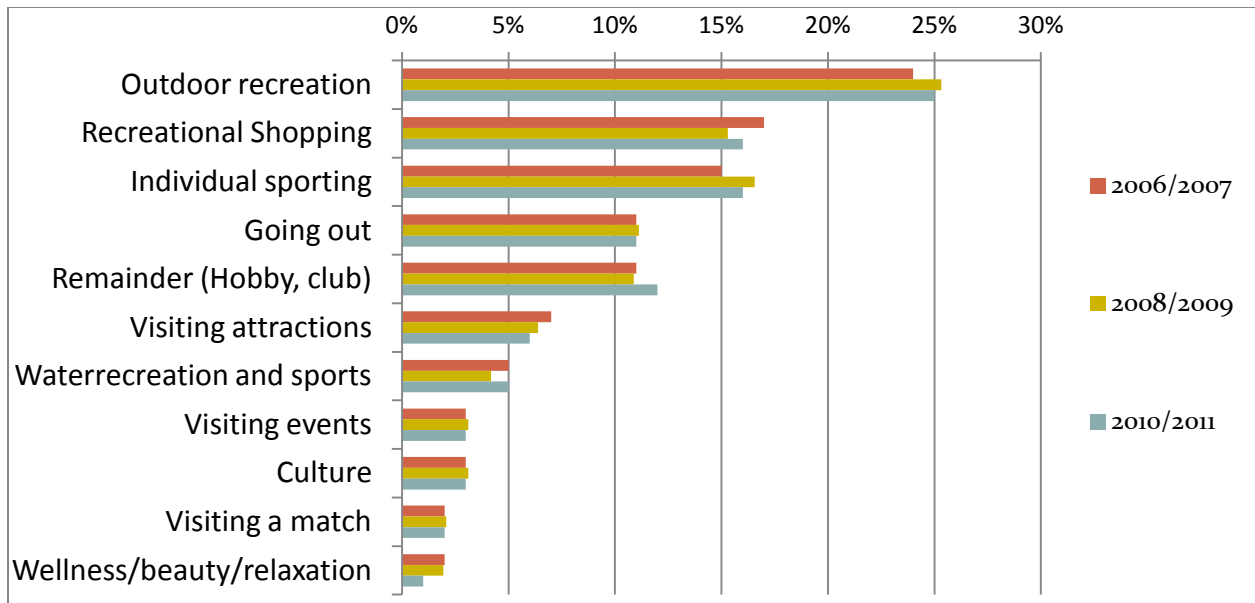


Figure 4.1 Overview of most attended free time activities in the Netherlands (NBTC-NIPO 2007, 2009 and 2011)

Segmentation in age groups

Figure 4.2 shows that the most daytrips in the Netherlands are taken by the age group of 25 to 45 years but that the number has dropped tremendously in the last recorded period. The age groups of 45 to 65 and even more so the group of 65 years and older are showing an increase in total daytrips. It is clear that the aging population is the main reason for these changes.

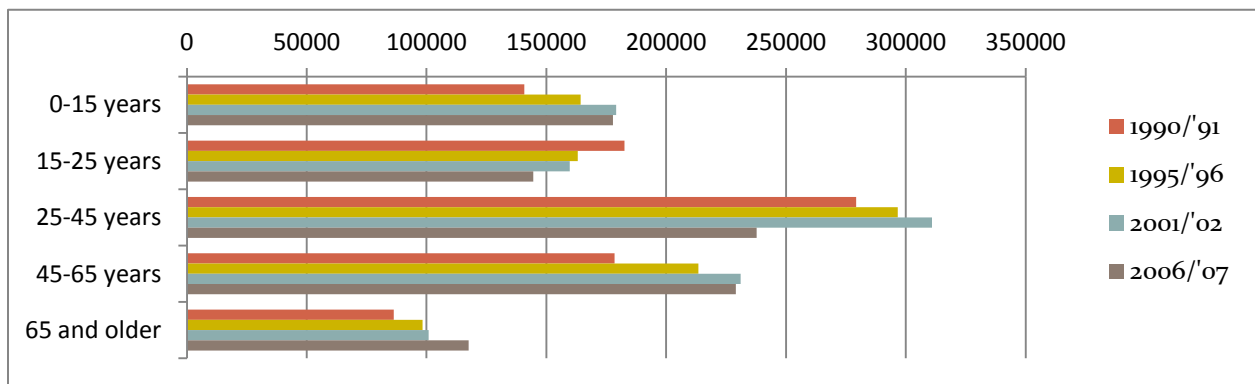


Figure 4.2 Total number of daytrips per age group (x1000), (CBS, 2007)

When we look at the total number of daytrips taken that involved recreational shopping in figure 4.3, the same effects are shown over different time periods. The age groups 45-65 and 65 and older show an increasing trend while the age group 25-45 shows a decreasing trend. Although the latter age group was still the group with most recreational shopping daytrips, a continuation of the current trend would mean that the age group of 45-65 years will become the biggest. This could have its consequences for shopping centers and their approach towards consumers due to possible changes in interests and preferences and therefore is of importance to keep in mind for this research.

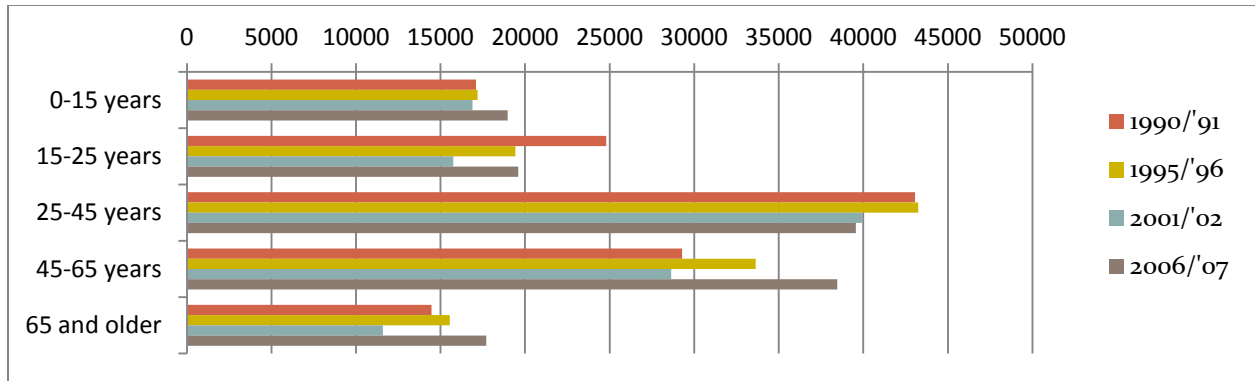


Figure 4.3 total number of daytrips for recreational shopping per age group (x1000), (CBS, 2007)

4.3 Consumer behavior / preferences

In order to be able to identify what stimulates a recreational shopper to visit a shopping center it is important to get a good overview of which research has already been performed on the area of consumer shopping behavior and preferences. The literature on consumer shopping behavior is fragmented and findings are sometimes inconsistent. This paragraph gives an overview of the most relevant conclusions that are drawn from previous research divided in the following subjects: Shopping motivations, shopping center attributes and tourism shopping.

Shopping motivations

In order to be able to stimulate the recreational shopper it is essential to know what the main motivations are for a consumer to visit a shopping center. The results of the search towards these motivations are given in this paragraph. All results are relatable to shopping centers with a (supra)regional catchment area and therefore also the downtown shopping center. An important study was conducted by Bloch, Ridgeway and Dawson (1994), who found that consumers view shopping centers as a place not only for shopping but also for other activities, such as entertainment, socializing with friends and browsing with no intentions of buying. These multiple motives inherent within a single shopping trip clearly indicate the entertaining capabilities of shopping. According to Cox et al. (2005), the shopping motive to socialize and mingle with other shoppers is of relatively little importance for consumers. In this research bargain hunting appears to be the most important source of shopping enjoyment followed by recreational browsing or window shopping. Other sources are the enjoyment of being pampered by the salespeople, the sensory stimulation of visiting a store or shopping center and the kinesthetic experience. A third and most recent research on this subject identifies a division into two types of shopping motivations based on a literature study and on interviews. The two types are: shopping trip value, which is originated by fulfillment of general shopping motivations, and in-store shopping value, which stems from retail elements that create in-store shopping experiences that consumers have in specific retail contexts (Davis and Hodges, 2012). Table 4.1 gives an overview of the motivations/values identified. A total of 11 values are identified but the importance and ranking of each value is not given in this research in contrast to Cox et al. (2005) as shown in table 4.2. It is interesting that the top five of shopping motivations is mostly recreational oriented, which shows that the recreational shopper already is the most important type of consumer for shopping centers. There is much more literature to be found on this subject which might include motivations that are not mentioned here. Nevertheless it can be assumed that the motivations that are mentioned here are the most relevant towards the research goal because the research conducted by Davis and Hodges is partly based on a literature study.

Table 4.1 Consumer shopping values/motivation (Davis and Hodges, 2012).

Shopping trip values	
Functional value	Shop to purchase products that are needed or wanted.
Self-gratification value	Relax, release stress, or have a change from routine.
Epistemic value	Get inspired and find new ideas by the exposure to new trends and fashions, new ideas, and novelty goods in the marketplace.
Socialization value	Spend some time with family or friends.
Transaction value	Hunt bargains because of the thrill of finding a really good deal.
In-store shopping values	
Product quality value	High quality merchandise.
Product price value	Good price value for products.
Product selection value	A good selection of different styles and brands, including private labels.
In-store service value	Good service and interaction with sales personnel.
Shopping environment value	Pleasant and relaxing shopping environment
Shopping efficiency value	Go in, get what is on the shopping list, and get out quickly.

Table 4.2 Most important shopping motivations (Cox et al. 2005).

1	Bargain hunting	Hunt bargains because of the thrill of finding a really good deal.
2	Recreational browsing / window shopping	Get inspired and find new ideas by the exposure to new trends and fashions, new ideas, and novelty goods in the marketplace.
3	Service	Being pampered by the salespeople.
4	Sensory stimulation	A change from routine, getting out of the house in a new environment.
5	Kinesthetic experience	The physical exercise that is created by shopping.

Shopping center attributes

This paragraph gives an overview of consumer preferences towards certain attributes of shopping centers. These attributes have to align with the preferences that emerge from the previously discussed shopping motivations in order to attract consumers. Although it is clear that the supply that shopping centers offer through a mix of stores and services is the most important attribute, there are many other attributes that influence the decision of consumers to visit a shopping center. In this overview there has not been made a distinction into the type of shopping center (downtown, peripheral, etc.) but it does only include results that are applicable for (supra)regional shopping centers. Table 4.3 contains a broad list of attributes that are generally preferred by consumers and which are derived from previous research on this subject. The list is categorized into subsets like accessibility, atmospherics, etc.

Ibrahim and Chye (2002) researched factors that influence the frequency of shopping center visits. It was concluded that there are two significant attributes that affect the entertaining shopping experience. These attributes are 'effort' and 'center feature oriented'. The first attribute 'effort' was the most significant. It comprises a set of variables relating to the mental and physical efforts which the shopper needs to make during the shopping trip. These variables are: traveling time to shopping center, directness of travel to shopping center, absence of waiting time, shortness of walking distance, low-cost travelling, absence of congestion, absence of crowd and smoothness of travel. The second significant factor 'center features oriented' incorporates the following variables: good lighting in shopping center, availability of unique store design, wide variety of products, availability of celebrations, activities and functions in shopping center, availability of sales, promotions, discounts and bargains, wide variety of stores, availability of food court/restaurant, good air quality and high quality sales service. Thang and Tan (2003) identified the following significant variables on how consumer perception of the attributes of

store image affects their preference for the stores (listed in a descending order of importance): merchandising, accessibility, reputation, in-store service, store atmosphere and promotions. In the area of shopping atmospherics Michon, Chebat and Turley (2005) concluded that pleasant ambient odors have a positive influence on shoppers' perceptions. Finally, the previously discussed research by Borgers and Vosters (2011) concluded that the following attributes play an important role within large shopping centers: parking tariff, design style, type of anchor stores, type of traffic allowed in the shopping center, scale, total length of the shopping streets and accessibility by car.

Tourism shopping

Shopping is one of the most pervasive leisure activities engaged in by tourists and is recognized by scholars as a significant economic, psychological, and social pursuit by vacationers. From an economic perspective, shopping is the most popular activity sought while on vacation by US consumers. Tourists and residents often share vibrant shopping spaces which serve as leisure locales where social bonding occurs among users (Snepenger, Murphy and O'Connell, 2003). During the limited time spent in a place, shopping is probably one of the easiest and best means of experiencing the local culture. Destination authorities should recognize the significance of creating appealing shopping districts, as tourists would prefer exciting shopping experience offered by nearby rival towns to weaker shopping districts. Giving managerial attention to exterior shopping environment is particularly important since it must be considered acceptable and pleasing before the interior of the shops is ever experienced. Yüksel (2007) states that environmental perceptions affect shopping emotions, values and behaviors. Higher favorability of the environment with activating nature is associated with greater approach behaviors. Tourists tend to show a high willingness to talk to salespeople, spend more time browsing and exploring the products, and spend more money than originally planned when the climate of the shopping habitat is perceived to be stimulating. This implies that destinations possessing shopping locations with dreary environments may be at a disadvantage when compared to more interesting environments of other nearby destinations.

A research performed on tourist shopping behavior in downtown shopping areas (Kemperman, Borgers and Timmermans, 2009), shows that the preferences for shopping streets are related to shopping supply and the accessibility from each street to shopping supply in other streets. Further, distance from and to the entry link of the whole downtown area (near car parks, bus stops, bike sheds, railway station, or other locations) and the history of the route are important factors influencing route choice behavior. Tourists tend to make roundtrips by using the same streets twice. Also, some physical characteristics of the streets are important. Tourists prefer streets with buildings on both sides, that have a good visibility, are pedestrian friendly, but they do not like differences in height (steps). Tourists also have a preference for streets located by the river. Finally, there was concluded that shopping motivations, familiarity with the area and planning of the route affect tourist route choice behavior as well. For example, in contrast to the targeted shopping consumer, the recreational consumer tends to be less sensitive to distance, and prefers streets with a view. The shopping preferences of tourists have also been added to table 4.3 because they are relevant towards most downtown shopping centers in the Netherlands and the recreational consumer in general.

Table 4.3 General consumer preferred shopping center and store attributes

Accessibility	
1 Short traveling time	6 Pedestrian friendly infrastructure
2 Smoothness of travel	7 Little height differences (steps)
3 Low-cost traveling	8 Close by public transport stops/stations
4 Parking tariff	9 Limited total length of shopping streets
5 Accessibility by car	
Atmospherics	
1 Good indoor lighting	4 Piped-in music
2 Unique store design	5 Pleasant ambient odors
3 Much greenery outdoor	6 Good air quality
Supply and facilities	
1 Wide variety of stores	4 Stores with a good reputation
2 Activities and celebrations	5 Leisure oriented facilities
3 Food court/restaurant	6 Anchor stores
Product quality and others	
1 Wide variety of products	4 High quality sales service
2 Availability of sales	5 Discounts and bargains
3 Promotions	

Ibrahim and Chye (2002), Thang and Tan (2003), Michon et al. (2005), Yüksel (2007), Kemperman et al. (2009), Borgers and Vosters (2011).

4.4 Conclusions

Recreational shopping is one of the most popular free-time activities in the Netherlands. The total number of recreational shopping activities did decline over the last few years but this decline is less steep than the overall decline in free time activities which shows that this activity is still growing in popularity in relation to other types of free-time activities. The top five of main shopping motivations are mainly recreational oriented which underlines the importance of the recreational consumer for shopping centers. Most important motivation is bargain hunting followed by window shopping, service, sensory stimulation and the kinesthetic experience. Looking at the shopping center attributes, the accessibility and diversity in stores and products are important characteristics but there are much more attributes that contribute to the attraction of a shopping center. Literature offers much information on shopping center and/or store attributes that are preferred by consumers. However, there is little known about which attributes specifically stimulates the recreational consumer to visit a shopping center. In light of the research goal this is further investigated in the remainder of the graduation research.

5. Data collection

The project aims to improve the attractiveness of the Dutch downtown shopping centers first by analyzing the most important factors on the choice behavior of the Dutch citizen for a free-time activity (phase one) and secondly, by analyzing the most important shopping center attributes on the choice of downtown shopping center by the recreational consumer (phase 2). This research goal is divided into six research questions evenly divided over both phases. In order to be able to answer the research questions, data will need to be collected which allows for conducting statistical research on the topic. This chapter describes which variables will be involved in the research, how these variables will be applied per phase and how the data for these variables is obtained. Paragraph 5.1 provides the list of variables that are involved for both phase 1 and 2. These variables are extracted from the research design as discussed in paragraph 1.3. The next paragraph describes the source or method that is used to obtain the necessary data per type of variable. The last paragraph of this chapter provides a list of shopping centers in the Netherlands that are observed for this research and which will be used as the choice alternatives for the second phase of the research.

5.1 Variables involved

Phase 1

The first phase focuses on the respondent's choice of the free time activity. The three research questions focus on identifying the relationship between three main factors and the choice behavior. These three factors are: personal characteristics, the time of the day and the leisure supply surrounding the residence area. Based on the conceptual framework shown in chapter 1, these three main factors are further divided into a set of variables as shown in table 5.1. These are partly derived from the literature study where the importance of certain characteristics, like age and duration of the activity, already has been discussed. The other variables, like the presence of children within a household and the education level of the respondent, are added on own initiative to research possible relevant effects which have not been discussed in the literature study. The personal characteristic variables will also be part of the second phase of the research and these will act as interaction variables in both phases. The same goes for the 'time of the day' variable.

Table 5.1 variables for phase 1

Personal characteristics	Activity time characteristics
Age	Time of the day
Gender	Duration of activity
Work status	
Household: size	Leisure supply in the area
Household: children	Shortest travel distance per type of leisure
Education	Nr. of leisure facilities within a certain radius

Phase 2

In this phase the choice of the shopping center to visit for recreational shopping is the dependent variable. The three research questions of the second phase of the research focus on identifying the most important shopping center attributes in relation to the choice behavior of the recreational consumer divided into three types, supply, accessibility and atmospherics. The list of variables for supply and accessibility are based on the literature study, mainly from chapter 4. The third type, atmospherics, is partly based on the literature study but because the literature offers little information on the effect on recreational shoppers the list of atmospherics attributes is as broad as possible. By

visiting multiple shopping centers, a list of reoccurring and varied attributes is assessed which can be determined objectively by a random observer. The complete list of variables for the second phase of the research is shown in table 5.2.

Table 5.2 variables for phase 2

Supply attributes	Accessibility attributes
Total number of stores in downtown area	Travel distance
Number of stores per branche in downtown area	Distance, train station – main shopping area
Number of chain stores in downtown area	Distance, bus stop – main shopping area
Number of service facilities in downtown area	Number of covered parking garages (150m radius)
Number of leisure facilities in downtown area	Number of open parking lots (150m radius)
Number of stores in main shopping area	Total number of covered parking spots
Number of catering facilities in main shopping area	Total number of open parking spots
Number of service facilities in main shopping area	General parking tariff downtown
Number of leisure facilities in main shopping area	General parking tariff covered parking garages
Atmospheric attributes	
Size of main shopping area	Presence of music
Height of surrounding buildings	Presence/density of resting points.
Age of surrounding buildings	Presence/density of greenery (trees, planters)
Building type of surrounding buildings	Presence of water (fountain, channel)
Variety of buildings	Presence/density of artworks
Warm/cold color ratio of build environment	Presence of historic churches
Type of pavement	Presence/density of advertisement
Type of traffic allowed	Presence/density of stores
Number of curves/angles within streets	Presence/density of catering facilities
Shape of covered shopping areas	Presence/density of leisure facilities
Number of shopping levels covered area	Presence/density of service facilities
Shape of roof covered shopping area	Height differences in streets
Presence of natural light covered shopping area	Min. sightlines required for overview
Presence of floor plans covered shopping area	Number of Disruptions within sightlines
Presence of rise points (stairs, elevator, escalator)	Shape of squares
Number of entry points covered shopping area	

5.2 Methods and sources for data collection

Personal characteristics, activity time characteristics, choice of activity and choice of shopping center

All of these variables are represented in data provided by the *Rijkswaterstaat Dienst Verkeer en Scheepvaart* (RWS DVS). The research which contains the datasets is called *Mobiliteits Onderzoek Nederland* (MON), which was later changed into *Onderzoek Verplaatsingen in Nederland* (OVIN). In general these datasets report the travel behavior of respondents per day including the personal characteristics of the respondents, the time of the day/week per trip, motive/purpose for each trip and the time spend at the travel purpose's location. This data has been collected in a manner that it represents a good sample of the Dutch society. In order to get sufficient respondents, 3 datasets which contains info over a period of four years, are combined into one dataset. The following three datasets will be used (RWS DVS, 2007, 2009 and 2010) :

- MON 2007 with a total of 52.218 respondents and 180.656 recorded trips;
- MON 2009 with a total of 40.836 respondents and 140.904 recorded trips;
- OViN 2010 with a total of 43.191 respondents and 136.255 recorded trips.

In order to get only those respondents which are relevant for the research, a number of filters are applied to the dataset. These filters are discussed in paragraph 5.4.

Leisure supply in the area

In order to get data about the supply of leisure facilities in the proximity of the respondent's residence, the dataset *Nabijheid van Voorzieningen 2008* (NVV 2008) is used provided by the *Centraal Bureau voor Statistiek* (CBS). This dataset contains a list with all zip codes in the Netherlands and the total number of times a certain facility is represented within a certain radius of a specific zip code (CBS, 2008). By matching the zip codes of this dataset with the zip codes of the respondents present in the MON/OViN dataset, the supply of leisure facilities within a certain radius per respondent can be determined.

Accessibility attributes shopping centers

The accessibility attributes of shopping centers like shortest walking distance to a public transport facility, parking facilities and parking tariff are determined through own research by means of internet research, google earth and exploration of each shopping center individually. Only the variable travel distance is determined by using a distance matrix which provides the distance between two zip codes, in this case the zip codes for each respondent residential location and the zip codes for each shopping center.

Supply attributes shopping centers

The supply attributes are divided into two types, supply of the downtown area as a whole and the supply in the main shopping area. The determination of the size of the main shopping area is further discussed below. This division is made because in general the proportions of the individual types of facilities are different between the two types. The supply of the main shopping area is counted by hand and is divided into four categories, number of stores, service-, catering- and leisure facilities. The supply attributes in the downtown area (total number of stores, number of stores per branche, number of chain stores, etc.) are provided by Locatus. This company monitors the Dutch retail landscape and provides a large database with all the necessary information for this research (Locatus, 2012).

Atmospheric attributes shopping centers

All of the atmospheric attributes (greenery, music, resting spots, colors, etc.) are obtained by exploring each shopping center using an entry form which allows for an objective determination of these attributes and which would be filled in the same by any random person. In order to be able to fill in these entry forms, specific forms are designed for streets, squares, and indoor shopping areas as shown in appendix 2. Each type of form contains corresponding and unique attributes that need to be assessed. As previously mentioned it is difficult to determine in advance which exact atmospheric attributes are of importance to take into account and therefore the forms cover a broad spectrum of variables that can be assessed objectively. Appendix 2 also contains some additional explanation towards certain variables. These entry forms have been applied on streets, squares or indoor shopping areas which have been assessed as being part of the main shopping area within the downtown area of a city as a whole. Determining the size of the main shopping area is done by applying three guidelines. First guideline is the density of visitors in the street/square/indoor shopping area. If a segment appears to draw much less visitors than the average downtown shopping area, it is not taken into account. The second guideline is focused on the presence of (chain)stores. If the number of stores decreases to a level where it no longer dominates the streetscape, the particular segment is not taken into account. The presence

of chain stores is often also a good indicator for assessing the main shopping area. The third and last guideline is based simply on the appearance of the pavement. All of the researched shopping centers have a certain unique and decorated type of pavement which is placed throughout the whole downtown shopping area. If the pavement clearly changes into a more general, plain type of pavement it has to be assessed if that marks the border of the shopping area. After the size of main shopping areas is determined, the attributes for each segment can be filled in. By combining all segments together, the atmospheric attributes of the shopping center as an entity can be determined. Table 5.3 gives an example of three types of atmospheric attributes, Building type: historic, greenery: trees and curvatures/angles in the street. The overall value for three downtown shopping centers is given. This overall value is determined by adding the values for each segment and then dividing this by a main 'size' related variable as shown in the table. This last step makes the figures for the individual shopping centers comparable with each other.

Table 5.3 Examples of determination of atmospheric attributes

Attribute	Scale	Divided by	Eindhoven	Tilburg	Breda
Building type: historic	% per m frontage	Total frontage length	0.07	0.10	0.14
Greenery: trees	No. per 100m ² street	Total square footage	0.11	0.39	0.11
Curvatures/angles	No. per 100m street	Total length streets	0.34	0.62	0.54

For these three attributes, the figures show that Breda has the largest presence of historic buildings per meter frontage with 14 percent. Tilburg has the highest density of trees with 0.39 trees per 100 square meters of street. Tilburg has also the highest number of curvatures/angles in the street with 0.62 curvatures/angles per 100 meter of street.

5.3 Shopping centers involved in the research

The choice of the shopping centers that are used for this research is based on multiple factors. First, the MON/OVIN dataset is used to determine which shopping centers in the Netherlands attract a reasonably large amount of recreational consumers. Second, it had to be made sure that large unique shopping concentrations like the previously mentioned Arena Boulevard in Amsterdam, Alexandrium in Rotterdam, MegaStores in Den Haag and the Designer Outlet Roermond did not lie within the area of the chosen downtown shopping centers because these would act as disruptive factors in this research due to their unique attributes which are not present in downtown shopping centers. The same goes for cities with large international tourism flows like Amsterdam and Maastricht because the research focuses on the Dutch recreational consumer, not the international tourist who may have other motives for visiting a shopping center. Next a multitude of factors like mutual distances, mutual competition, mutual differentiations and practical considerations led to the definite choice of nine shopping centers as shown in table 5.4, which are mostly located in the eastern part of the province Noord-Brabant. Appendix 3 contains maps of the main shopping area per shopping center with the division between streets, squares and covered shopping areas.

Table 5.4 nine shopping centers involved in the research

1	Downtown Eindhoven	6	Downtown Helmond
2	Downtown Tilburg	7	Downtown Weert
3	Downtown Breda	8	Downtown Nijmegen
4	Downtown s'Hertogenbosch	9	Downtown Arnhem
5	Downtown Oss		

5.4 Conclusions

Data for a broad list of variables has been obtained in order to be able to answer the six research questions part of the research goal. The phase one variables are extracted from two datasets provided by the *Rijkswaterstaat Dienst en Verkeer* and the *Centraal Bureau voor statistiek*. The data collection for the second phase of the research is mostly done by means of own research which involves internet research for the accessibility attributes and visiting the downtown shopping centers for the atmospheric attributes. Also data has been extracted from datasets provided by *Locatus* in order to establish the supply attributes of shopping centers. Establishing the atmospheric attributes requires an extensive analysis of the shopping centers using entry forms which have been developed to involve a broad spectrum of attributes that can be assessed objectively. In total there are nine shopping centers that have been chosen to be part of the research. These shopping centers are mainly located in the eastern part of the province Noord-Brabant.

6. Data analysis and preparation

After all the data has been collected, it has to be analyzed and prepared for further research in a manner that it can be used to answer the research questions. These questions aim to establish the most relevant factors for the choice of the free-time activity in phase one, and the most relevant attributes in the choice of downtown shopping centers for recreational consumers in phase two. In this chapter it is shown how the data is analyzed and prepared for further research. Because the research is divided into two phases, there are also two datasets that will be developed for applying statistical research. In the first paragraph the MON/OViN data, providing most of the phase one variables, is filtered and adjusted towards an applicable dataset which forms the core of both datasets. In paragraph 6.2 it is explained how the two datasets will be constructed and which variables are used per dataset. Next the phase one variables, consisting of the explanatory variables dealing with the supply in the area and dummy variables are discussed. In paragraph 6.4 the phase 2 variables consisting of the shopping center attributes are analyzed and reduced to a total of 18 attributes. In the following paragraph some important/relevant findings in the correlations between the shopping center attribute variables are discussed. The last paragraph discusses the interaction variables which are part of both phase one and two of the research.

6.1 Filtering and adjustment of the MON/OViN data

Filtering of data



Figure 6.1 Position of the downtown shopping centers and the respondents area.

The original MON/OViN dataset contains many respondents who are not relevant towards the research goal and therefore need to be filtered out of the data. The first filtering of respondents is based on their residential location. Figure 6.1 shows the position of the nine downtown shopping centers in the Netherlands. Most of the shopping centers are located in the province of Noord-Brabant. The marked area represents the area which provides the respondents present in the MON/OViN dataset according to their residential location. Each household within this marked area most likely makes a choice between these nine shopping centers to go for recreational shopping, which means that these

households are the least affected by other shopping centers. Therefore these are the respondents that will be involved in this research for both phase one and two. The second filter is based on the age of the respondent. When a respondent is younger than 14, it is assumed that the choice to go out for a recreational activity is not made by him/her selves but by the parent(s)/attendant who makes the choice. The third filter that is applied focuses on the activity duration. In order to be able to determine the relevance of the time of the day for the choice of an activity, a one-day hours-schedule will be made for phase one of the research. This means that for each respondent each free-time activity taken on that day is listed in the schedule, including free-time hours spend at home. This is further discussed in the next paragraph. When the duration of an activity is less than 30 minutes, it cannot be taken into account within the hours-schedule and therefore is filtered out of the data. Also the most important activity for this research, recreational shopping, is only considered to be recreational shopping when the activity lasts longer than 30 minutes. The fourth and last filter is based on the time of the day the activity is taken. Figure 6.2 shows the division of the frequency for the activity recreational shopping over the day. It is clear that the period from 8 o'clock in the morning to 8 o'clock in the evening is most relevant for this activity. Therefore only this period (12 hours) is taken into account for this research. All activities taken outside this time period are filtered out because recreational shopping is not an option in that time period.

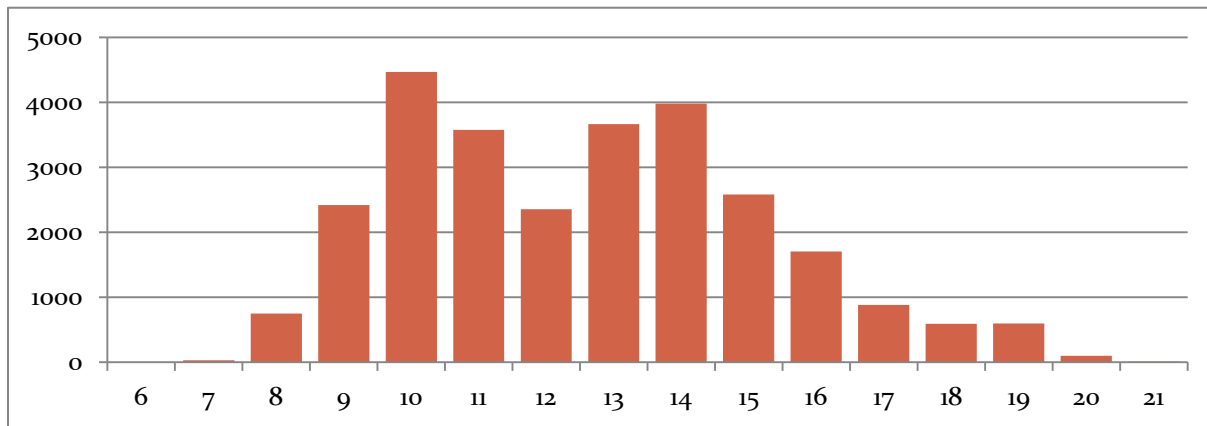


Figure 6.2 Frequency of the activity recreational shopping per starting hour (RWS DVS, 2007, 2009 and 2010).

Adjustment of the data

Next to the free-time activities, the MON/OViN data contains other activities which could also be part of the respondent's day, for instance work and education. All of these non-free-time activities are considered to be obligations. The time that a respondent spends on obligations, including travel time, is also time in which the respondent is not able to choose between the free-time activities. Therefore all the hours that are occupied with an obligation are deleted from the 12 hour schedule part of phase one. These obligatory activities will also not play any role in the second phase of the research.

6.2 Structure of the datasets

Dataset for phase one

For this phase, a dataset is constructed which shows the free-time spending of a respondent during one day, from 8 o'clock in the morning to 8 o'clock in the evening. This is done by dividing the day into twelve one-hour sections. For each hour there are 6 choice alternatives as shown in table 6.1. As previously discussed, an hour occupied with an obligatory activity is deleted from the hours-schedule. A

simplified example of an hours-schedule for one respondent's day is shown in appendix 4. The time of the day variables are derived from the hours-schedule. It also allows to add the alternative 'free-time spend at home', which was not present in the MON/OViN dataset, as an activity because all remaining unoccupied hours are automatically categorized as being free-time spend at home. This alternative will act as the base alternative which means this is the starting point from which possibly the choice is made to go for an outdoor leisure activity. The working of the base alternative is further discussed in paragraph 7.1. The supply in the area variables are also part of the first phase of the research. The exact variables involved are further discussed in paragraph 6.3.

Table 6.1 choice alternatives phase 1

1	Free-time spend at home
2	Recreational shopping
3	Socializing
4	Touring/walking
5	Sports/hobby
6	Other free time activities

Dataset for phase two

For the second dataset the hours-schedule has not been applied because the activity 'free time-spend at home' is no longer relevant. The dataset only involves respondents who have already chosen to go for recreational shopping. The choice alternatives in this phase focus on the location where the activity takes place. Table 6.2 shows the ten choice alternatives part of this dataset which includes the nine analyzed downtown shopping centers. The duration of the activity continues to be taken into account by multiplying the choice by the time spend in hours at that location. So for instance if one respondent spends two hours of recreational shopping in Eindhoven, this respondent is included two times in the dataset with two times the choice 'recreational shopping: downtown Eindhoven'. A simplified example of the dataset including multiple respondents is shown in appendix 4. Alternative ten, recreational shopping: elsewhere, will act as the base variable in this phase in the same manner as 'free-time spent at home' does in phase one.

Table 6.2 choice alternatives phase two

1	Recreational shopping: downtown Eindhoven
2	Recreational shopping: downtown Tilburg
3	Recreational shopping: downtown Breda
4	Recreational shopping: downtown s'Hertogenbosch
5	Recreational shopping: downtown Oss
6	Recreational shopping: downtown Helmond
7	Recreational shopping: downtown Weert
8	Recreational shopping: downtown Nijmegen
9	Recreational shopping: downtown Arnhem
10	Recreational shopping: elsewhere

6.3 Phase one variables

Supply in the area variables

The supply in the area variables are part of phase one of the research. For the choice alternatives recreational shopping, touring/walking, sports/hobby and other-free time activities in the first dataset, explanatory variables have been extracted from the *Nabijheid van Voorzieningen 2008* dataset (NvV

2008). The ‘free-time spent at home’ alternative is not represented by an explanatory variable because it is the base alternative as previously discussed. No explanatory variables could be provided for the activity socializing and therefore this alternative is represented with a dummy variable. This is further discussed below. The NvV 2008 provides two main types of variables. One is the shortest distance towards certain leisure facilities and the other is the total number of leisure facilities within a certain radius. Both types of variables have been applied in this research, as shown in table 6.3. The list of supply in the area variables is also shown in appendix 5.

Table 6.3 supply in the area variables

1	Recreational shopping	Number of retail facilities within a 3 kilometer radius
2	Touring/walking	Shortest distance to public greenery
3	Touring/walking	Shortest distance to open nature reserve
4	Touring/walking	Shortest distance to semi-public greenery
5	Sports/hobby	Shortest distance to a sports ground
6	Sports/hobby	Shortest distance to a swimming pool
7	Sports/hobby	Shortest distance to an ice rink
8	Other free-time activities	Number of catering facilities within a 3 kilometer radius
9	Other free-time activities	Number of leisure facilities within a 20 kilometer radius

The retail facilities mentioned in the first variables includes stores, department stores and supermarkets. The last activity covered with the *Nabijheid van Voorzieningen 2008* dataset is other-free time activities. For this activity all remaining leisure related activities in the dataset have been merged into two variables. The catering facilities include hotels, bars, cafeterias and restaurants. The leisure facilities include museums, theater/music venues, cinemas and attractions.

Dummy variables

The collected data did not provide any explanatory variables for the remaining choice alternative socializing. The choice for this alternative therefore is explained by using a dummy variable. This dummy only consists of a 1 for the alternative and a 0 for the other alternatives. Although dummy variables do not allow for any explanatory research, they do allow for researching the effect of personal characteristics and time of the day, on the choice for these alternatives. The personal characteristics and time of the day variables will act as interaction variables and are discussed in paragraph 6.5. The other free-time activities also have their own dummy variable. These variables will be used in the statistical research if the previously mentioned explanatory variables do not provide logical or significant results or they can be used in combination with the interaction variables. The dummy variables are also shown in appendix 5.

6.4 Phase two variables

Shopping center attribute variables

The phase 2 variables consist of the shopping center attribute variables. As previously mentioned in paragraph 5.1, the list of variables is very broad. After collecting all the data per street, square and indoor shopping area, the accumulated values for the main shopping centers as a whole have been calculated. The results of these values per downtown shopping center are shown in appendix 6. Looking at the supply attributes it is clear that the downtown shopping centers of Eindhoven, Breda, s’Hertogenbosch, Nijmegen and Arnhem represent the larger shopping centers. The downtown shopping centers of Tilburg, Helmond, Weert and Oss are somewhat smaller. The list also shows that some of the attributes like shape square: round/oval and greenery: plantation, are not or hardly present

within the examined shopping centers. These types of variables are deleted from the list before the statistical research. Reducing the number of variables is further discussed below.

Reducing the number of attribute variables

The total list of attributes shown in appendix 5 consists of 116 variables. For this research only nine shopping centers have been taken into account. In order to provide some useful information after the statistical operations, the list of variables that will be brought into the Limdep software for statistical research has to be reduced to a maximum of eight. This number is only relevant for the shopping center attribute variables, excluding the travel distance variable which is linked to the respondent residence location and therefore far more diverse. The other types of variables are not limited to this constraint because they are not linked to the nine shopping centers. If the number of variables would be higher than this maximum, Limdep will most likely not be able to estimate correct parameters per variable. The reduction of the number of variables will be done by applying some general guidelines.

- If the correlation of the values between two variables is high, it means that these values per shopping center are relatively the same and therefore applying statistical research on these variables would only lead to the same results. When two variables show a correlation higher than 0.7 and the correlation is significant at the 0.05 level, one of the variables will be merged into the other and the remaining variable will represent both. The correlation coefficients are calculated by the Pearson product-moment method. In paragraph 6.5 some of the most important/relevant correlations between shopping center attribute variables are discussed.
- If the values of a variable show no or little differentiation, the variable has no use for further statistical research and therefore will be deleted from the list.
- If two variables are highly alike in terms of what they represent and if they are calculated at the same scale, these variables will be combined into one new variable.
- If two variables are in some regards alike in terms of what they represent and they have not been changed by the previous guidelines, it will be assessed which of both variables is most representative for the general matching attribute. The less relevant attribute will be deleted. Assessing the most relevant variable will be done partly based on the literary knowledge gathered in the first three chapters of this paper and partly by logical assumptions.

Appendix 5 contains all the shopping center attribute variables (the supply-, accessibility- and atmospheric attributes in the table). The table shows how and why these variables have been affected after applying the guidelines (applied, merged, combined or deleted). The table also shows all the other variables that are part of the research and their status/role in this research. The remaining shopping center attribute variables that will be used for further statistical research are shown in table 6.4. Sometimes the variable also represents unlikely attributes as for instance the variable 'advertisement signs, total' which also represents the presence of pedestrians-only areas. This is done due to the high correlation between the two which led to the merging of the variables. The list now consists of 18 variables. During the statistical research this list will be shortened to the maximum of nine variables (including the travel distance variable) or less, to the point that Limdep is able to estimate useful models. This is further discussed in paragraph 7.7.

Table 6.4 Remaining shopping center attribute variables used for statistical research

Variable	Represents
Supply facilities total (downtown area)	Number of stores per branch, number of leisure facilities, number of catering facilities and number of chain stores in downtown area.
Stores (main shopping area)	Number of stores in main shopping area.
Catering (main shopping area)	Number of catering facilities in main shopping area.
Services (main shopping area)	Number of service facilities in main shopping area.

Leisure (main shopping area)	Number of leisure facilities in main shopping area.
Travel distance	The travel distance from residence location to shopping center.
Shortest distance to train station	Walking distance from the nearest train station to shopping center.
Square footage of streets	The size of the main shopping center.
Square footage of squares	The presence of squares in the main shopping center.
Square footage indoor area	The presence of indoor shopping, (covered) parking, marble pavement and the modernity of the shopping center.
Average no. storeys in frontage	Used as general indicator for height of frontage.
Building type, historic	The historic value of the shopping center.
Pavement color, warm	The presence of warm colors in the street.
Resting p, length benches/other	The length of benches / other seating facilities
Greenery, trees	The presence of greenery (trees and planters).
Artworks present	The presence of artworks
Curvatures/angles in the street	The curvatures/angles within the street map of the shopping center.
Advertisement signs, total	The presence of advertisement and pedestrians-only area.

6.5 Correlations between shopping center attribute variables

This paragraph discusses some of the correlations between shopping center attribute variables, given in appendix 5, starting with the supply attributes. As discussed in the literature study, supply is an important attribute for recreational consumers. Therefore the supply attribute in general is discussed extensively by applying 12 different variables for the downtown area as an entity, including figures for five different retail branches, three leisure branches, and four variables for supply in the main shopping area. Also the total size of vacancy in the downtown area is taken into account. After analyzing the correlation coefficients it is clear that all supply in the downtown area variables can be merged into one, supply facilities total. Even the vacancy variable shows high correlations with all other branches. The same goes for the presence of chain stores. This means that each type of supply facility per downtown area is represented at almost the same level relatively to the total supply. The accessibility has been brought back to two variables which are both unique in their correlation with other variables. The variable travel distance is unique due to the fact travel distance is different per respondent's resident location. The walking distance to the nearest train station is the other unique accessibility variable. The variables 'total public covered parking spots' and 'total public parking spots' have been merged with 'square footage indoor area'. These high correlations could be explained due to the fact that most of the analyzed indoor shopping areas have parking on the roof or underground. The atmospheric attributes show more irregularity between the variables. Only a few variables have been merged due to high correlations and most variables have been deleted due to little differentiation within the variable or they are assessed as being less relevant than other similar variables. There are some logical correlations to be found as for instance 'presence of buildings build before 1900' and 'presence of buildings with an historic building type' or 'number of trees' and 'number of planters'. Also the correlation between 'presence of modern buildings' and 'square footage indoor area' could be explained due to the fact that most of the buildings of indoor areas have been assessed as being modern. The data also shows a somewhat unlikely correlation between the presence of advertisement signs and the percentage of pedestrians-only traffic area within the shopping centers. Nevertheless these variables have been merged into one variable which represents both.

6.6 Interaction variables

The variables for the personal characteristics and a time related variable will be used as interaction variables in both datasets to get better insights into the decision making process of different

respondents and the time of the day. Take for instance the age variable. By using age as an interaction variable it will be possible to analyze the differences between young and old people and their choice of free-time activities. By narrowing down the influence of these interaction variables, it will be possible to better predict the decisions made by a certain respondent. In order to be able to apply these interaction variables it is important that there is only a limited set of categories per variable, with a maximum of three categories. Using more categories would only increase the complexity of the statistical calculations that need to be made and that could interfere with the reliability of the results. Furthermore the usage of a limited set of categories also improves the interpretation of the effects of the interaction variables. This is shown in paragraph 7.4. There are 7 interaction variables that are taken into account as shown in table 6.5. The table also shows how they are categorized. The time of the day interaction variable is divided into two variables with the same categories but with different valuation of these categories. This is done because it is assumed that, in contrast to the other six interaction variables, the time of the day variable does not have a linear effect over the categories. This means that it is also possible that the interaction with the middle category (from 12 o'clock to 16 o'clock) has the biggest effect on the choice made by respondents. In order to be able to measure the effect of each category individually (in a variable with three categories) it is necessary to divide the variable into two parts. The interaction variables are also shown in appendix 5.

Table 6.5 Interaction variables and their categorization

Interaction variable		-1	0	1
1	Gender	Female	-	Male
2	Age	<30	30-55	>55
3	Work	None or <12 hrs/w	12-30 hours/week	>30 hours/week
4	Household size	<3	-	3 or more
5	Children within household	No	-	Yes
6	Education*	Low education	Medium education	High education
7	Time of the day 1	8 to 12 o'clock	12 to 16 o'clock	16 to 20 o'clock
Interaction variable		-1	1	0
8	Time of the day 2	8 to 12 o'clock	12 to 16 o'clock	16 to 20 o'clock

* Check appendix 5 for the exact types of education per category

6.7 Conclusions

The MON/OViN dataset is filtered and adjusted in a manner that it can be used for this research. The most important filter that has been applied is based on the residence location. Only respondents living within the area of the nine shopping centers are selected for this research. The MON/OViN dataset forms the base of the two datasets that are created for each phase and which will be used for statistical research. The phase one dataset includes an hour-schedule from 8 o'clock in the morning to 8 o'clock in the evening per respondent. This allows for the addition of the choice alternative 'free-time spend at home' which is not present in the MON/OViN dataset. The phase two dataset focuses only on the respondent who chooses to go recreational shopping and the choice alternatives are the shopping locations. The variables that will be added to the phase one dataset are divided in a number of 'supply in the area' variables and dummy variables per choice alternative. The list of the phase two variables, the shopping center attribute variables, has been shortened down to a total of 18 variables. This is done by deleting less relevant variables and variables with little differentiation. Variables with high correlations have been merged into one main variable. The merging of variables has mainly been applied on the supply-attributes. The interaction variables are divided into personal characteristics and time of the day variables and are applied in both datasets.

7. Results models

In this chapter the results are given of the statistical analyses carried out with Limdep. First an explanation is given of the multinomial logit model in paragraph 7.1 which is applied in this research. In the next paragraph the general descriptives of the phase one dataset are given. In paragraph 7.3 the expectations for the positive or negative influence per explanatory variable is discussed followed by an analysis and interpretation of the results of the multinomial logit model in paragraph 7.4. The same steps for analyzing phase two of this research are taken in paragraphs 7.5 to 7.7.

7.1 Explanation of the multinomial logit model

Multinomial logit model

The multinomial logit model, which is part of the discrete choice models, will be applied in this research for both phases using the software package Limdep/Nlogit 4.0. (Hensher, Rose and Greene, 2005) The aim of such a model is to understand and predict choices made between alternative facilities/products/services/actions, in this case choices made between alternative free-time activities and alternative shopping centers (Train, 2003). The probability that an activity will be chosen from a set of free-time activities depends on the utility of the alternatives, under the assumption that an individual will choose the maximum-utility alternative. The utility of an alternative consists of a structural and a random part. The structural utility deals with the characteristics of each alternative. This type of utility is a weighted sum of the characteristics of the alternative. The weights of the utility can be estimated from observed choices, which can be used to predict the probability that each of the alternatives will be chosen. The random part is added to take biases due to differences in individuals and moments into account (Train, 2003). In formula:

$$V_{iq} = \sum_n \beta_n X_{inq}$$

V_{iq} : Structural utility of alternative i for individual q ;

X_{inq} : Score of alternative i on attribute n for individual q ;

β_n : Parameter representing (generic) weight of attribute n .

$$U_{iq} = V_{iq} + \varepsilon_{iq}$$

U_{iq} : Utility of alternative i for individual q ;

ε_{iq} : Random utility of alternative i for individual q .

The structural utility for the base alternatives of both datasets, free-time spend at home and recreational shopping elsewhere, will be set to $V=0$, which means that Limdep will take these values as the starting point upon which parameters (β) for the other alternatives will be estimated. The probability an alternative is chosen does not depend on the absolute value of the utilities of the alternatives. It depends on the differences between the utilities of the available alternatives. In other words, the ratio between the probabilities of two alternatives only depends on the difference between the utilities of these alternatives. The formula to compute the choice probabilities (according to the multinomial logit model) is:

$$P_{iq} = \frac{e^{V_{iq}}}{\sum_j e^{V_{jq}}}$$

P_{iq} : Probability individual q will choose alternative i .

Model performance

Limdep statistically estimates parameters for each variable such that the probabilities of chosen the alternatives are maximized. This is called maximum likelihood estimation. The log likelihood is a measure of how precise the model re-predicts observed behavior. To determine whether the model is usable for data analyses, the model is being validated through the goodness-of-fit test: Mcfadden's rho-square (Rho^2). This is the representation of the fit of the model, it shows to what extent the loglikelihood of the model with the estimated parameters is better or worse in comparison with the model in which all of the parameters are set to zero. When all parameters are set to zero, the probability that alternatives are chosen is uniform distributed (equal chances). This is called the null-model. Rho^2 ranges from 0 till 1 and the rule "higher is better" is applicable. Hendriks and Ottens (1997) argue that a model with a Rho^2 higher than 0.2 reflects an acceptable model, when Rho^2 is higher than 0.4 it is even called an excellent model. Mcfadden's rho-square is calculated in the following manner

$$Rho^2 = 1 - \frac{LL(\beta)}{LL(0)}$$

$LL(\beta)$: log-likelihood using estimated parameters;

$LL(0)$: Log-likelihood using null-model

7.1 Phase one, general descriptions

Table 7.1 shows the general descriptions of the hours-schedule dataset part of phase one. A total of 12,664 respondents have been taken into account, after the previously discussed filtering of the data, these respondents had 95,690 free hours to spend in the period of 8 o'clock in the morning to 8 o'clock in the evening. Most of these free hours are spend at home. Recreational shopping occupies a total of 3,929 free hours which makes it the second most attended outdoor free-time activity after socializing. When looking at the number of respondents who attended the activity, recreational shopping is the best scoring outdoor activity above socializing. This difference is explained by the total time spend on the activity per respondent. The free-time spend at home variable logically shows the most average hours per respondents with six hours and 24 minutes. Table 7.1 shows that the average respondent spends most hours per trip on socializing.

Table 7.1 General descriptives of the phase one hours-schedule dataset

Respondents	12,664	
Free hours	95,690	63%
Occupied hours	56,278	37%

	Respondents	Hours spend	Hours/Resp.
1 Free-time spend at home	12248	78411	6.40
2 Recreational shopping	2916	3929	1.35
3 Socializing	2561	6089	2.38

4	Touring/walking	1735	3300	1.90
5	Sport/hobby	1003	2039	2.03
6	Other free-time activities	903	1922	2.13

7.2 Phase one, expectations of the estimated parameters

Before the results of the model estimation are discussed, the expected behavior of each applied variable is given. Each explanatory variable can have a positive or negative effect on the choice for an alternative. This effect is shown in the parameter β , as previously discussed, which can have a positive or negative value. These expectations are based on the previously performed literature study and to some extent also on common sense. In the next paragraph these expectations will be compared with the actual results. If the estimated result differs from the expectation, it could be that the estimation was wrong or that the variable is not a good representation for the particular choice alternative. The results for the dummy variables are not relevant for describing expectations, so only the remaining 9 explanatory variables will be discussed per type.

The 'shortest distance' variables

The six 'shortest distance' variables should have a negative parameter. When the shortest travel distance towards public greenery, semi-public greenery, open nature, a sports ground, a swimming pool or an ice rink increases, this has a negative effect on the respondent choice to go to that particular facility. A negative parameter also means that an increasing value of the variable has a negative effect on the choice for the alternative the variable represents.

The 'number of facilities within a certain radius' variables

The 'number of facilities within a certain radius' variables should have a positive parameter. An increase in the number of facilities (retail, catering and leisure) within a certain radius should all have a positive effect on the choice to go for a recreation activity.

7.3 Phase one, results

Optimization of the multinomial logit model

Table 7.2 shows the multinomial model estimated with Limdep. During the process of modeling the best possible model three factors are of importance. First the significance value P should be less than 0.05. The significance says something about the degree of certainty that the parameter of the variable differs from zero. Second, the direction of the parameter should be logical as discussed in the previous paragraph. The third factor is based on the Rho^2 value. With the addition of variables into the model the Rho^2 has to be maximized. Following these three factors, four of the main explanatory variables have been deleted from the model or replaced. First, the variable for recreational shopping, number of retail facilities within a 3 kilometer radius, showed a negative parameter which is illogical. This variable therefore has been replaced with the dummy variable for recreational shopping. The same goes for both of the explanatory variables for the alternative 'other free-time activities', number of catering facilities within a 3 kilometer radius and Number of leisure facilities within a 20 kilometer radius. These have also been deleted and replaced with a dummy variable. The variable 'shortest distance to public greenery' did not provide a significant parameter and therefore is deleted and not replaced due to the fact that there still are two more explanatory variables remaining for the alternative touring/walking. Furthermore, all the interaction variables which showed insignificant values for the parameters have not been included in the model, this is inter alia the case for all the 'household size' interactions and most of

the 'children present in the household' interactions. The loglikelihood of the model is -73.131 and the loglikelihood of the null-model is -171.453. Therefore the Rho^2 is:

$$Rho^2 = 1 - (-71.568 / -171.452) = 0.58$$

According to Hendriks and Ottens (1997), this Rho^2 represents an excellent model.

Table 7.2 results of the phase one MNL model

Variable	Coefficient β	Std. error	β /Std.er	Significance P
Dummy recr. shopping	-3.1561	0.0205	-153.4	0.0000
Dummy socializing	-2.7032	0.0159	-170.3	0.0000
Shortest dist. semi-public greenery	-1.9847	0.0624	-31.8	0.0000
Shortest dist. open nature reserve	-0.1890	0.0137	-13.8	0.0000
Shortest distance sports ground	-2.4559	0.0499	-49.2	0.0000
Shortest dist. swimming pool	-0.1505	0.0067	-22.4	0.0000
Shortest distance ice rink	-0.0406	0.0028	-14.5	0.0000
Dummy other free-time act.	-3.6940	0.0231	-159.9	0.0000
Gender*Dum recr. shopping	-0.1399	0.0141	-9.9	0.0000
Gender*short.dist. sports ground	0.1993	0.02776	7.2	0.0000
Gender*Dum touring/walking	-0.3316	0.0348	-9.5	0.0000
Age*Dum recr. shopping	0.1824	0.0246	7.4	0.0000
Age*short.dist.semi-pub. green	0.9665	0.1045	9.3	0.0003
Age*short.dist. open nature reserve	0.2787	0.0183	15.3	0.0000
Age*short.dist. sports ground	0.7396	0.1094	6.8	0.0000
Age*dum sport/hobby	-0.7516	0.0915	-8.2	0.0000
Age*dum touring/walking	-1.4677	0.0856	-17.1	0.0000
Work* Dum recr. shopping	-0.1472	0.0208	-7.1	0.0000
Work* Dum socializing	-0.1744	0.0155	-11.2	0.0000
Work* short.dist.semi-pub. green	0.4219	0.0593	7.1	0.0001
Work* short.dist. open nature reserve	-0.0807	0.0122	-6.6	0.0000
Work* short.dist. swimming pool	-0.0282	0.0044	-6.3	0.0000
Children* short.dist. open nat. reserve	0.2441	0.0128	19.1	0.0000
Children*dum touring/walking	-1.6806	0.1053	-16.0	0.0000
Education* Dum recr. shopping	0.1475	0.0292	5.0	0.0000
Education* short.dist.semi-pub. green	0.8374	0.1197	7.0	0.0001
Education* short.dist. open nat. reserve	0.1508	0.0198	7.6	0.0000
Education*dum touring/walking	-1.1147	0.1031	-10.8	0.0000
Time* Dum recr. shopping	-0.5898	0.0278	-21.2	0.0000
Time* Dum socializing	0.2673	0.0190	14.1	0.0000
Time* Dum touring/walking	0.1281	0.0237	5.4	0.0000
Time2* Dum recr. shopping	0.7587	0.0222	34.2	0.0000
Time2* Dum socializing	0.5655	0.0192	29.3	0.0000
Time2*Dum touring/walking	0.5642	0.0235	24.0	0.0000

Table 7.3 Categorization of the interaction variables

Interaction variable		-1	0	1
1	Gender	Female	-	Male
2	Age	<30	30-55	>55
3	Work	None or <12 hrs/w	12-30 hours/week	>30 hours/week
4	Household size	<3	-	3 or more
5	Children within household	No	-	Yes
6	Education*	Low education	Medium education	High education
7	Time of the day 1	8 to 12 o'clock	12 to 16 o'clock	16 to 20 o'clock
Interaction variable		-1	1	0
8	Time of the day 2	8 to 12 o'clock	12 to 16 o'clock	16 to 20 o'clock

* Check appendix 5 for the exact types of education per category

Interpretation of the interaction variables

The five 'shortest distance' variables all show negative parameters, which is in line with their expectations. The interpretation of the interaction variables will be explained for both the dummy and the distance variables. The categorization of all interaction variables are given in table 7.3. First the interaction with dummy variables will be explained through the first interaction variable *gender*dum.recrr.shopping*. For this variable the value for gender (value -1 for female and 1 for male) is multiplied with the value of the dummy variable (1 if the alternative represents recreational shopping). Next, this is multiplied with the value of the corresponding parameter (β) which is -0.1399 to determine the contribution of gender to the structural utility of the recreational shopping alternative. This means that women ($-0.1399*(-1*1) = 0.1399$) are more likely to choose to go for recreational shopping than men ($-0.1399*(1*1) = -0.1399$). This is a logical result because in general women are more active with recreational shopping than men. For the interaction with the distance variables the same calculation is made but due to the fact that the value of the variable differs per respondent it is not sensible to give the structural utility per respondent. The working of the parameter is the same. Take for instance the second interaction variable *gender*short.dist. sports ground*. This value is positive which means that men would have a higher structural utility if the distance would be the same for men and women. Take for instance *short.dist. sports ground = 1*. This would mean that the structural utility of the base variable is: $-2.4559*1 = -2.4559$. The parameter of the base variable changes when only women are taken into account. The parameter then changes to $-2.4559+(-1*0.1993) = -2.6552$ for women. For men it changes to $-2.4559+(1*0.1993) = -2.2566$. Therefore women are more sensitive to the travel distance towards sports grounds than men. In other words, men are more likely to travel greater distances than women to go for sports/hobby on a sports ground because the contribution to the structural utility of travel distance should be as close to zero as possible. For interaction variables with 3 categories (-1, 0 and 1), the middle category does not take part in the interpretation because their structural utility is always zero. For the interpretation of the time of the day interaction, which is divided into two variables, the structural utility for each of the three categories is calculated, including the middle category. This calculation is conducted in the following manner:

Structural utility category 8 to 12 o'clock = $-1*Time1*Dum.activity + -1*Time2*Dum.activity + parameter$ Dummy activity;

Structural utility category 12 to 16 o'clock = $1*Time2*Dum.activity + parameter$ Dummy activity;

Structural utility category 16 to 20 o'clock = $1*Time1*Dum.activity + parameter$ Dummy activity .

Take for instance the time interaction with recreational shopping. According to the calculations the structural utility for the first category (8 to 12 o'clock) is -3.334. For the time 12 to 16 o'clock it is -2.387 and for the last period (16 to 20 o'clock) it is -3.746. This means that the middle category is, due to its

highest structural utility, the time period in which people are most likely to choose recreational shopping as a free-time activity.

Analysis of the results

This research focuses on the recreational consumer and therefore the five significant interaction variables with the recreational shopping dummy will be discussed first. As previously mentioned women are more likely to choose recreational shopping than men. Furthermore, according to *Age*Dum recr. shopping*, someone who is older than 55 has a higher probability to choose recreational shopping than someone younger than 30. The same goes for people who do not have a job or who work for less than 12 hours per week. They show a higher structural utility than people who work more than 30 hours per week. For the education variable it is clear that people with a high education are more likely to go for recreational shopping than people with a low education. The last relevant interaction variable for this alternative are the time variables and these show that the afternoon (12 o'clock to 16 o'clock) is most likely the best time to start with the activity followed by the morning (8 o'clock to 12 o'clock). So according to the model the person with the highest probability to go for recreational shopping is a woman older than 55 who does not work or works less than 12 hours per week and who is highly educated. During the afternoon (12 o'clock to 16 o'clock) this probability increases. Looking at some of the other interaction variables which could be relevant it shows that socializing is also most likely chosen by people who do not work or work less than 12 hours per week instead of people who work more than 30 hours. The activity socializing is most likely chosen during the afternoon (12 o'clock to 16 o'clock), followed by the early evening (16 o'clock to 20 o'clock). For the alternative sports/hobby it can be concluded that people younger than 30 are most likely to choose the activity sports/hobby. In terms of travel distance towards sporting facilities it shows that men are less sensitive than women. The same goes for people older than 55 instead of people younger than 55 and people with no job or who work less than 12 hours per week instead of people who work more than 12 hours per week. They are the least sensitive towards the two distance variables for sports/hobby, 'Shortest distance sports ground' and 'Shortest distance swimming pool'. The activity touring/walking is most likely chosen by women who are younger than 30 and with no children in their household and with a low education. This is the specific group who is most likely to choose touring/walking but it can also be concluded that on the individual characteristics for instance women are more likely to choose recreational shopping than men, etcetera. The time of the day interaction shows that just as for recreational shopping and socializing, the afternoon is the best time to start with the activity. The interactions with the two distance variables for the alternative touring/walking are the same with the exception of the interaction with work. The distance toward semi-public greenery seems to be less of an issue for people older than 55 who work more than 30 hours per week and with a high education. The distance towards open nature reserves appears to be less of an issue for people older than 55 who do not work or work less 12 hours per week and who have a high education. The same goes for these two variables that it is also possible to look at the results for the individual characteristics, which means that people older than 55 are less sensitive than people younger than 55 etcetera. The *Children* short.dist. open nature reserve* variable also shows that households with children are less sensitive towards the travel distance than households without children.

7.4 Phase two, general descriptions

The descriptions of the phase 2 dataset are shown in table 7.3. The 2916 respondents of phase one who choose to go for recreational shopping have been taken into account for this dataset. These respondents spend an average of one hour and 21 minutes on this activity. The descriptions show that the shopping center in downtown Nijmegen had the most visitors compared with the other eight

downtown shopping centers. The most hours of recreational shopping have also been spent in Nijmegen. Looking at the average time spend per respondent, it shows that the downtown shopping center of Oss holds on to their visitors the longest with an average of two hours and 11 minutes per shopping trip. The nine chosen shopping centers cover 19 percent of all recreational shopping trips made. This means that 81 percent of the respondent went somewhere else to go for recreational shopping. This could also be somewhere outside the marked respondent area because the data only involves respondents living within the marked area but does not exclude respondents traveling outside this area to spend their free-time activity. This is done because otherwise the data would be altered in a manner which would influence the validity of the results. Therefore other large shopping concentrations like the Arena Boulevard Amsterdam etc. also attract visitors from the study area. The same goes for smaller shopping concentrations within the marked area. In terms of hours spent shopping, the share of the nine shopping centers is somewhat larger with 23 percent to 77 percent of the total of hours spent.

Table 7.3 General descriptives of the phase two dataset

Respondents	2916			
Hours spend shopping	3929			
		Respondents	Hours spend	
			Hours/Resp.	
1	Rec. Shopping: downtown Eindhoven	109	186	1.71
2	Rec. Shopping: downtown Tilburg	57	79	1.39
3	Rec. Shopping: downtown Breda	43	73	1.70
4	Rec. Shopping: downtown s'Hertogenbosch	51	99	1.94
5	Rec. Shopping: downtown Oss	21	46	2.19
6	Rec. Shopping: downtown Helmond	47	60	1.28
7	Rec. Shopping: downtown Weert	34	58	1.71
8	Rec. Shopping: downtown Nijmegen	119	198	1.66
9	Rec. Shopping: downtown Arnhem	65	114	1.75
10	Rec. Shopping: elsewhere	2370	3016	1.27

7.5 Phase two, expectations of the estimated parameters

In this paragraph expectations (positive or negative) of the parameter β will be given in the same manner as paragraph 7.3. The descriptions below include only the supply and accessibility attribute variables for phase two derived from appendix 5. There are not any expectations given for the atmospheric attributes for two reasons. First, the literature offers little information on the effects of many of the attributes involved in the research. Second, the personal characteristics (mainly gender and age) play an important role on the value of these effects, as the results will prove. Therefore only expectations will be given for the variables supply facilities total, travel distance, distance to train station and the four 'supply in the main shopping area' variables.

Supply facilities total

In general it is clear that an increase in supply of facilities within a shopping center should attract more visitors, therefore the parameter for this variable should be positive. It would also be interesting to assess if there are differences between the supply of chain stores and the supply of local stores makes, but due to the high correlations between all types of branches and chain stores between the nine shopping centers this is not possible to investigate in this research.

Supply in the main shopping area variables

The supply in the main shopping area consists of four variables, the supply of stores, catering, services and leisure facilities. It is clear that the parameter should be positive just as in the previous variable.

Travel distance

When the travel distance towards the shopping center increases a recreational consumer will less likely choose to go to that particular shopping center. Therefore an increasing distance is negative and the parameter for this variable should also be negative.

Distance to train station

The walking distance from the train station towards the shopping distance could be of importance for visitors who use public transit. Although all of the researched shopping centers are closely connected with bus stops as shown in appendix 5, the extra effort of taking the bus after already having traveled with the train is perceived as less preferable and therefore an increasing walking distance to the nearest train station is expected to have a negative effect.

7.6 Phase two, results

Optimization of the multinomial logit model

The results for the phase two multinomial logit model is shown in table 7.4. For the optimization of the model the same factors have been applied as discussed in paragraph 7.4. For the attributes representing supply and accessibility, the variables for supply in the main shopping area and the variable 'distance to train station' did not provide significant results and therefore have been deleted. The two remaining variables 'supply facilities total' and 'travel distance' show logical parameters in line with the expectations. For the atmospheric attributes no variables have been found which provided significant results. This could mean that the correlations between variables are still too high or the choices made by the respondents do not offer useful distributions for Limdep to calculate significant parameters. Or the respondents are not sensitive towards the specific attributes. Therefore 'supply facilities total' and 'travel distance' are the only base explanatory variables in the model. The rest of the model consists of interaction variables which includes atmospheric attributes. This is possible because the interactions further differentiate the base explanatory variables. In total nine interaction effects have been added to the model. The total number of attribute variables taken into the model (both base and interaction variables) is eight. Table 7.5 gives an overview of which variables have been applied in the model and which of the 18 initial variables taken into the statistical research did not provide any significant results. The loglikelihood of the model is -2565.13 and the null model's loglikelihood is -9944.86. Which leads to the following Mcfadden's Rho square:

$$\text{Rho}^2 = 1 - (-2565.13 / -9944.86) = 0.74$$

Table 7.4 results of the phase two MNL model

Variable	Coefficient β	Std. error	β /Std.er	Significance P
Supply facilities total (downtown)	0.0004	0.0008	5.192	0.0000
Travel distance	-0.1660	0.0055	-30.35	0.0000
Age*travel distance	-0.0523	0.0069	-7.63	0.0000
Age*pavement color, warm	0.3047	0.1169	2.61	0.0091
Gender*travel distance	-0.0243	0.0110	-2.21	0.0274
Gender*building type, historic	-3.2056	0.6464	-4.96	0.0000
Gender*street surface	0.0007	0.0001	4.51	0.0000

Work*travel distance	0.0105	0.0044	2.36	0.0182
Education*stores in main area	0.0016	0.0003	5.07	0.0000
Education*catering in main area	-0.0237	0.0082	-2.90	0.0038
Education*leisure in main area	-0.0937	0.0235	-4.00	0.0001

Table 7.5 results for the 18 initial variables taken into the statistical research

Variable	Significant results		Type
Supply facilities total (downtown)	Yes		Base variable
Stores (main shopping area)	Yes		Interaction variable
Catering (main shopping area)	Yes		Interaction variable
Services (main shopping area)	No		-
Leisure (main shopping area)	Yes		Interaction variable
Travel distance	Yes	Base and interaction variables	
Shortest distance to train station	No		-
Square footage of streets	Yes		Interaction variable
Square footage of squares	No		-
Square footage indoor area	No		-
Average no. of storeys in frontage	No		-
Building type, historic	Yes		Interaction variable
Pavement color, warm	Yes		Interaction variable
Resting p, length benches/other	No		-
Greenery, trees	No		-
Artworks present	No		-
Curvatures/angles in the street	No		-
Advertisement signs, total	No		-

Analysis of the results

The results show that the two base variables ‘supply facilities total’ and ‘travel distance’ act as expected. A positive parameter for the number of supply facilities and a negative parameter for the travel distance variable. This variable is further combined with the age, gender and work interaction variables and this shows that woman younger than 30 and who work more than 30 hours per week are less sensitive to the travel distance towards the nine downtown shopping centers. So, men older than 55 and who do not work or who works less than 12 hours per week are the most sensitive for the travel distance. Just like in phase one it is also possible to make the comparison with less specific groups, so for instance focusing only on the characteristic gender, it shows that women are less sensitive towards the travel distance than men. On the atmospheric attributes there were only three significant findings. First it shows that the parameter for *age*pavement color, warm* is positive, which means that people older than 55 put more value in the presence of warm colors in the streets than people younger than 30. The second significant interaction-atmospheric variable is *gender*building type, historic*. Women appear to put more value in the presence of historic buildings in the streetscape than man and therefore women are more likely to choose for the more historic downtown shopping centers. The third variable shows that men are more likely to go to large shopping centers in terms of the total surface area of streets. The education interaction showed some interesting results in terms of the valuation of the supply of facilities in the main shopping area. It shows that on the one hand people with a high education put more value in the presence of stores than people with a low education. On the other hand, people with a low education put more value in the presence of catering and leisure facilities than people with a high education. For all the unenclosed variables it has already been discussed that the correlations are still too high. For the variables that did not provide useful results after combining them with interaction

variables, it could mean that these shopping center attributes do not play a significant role in the choice made between the nine downtown shopping centers by the respondent.

7.7 Conclusions

In this chapter Multinomial Logit Models have been estimated for the datasets of both phases by using the Limdep/Nlogit 4.0 software package. After optimizing the models by deleting illogical and insignificant variables from the calculation and maximizing the McFadden's Rho square, the final results have been analyzed. The most relevant result of phase one is that the person who is most likely to choose for recreational shopping as a free-time activity is a woman older than 55 who does not work or works less than 12 hours per week and who is highly educated. Looking at the individual characteristics this means that women are more likely to choose to go for recreational shopping than men. The same goes for people older than 55 instead of people younger than 55, people who do not work or who work less than 12 hours per week instead of people who work more than 12 hours per week and people with a high education instead of people with a low education. During the period from 12 o'clock to 16 o'clock this probability increases. Phase 2 shows that certain shopping center attributes, next to total supply and travel distance, like the presence of historic buildings and warm colors in the street, size of the shopping center and supply of leisure and catering affect the attractiveness towards certain possible target groups.

8 Conclusions

In this last chapter conclusions are drawn towards the research. These conclusions are linked back to the main research question and research goal and/or findings in the literature study. In paragraph 8.1 a short overview is given of the process during this research and some important conclusions that could already be drawn during this process are discussed. In the next paragraph the final results of the research are given and these will be compared, if possible, with findings in the literature study. Paragraph 8.3 focuses mainly on the research goal by giving some advice that can be drawn from the results. In the last paragraph some recommendations are given for future research on the same or similar topics.

8.1 General conclusions process

The main research question of this research is: How can the attractiveness of downtown shopping centers in the Netherlands for recreational consumers be improved? In order to be able to answer this question, the research is divided into two phases. First it is investigated which personal characteristics, time characteristics, and leisure supply characteristics are involved in the choice of the Dutch citizen to go for recreational shopping as a free-time activity in relation to other free time activities. The second phase continues primarily on the activity recreational shopping and focuses on the relation between the choice of shopping center to execute the recreational shopping activity and the shopping center attributes. The following sub-questions are developed:

Phase 1

1. What is the relation between the general characteristics of the Dutch citizen and the choice of a free-time activity?
2. What is the relation between the time of the day and the choice of a free-time activity?
3. What is the relation between the leisure supply in the area and the choice of a free-time activity?

Phase 2

4. What is the relation between the accessibility attributes of a shopping center and the choice of a recreational consumer for the shopping center?
5. What is the relation between the atmospheric attributes of a shopping center and the choice of a recreational consumer for the shopping center?
6. What is the relation between the supply attributes of a shopping center and the choice of a recreational consumer for the shopping center?

After the research goal and research question were defined, data has been collected for all the variables involved in the process. The phase one variables, personal characteristics, time of the day characteristics, leisure supply in the area and choices made by the Dutch citizen, have been extracted from two datasets supplied by the *Rijkswaterstaat Dienst Verkeer en Scheepvaart (RWS DVS)* and the *Centraal Bureau voor statistiek (CBS)*. The phase 2 variables, shopping center supply, accessibility and atmospheric attributes, have mainly been collected by means of own research. There are nine downtown shopping centers in and around the eastern part of Noord-Brabant that have been included in the research. Next, the collected data is analyzed and prepared for statistical research. Variables with high correlations have been merged and variables with little variation have been deleted. This showed that many of the attribute variables of the nine downtown shopping centers had high correlations with each other and therefore were relatively the same. Mainly the supply attributes for the downtown area as an entity showed high correlations between all types of branches and also in presence of chains stores and the level of vacancy. Therefore these attributes have been merged into one main supply variable. On the level of the main downtown shopping there were significant differences between the supply in stores,

catering and leisure facilities. Many of the atmospheric attributes showed little differentiation between the nine shopping centers, for instance presence of music and presence of grass, and therefore it is not possible to measure significant effects on the recreational consumer's choice behavior in terms of location to go for recreational shopping. During the literature study several international leisure-shopping concepts have been discussed like the Urban Entertainment concept and the American mall concept. These concepts rely on a mix between shopping and entertainment to attract more visitors. When looking at the nine selected shopping centers, it is clear that these types of concepts have not been implemented in the downtown shopping centers because there is a very small presence of leisure facilities within the main shopping areas and these facilities mainly consist of cinemas and (small) casinos. Due to this lack of leisure facilities, it was not possible to assess if the international leisure-shopping concepts should also be applied in the Netherlands, although the presence of leisure facilities variable did provide one significant result in combination with the characteristic education.

8.2 Results

First the relevant results towards the free-time activity recreational shopping in phase one are discussed. The model shows that women are more likely to choose recreational shopping than men. Furthermore, someone who is older than 55 has a higher probability to choose recreational shopping than someone younger than 30. The same goes for people who do not have a job or who work for less than 12 hours per week. For the education characteristic it is clear that people with a high education are more likely to go for recreational shopping than people with a low education. The last relevant result for the choice alternative recreational shopping focuses on the time of the day variables. These show that the afternoon (12 o'clock to 16 o'clock) is most likely the best time to start with the activity followed by the morning (8 o'clock to 12 o'clock). The results of the second phase show that the attributes supply and travel distance act as expected in accordance with findings in the literature study. An increasing supply has a positive effect on the choice of a downtown shopping center and an increasing travel distance has a negative effect. The travel distance is further combined with the age, gender and work characteristics and this shows that woman younger than 30 and who work more than 30 hours per week are less sensitive to the travel distance towards the nine downtown shopping centers than men older than 55 and who do not work or who works less than 12 hours per week. For three types of atmospheric attributes significant results have been found. First, People older than 55 put more value in the presence of warm colors in the streets than people younger than 30. Second, Women appear to put more value in the presence of historic buildings in the streetscape than men and therefore women are more likely to choose for the more historic downtown shopping centers. Third, men are more likely to go to large shopping centers in terms of the total surface area of streets than women. These three significant results on atmospheric attributes were initially not identified in the literature study. The education characteristic showed some interesting results in terms of the valuation of the supply of facilities in the main shopping area. On the one hand, people with a high education put more value in the presence of stores than people with a low education. On the other hand, people with a low education put more value in the presence of catering and leisure facilities than people with a high education. This proves that as discussed in the literature study, the addition of leisure facilities does improve the attractiveness of a shopping center. Other significant results concerning the other choice alternatives in phase one show that people younger than 30 are most likely to choose the activity sports/hobby. People who do not work or work less than 12 hours per week, have the highest probability for choosing the activity socializing. The activity touring/walking is most likely chosen by women who are younger than 30, with no children in their household and with a low education.

8.3 Advice

This research aims to give information and insights into what attracts the recreational consumer towards downtown shopping centers in the Netherlands, in order to give advice to developers, investors, governments, real estate managers and other actors involved in the development, decision making process and management of downtown shopping centers and leisure. When the results of phase one and two are combined, the following advice can be given:

- Although people older than 55 are already more likely to choose to go for recreational shopping than people younger than 55, adding more warm colors in the street pavement could improve the attractiveness towards this target group. The importance of this conclusion is underlined when it is taken into account that the age groups of 45-65 and 65 and older, are increasing and will most likely become the biggest groups in terms of number of daytrips taken per year in the future. Changing the pavement within a downtown shopping center could be a costly operation and therefore it could also be useful to look at the current status per shopping center. Take for instance the downtown shopping center of Arnhem which has a very high percentage of warm colors in the streets (94%). For this shopping center it could be wise to focus their supply more on people older than 55 where in for instance Tilburg with only 10% warm colors the focus should be more on people younger than 55.
- The attribute building type: historic, shows that women are more sensitive towards the historic value of the shopping center than men. It is very difficult to alter the historic value of a shopping center to make it more historic. Therefore it could be sensible for a more historic shopping center like downtown s'Hertogenbosch to focus its supply more on women than on men.
- Men are more attracted to large shopping centers in terms of total square meters than women. This means that large shopping centers like downtown Eindhoven and downtown Nijmegen attract relatively more male recreational consumers than the smaller shopping centers like downtown Oss and downtown Helmond. Increasing the size of a downtown shopping center in general will attract more recreational consumers but for the smaller shopping centers it could be wise to focus their supply more on women than on men.
- The results of phase one showed that people with a low education are currently less likely to choose to go for recreational shopping than people with a high education. The results of phase two show that it seems possible to attract more people with a low education by increasing the supply in catering and leisure facilities within the downtown shopping center. People with a high education are mostly stimulated to go for recreational shopping by the supply in number of stores.
- Currently people younger than 30 are more likely to go for sports/hobby as a free-time activity while people older than 55 are more likely to go for recreational shopping. Therefore it could be possible to attract more people younger than 30 by adding more sports facilities within or nearby a shopping center. This has not been confirmed by the research in phase two due to a lack of sports facilities within the nine shopping centers that have been investigated.

8.4 Recommendations for future research

As discussed, many of the applied variables could not be used in the statistical research due to a lack of differentiation between the nine downtown shopping centers. Increasing the number of shopping centers applied in the research could provide more differentiation and therefore more significant results. However, it should be considered to include peripheral shopping concentrations (as for instance the Arena Boulevard and the Outlet Roermond) and large district shopping centers as well. Furthermore, it could be wise to use other research methods - like surveys - to further examine the effect of shopping center attributes on the choice behavior of recreational consumers. The data that has been collected for the nine shopping centers could be used in the future for other types of research. It could be possible to measure the effect of the attributes in terms of visitor flows on a smaller scale, for instance within one

downtown shopping center and per street. The data could also be used for research which focuses primarily on the attractiveness of squares or indoor shopping areas. To conclude, the results showed that currently people who are the least likely to choose to go for recreational shopping as a free-time activity are men, younger than 30, who work more than 30 hours per week and who have a low education. This group could be an opportunity for the future and therefore it could prove useful to investigate the preferences of this target group more extensively. Of course it is also possible to investigate a less specific target group as for instance men, younger than 30.

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Appendix 1, General indicators per type of shopping area in the Netherlands

Source: Locatus, 2011.

Type of shopping area	Number of areas	Number of outlets per area	Shopping floor space per area	Total number of outlets	Total shopping floor space
Downtown	17	648	114.464	10.966	1.937.442
Main shopping area large	40	270	54.190	10.937	2.220.435
Main shopping area small	81	139	27.229	11.185	2.171.045
Core catchment center large	152	72	13.427	10.821	2.017.211
Core catchment area small	644	18	3.357	11.370	2.135.205
Core catchment supermarket center	32	3	969	114	32.428
Total main shopping centers	966	58	10.924	55.393	10.513.766
Inner city shopping street	62	97	12.641	5.954	778.628
Subarea center	22	81	19.094	1.721	407.630
District center large	124	34	5.651	4190	710.100
District center small	479	14	2.866	6.821	1.390.355
Neighborhood center	417	7	1.306	2.829	550.591
Supermarket center	119	3	1.440	662	275.371
Total supporting shopping centers	1.294	17	3.165	22.177	4.112.675
Large-scale concentration	168	17	23.084	2.863	3.919.467
Special shopping area	16	26	6.602	420	104.686
Total remaining shopping centers	184	18	21.651	3.283	4.024.153
Total	2.444	33	7.624	80.853*	18.650.594*

*The store type 'distributed store' is not accounted for in these totals.

Total number of outlets



Total shopping floor space



Appendix 2, Atmospheric attributes forms

Shopping area						
Street						
Street name		Mark if applicable				
Number		Building Sides	Complete both sides			
Length			Complete one side			
Width average/max/min	/ / /		Other			
Frontage length		Traffic	Pedestrians only			
	%		Non-motorized only			
Storeys in frontage			Motorized			
	1	Buildings variation	One uniform total			
	2		Several building styles			
	3		Completely varied			
	4					
Building age	<1900	Music	None			
	1900-1940		Soft background music			
	1940-2000		Clearly present			
	>2000			Number		
Building type (* Appendix 4)	Historic	Resting points	Benches			
	Traditional (brick)		Terraces			
	Trad. (concrete/plastered)		Other			
	Modern (glass)		Length benches/other			
	Modern (other)	m2 terraces				
	Other	Greenery	Trees			
Building colors	Warm	m2				
	Cold	Greenery	Grass			
Pavement colors	Warm					
	Cold	Plantation				
Pavement (** appendix 4)	Cobbles	Water				
	Tiling		Height difference	max.		
	Asphalt			Stairs present	Yes-No	
	Marble	Number				
	Old natural stone	Min. sightlines required for complete overview				
	Other	Disruptions present within sightlines				
Historic church	Present	Yes-No	Curvatures/angles			
		Number				
Advertisement		Artworks present				
Advertisement signs on the street		Number				
Facade signs transverse to the street						
Occupation		Number	% of frontage length	Catering	Number	
Stores				Café/restaurant		
Catering				Lunchroom/coffee bar		
Services				Snack bar		
Leisure				Ice-cream salon		
Other				Anders		
Types of leisure						
Types of services						
Comments/details						

Shopping area					
Square					
Name			Mark if applicable		
Number			Traffic	Pedestrians only	
Size				Non-motorized only	
Outline length				Motorized	
Frontage length			Shape	Rectangular	
				Triangular	
				Round/oval	
				Other	
Storeys in frontage	1		Buildings variation	One uniform total	
	2			Several building styles	
	3			Completely varied	
	4				
	>4				
Building age	<1900		Music	None	
	1900-1940			Soft background music	
	1940-2000			Clearly present	
	>2000				
Building type (* appendix 4)	Historic		Resting points	Benches	
	Traditional (brick)			Terraces	
	Trad. (concrete/plastered)			Other	
	Modern (glass)			Length benches/other	
	Modern (other)			m2 terraces	
	Other		Greenery	Trees	
Building colors	Warm			Planters	
	Cold				
Pavement colors	Warm				m2
	Cold		Greenery	Grass	
Pavement (** appendix 4)	Cobbles		Water		
	Tiling		Height difference	max.	
	Asphalt			Stairs present	Yes-No
	Marble				Number
	Old natural stone		Min. sightlines required for complete overview		
	Other		Disruptions present within sightlines	Yes-No	
Historic church	Present	Yes-No	Artworks present	Number	
Advertisement					Number
Advertisement signs on the street					
Facade signs transverse to the street					
Occupation		Number	% of frontage length	Catering	Number
Stores				Café/restaurant	
Catering				Lunchroom/coffee bar	
Services				Snack bar	
Leisure				Ice-cream salon	
Other				Anders	
Types of leisure					
Types of services					
Comments/details					

Shopping area					
Indoor shopping area					
Name			Mark if applicable		
Number			Traffic	Pedestrians only	
Size of public floor space				Non-motorized only	
Size of roof covering public space				Motorized	
Frontage length			Shape	Single street	
Shopping floors				Multiple streets	
Building storeys				Streets and squares	
		%		Other	
Building age	<1900		Buildings variation	One uniform total	
	1900-1940			Several building styles	
	1940-2000			Completely varied	
	>2000		Music	None	
Building type (* appendix 4)	Historic			Soft background music	
	Traditional (brick)			Clearly present	
	Trad. (concrete/plastered)			Number	
	Modern (glass)		Resting points	Benches	
	Modern (other)			Terraces	
Building colors	Warm			Other	
	Cold			Length benches/other	
Building roof	Flat		Greenery	Trees	
	Dome shape			Planters	
	Other			m2	
Incidence of natural light	Through roof		Greenery	Grass	
	Through facade			Plantation	
Light exposure	Natural light		Water		
	Artificial light		Min. sightlines required for complete overview		
Pavement colors	Warm		Disruptions present within sightlines		
	Cold		Yes-No		
Pavement (** appendix 4)	Cobbles		Entry points	Level_	
	Tiling			Level_	
	Asphalt			Level_	
	Marble			Level_	
	Old natural stone		Level connections	Stairs	
	Other			Escalators up	
Artworks present		Number		Escalators down	
Floor maps present		Number		Elevators	
Advertisement					Number
Advertisement signs on the street					
Facade signs transverse to the street					
Occupation		Number	% of frontage length	Catering	Number
Stores				Café/restaurant	
Catering				Lunchroom/coffee bar	
Services				Snack bar	
Leisure				Ice-cream salon	
Other				Anders	
Types of leisure					
Types of services					
Comments/details					

Additional explanation variables

** Building type*

Historic: Primarily old brick facades with decorative elements mainly around windows and the eaves.



Traditional (brick): Brick facades with a conventional appearance.



Traditional (concrete/ plastered): Concrete or plastered facades with a conventional appearance.



Modern (glass): steel or concrete construction with primarily glass facades and modern unconventional architecture.



Modern (other): a combination of steel/concrete/other materials dominates the facade and the building has modern unconventional architecture.



****Pavement**

Cobbles



Tiling



Marble

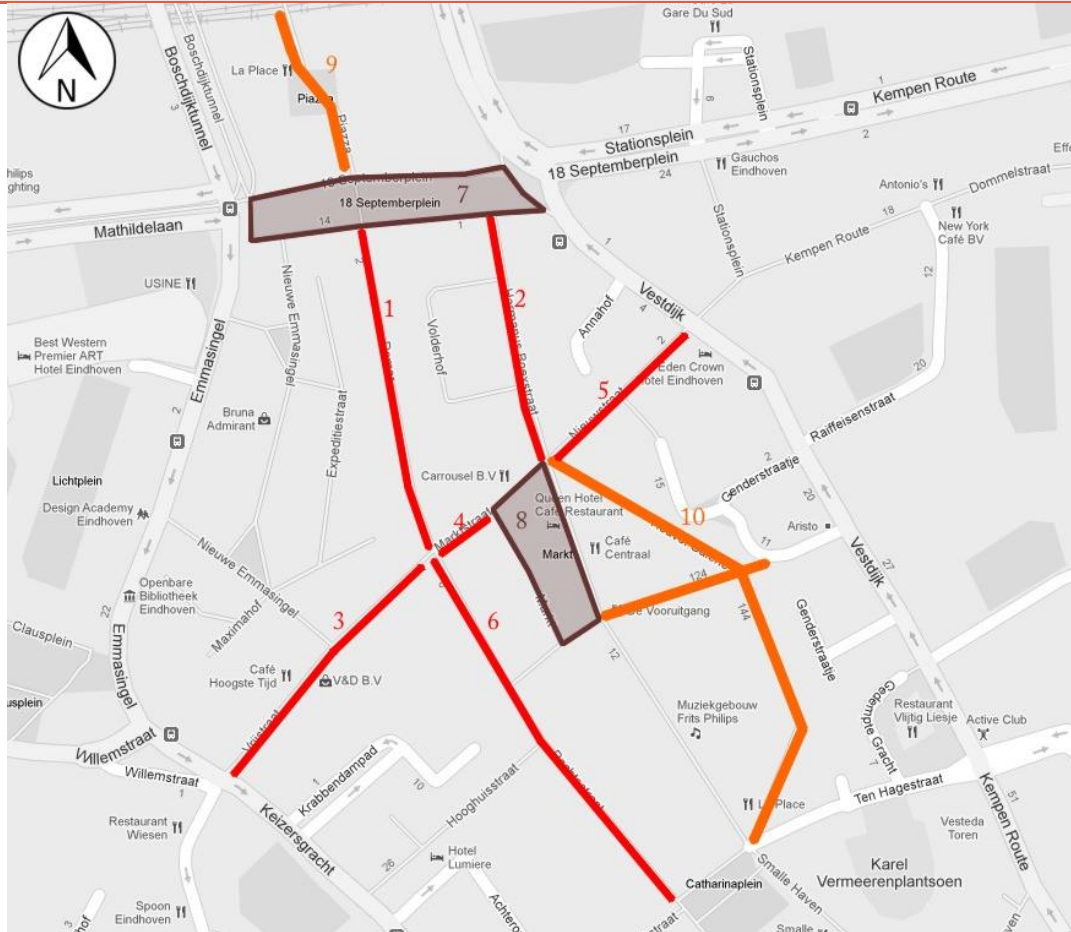


Old natural stone



Appendix 3, Main shopping areas of the nine downtown shopping centers

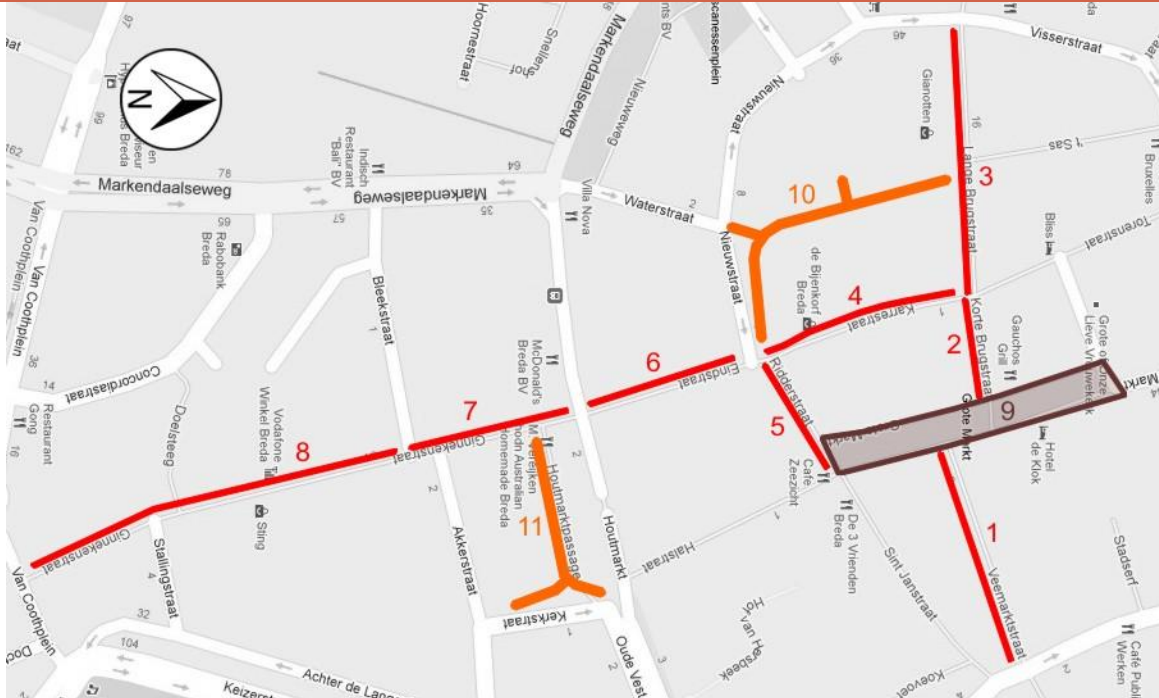
1 Downtown Eindhoven



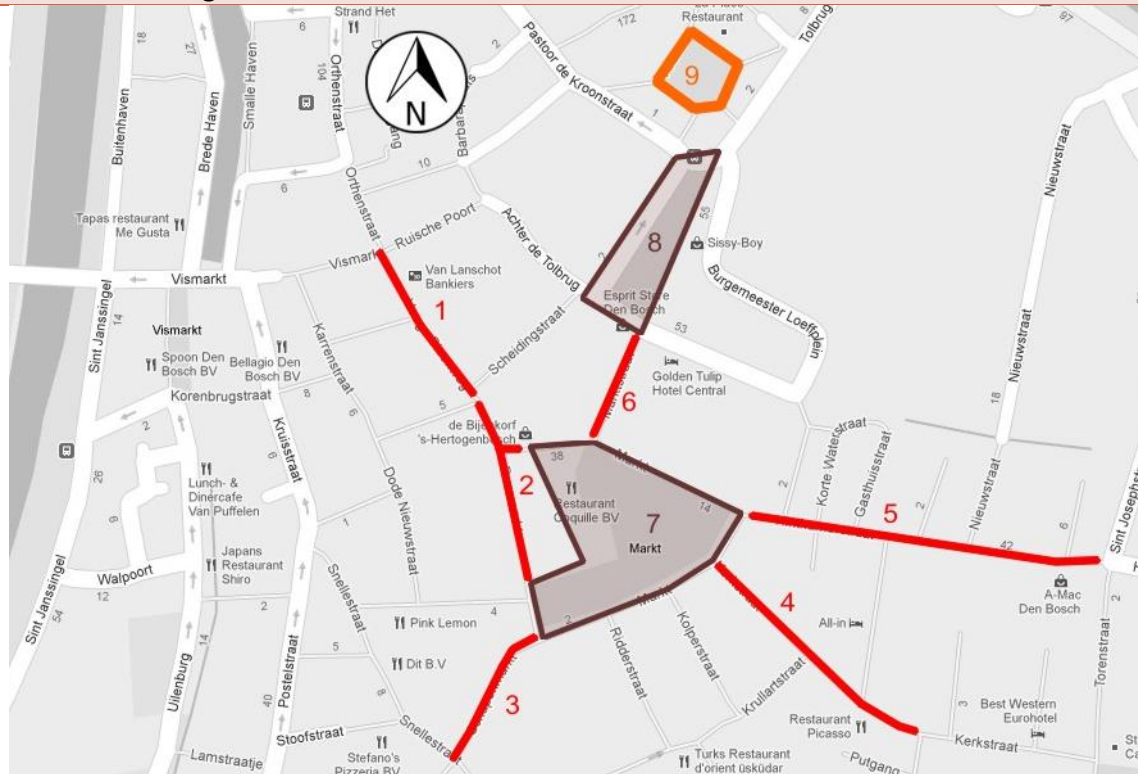
2 Downtown Tilburg



3 Downtown Breda

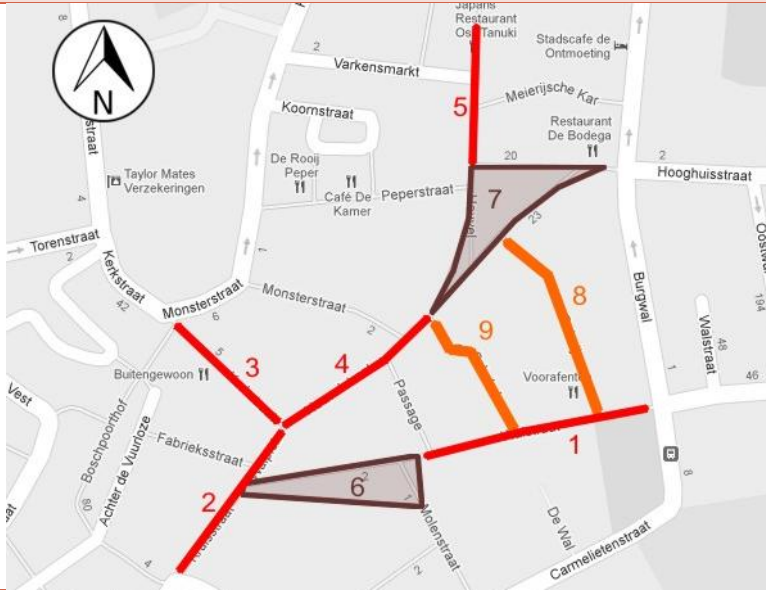


4 Downtown s'Hertogenbosch

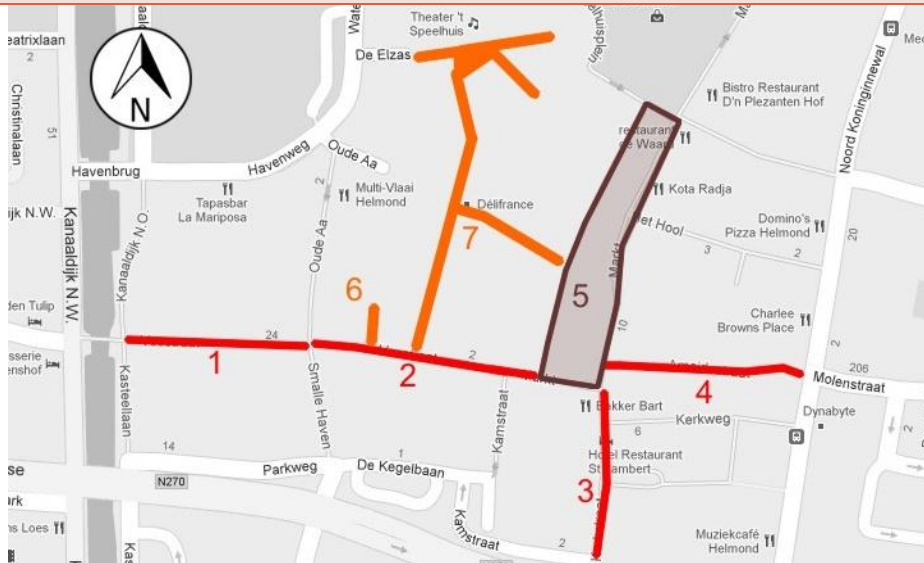


— Street
 Square
 Covered shopping area

5 Downtown Oss



6 Downtown Helmond



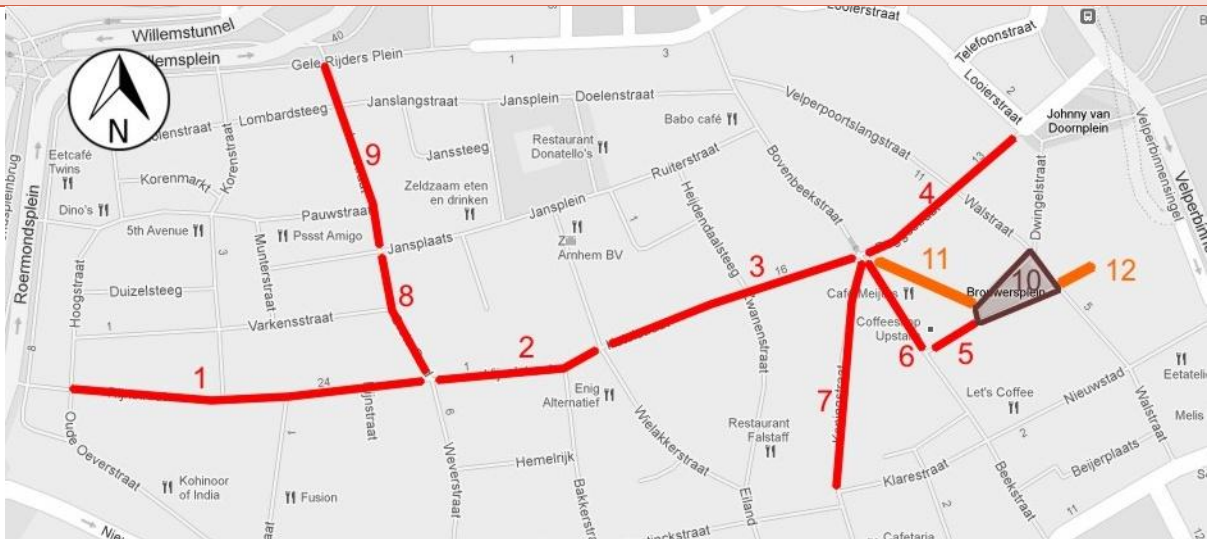
7 Downtown Weert



8 Downtown Nijmegen



9 Downtown Arnhem



— Street
 Square
 Covered shopping area

Appendix 4, Examples of the two datasets

Phase one hours-schedule dataset

MON/OViN data (simplified, one respondent)

RespID	TripID	activity	Duration	Starting hour
111	16	2	60	9
111	17	Obligation	180	10
111	18	4	180	14

Hours schedule (simplified), rows with grey text are deleted in the actual document for being occupied with an obligation. The interaction- and explanatory variables are added in the actual document.

Resp.ID	TripID	Hour	Alternative	Chosen					
111	0	8	1	1	111	18	14	1	0
111	0	8	2	0	111	18	14	2	0
111	0	8	3	0	111	18	14	3	0
111	0	8	4	0	111	18	14	4	1
111	0	8	5	0	111	18	14	5	0
111	0	8	6	0	111	18	14	6	0
111	16	9	1	0	111	18	15	1	0
111	16	9	2	1	111	18	15	2	0
111	16	9	3	0	111	18	15	3	0
111	16	9	4	0	111	18	15	4	1
111	16	9	5	0	111	18	15	5	0
111	16	9	6	0	111	18	15	6	0
111	17	10	1	0	111	18	16	1	0
111	17	10	2	0	111	18	16	2	0
111	17	10	3	0	111	18	16	3	0
111	17	10	4	0	111	18	16	4	1
111	17	10	5	0	111	18	16	5	0
111	17	10	6	0	111	18	16	6	0
111	17	11	1	0	111	0	17	1	1
111	17	11	2	0	111	0	17	2	0
111	17	11	3	0	111	0	17	3	0
111	17	11	4	0	111	0	17	4	0
111	17	11	5	0	111	0	17	5	0
111	17	11	6	0	111	0	17	6	0
111	17	12	1	0	111	0	18	1	1
111	17	12	2	0	111	0	18	2	0
111	17	12	3	0	111	0	18	3	0
111	17	12	4	0	111	0	18	4	0
111	17	12	5	0	111	0	18	5	0
111	17	12	6	0	111	0	18	6	0
111	0	13	1	1	111	0	19	1	1
111	0	13	2	0	111	0	19	2	0
111	0	13	3	0	111	0	19	3	0
111	0	13	4	0	111	0	19	4	0
111	0	13	5	0	111	0	19	5	0
111	0	13	6	0	111	0	19	6	0

Phase two dataset

MON/OViN data (simplified, four respondents)

RespID	TripID	activity	Duration	Starting hour
221	36	1	60	10
222	37	7	120	12
223	38	10	180	9
224	39	9	60	14

The interaction- and explanatory variables are added in the actual document.

Resp.ID	TripID	Hour	Alternative	Chosen					
221	36	10	1	1	223	38	10	2	0
221	36	10	2	0	223	38	10	3	0
221	36	10	3	0	223	38	10	4	0
221	36	10	4	0	223	38	10	5	0
221	36	10	5	0	223	38	10	6	0
221	36	10	6	0	223	38	10	7	0
221	36	10	7	0	223	38	10	8	0
221	36	10	8	0	223	38	10	9	0
221	36	10	9	0	223	38	10	10	1
221	36	10	10	0	223	38	11	1	0
222	37	12	1	0	223	38	11	2	0
222	37	12	2	0	223	38	11	3	0
222	37	12	3	0	223	38	11	4	0
222	37	12	4	0	223	38	11	5	0
222	37	12	5	0	223	38	11	6	0
222	37	12	6	0	223	38	11	7	0
222	37	12	7	1	223	38	11	8	0
222	37	12	8	0	223	38	11	9	0
222	37	12	9	0	223	38	11	10	1
222	37	12	10	0	224	39	14	1	0
222	37	13	1	0	224	39	14	2	0
222	37	13	2	0	224	39	14	3	0
222	37	13	3	0	224	39	14	4	0
222	37	13	4	0	224	39	14	5	0
222	37	13	5	0	224	39	14	6	0
222	37	13	6	0	224	39	14	7	0
222	37	13	7	1	224	39	14	8	0
222	37	13	8	0	224	39	14	9	1
222	37	13	9	0	224	39	14	10	0
222	37	13	10	0					
223	38	9	1	0					
223	38	9	2	0					
223	38	9	3	0					
223	38	9	4	0					
223	38	9	5	0					
223	38	9	6	0					
223	38	9	7	0					
223	38	9	8	0					
223	38	9	9	0					
223	38	9	10	1					
223	38	10	1	0					

Appendix 5, Variables involved and their process

	Name	Type*	Status/Role in research	Conclusion
1	Respondent ID	Ratio	General information	N/A
2	Trip ID	Ratio	General information	N/A
3	Set	Ratio	General information	N/A
4	Hour	Ratio	General information	N/A
5	No. of alternatives	Ratio	General information	N/A
6	Alternative	Nominal 2	General information	N/A
7	Chosen Alternative	Nominal 1	Indicator for chosen activity of respondent	Applied
8	Active during previous hour	Nominal 1	Indicator for activity taken by respondent in previous hour	Applied
Phase one variables				
9	No. of retail fac. in 3km radius	Ratio	Unique for each residence location of respondent	Applied
10	Shortest distance public greenery	Ratio	Unique for each residence location of respondent	Applied
11	Shortest dist. semi-public greenery	Ratio	Unique for each residence location of respondent	Applied
12	Shortest dist. open nature reserve	Ratio	Unique for each residence location of respondent	Applied
13	Shortest distance sports ground	Ratio	Unique for each residence location of respondent	Applied
14	Shortest dist. public swimming pool	Ratio	Unique for each residence location of respondent	Applied
15	Shortest distance ice rink	Ratio	Unique for each residence location of respondent	Applied
16	No. of catering fac. in 3km radius	Ratio	Unique for each residence location of respondent	Applied
17	No. of leisure fac. In 20 km radius	Ratio	Unique for each residence location of respondent	Applied
18	Dummy, Recreational Shopping	Nominal 10	Possibly used as dummy variable for alternative 2, phase 1	Applied
19	Dummy, Socializing	Nominal 10	Used as dummy variable for alternative 3, phase 1	Applied
20	Dummy, Touring/walking	Nominal 10	Possibly used as dummy variable for alternative 4, phase 1	Applied
21	Dummy, Sports/hobby	Nominal 10	Possibly used as dummy variable for alternative 5, phase 1	Applied
22	Dummy, Other free time activities	Nominal 10	Possibly used as dummy variable for alternative 6, phase 1	Applied
Phase two variables				
23	Supply facilities total (downtown)	Ratio	Used as a general indicator for retail supply attributes downtown	Applied
24	Vacancy (downtown)	Ratio	High correlation with 'supply facilities total' (0.778)	Merged
25	Daily supplies (downtown)	Ratio	High correlation with 'supply facilities total' (0.897)	Merged
26	Luxury and fashion (downtown)	Ratio	High correlation with 'supply facilities total' (0.975)	Merged
27	Free-time supplies (downtown)	Ratio	High correlation with 'supply facilities total' (0.978)	Merged
28	Household supplies (downtown)	Ratio	High correlation with 'supply facilities total' (0.873)	Merged
29	Other retail stores (downtown)	Ratio	High correlation with 'supply facilities total' (0.756)	Merged
30	Leisure bar/restaurant/hotel	Ratio	High correlation with 'supply facilities total' (0.982)	Merged
31	Leisure culture (downtown)	Ratio	High correlation with 'supply facilities total' (0.884)	Merged
32	Leisure relaxation (downtown)	Ratio	High correlation with 'supply facilities total' (0.925)	Merged
33	Services (downtown)	Ratio	High correlation with 'supply facilities total' (0.970)	Merged
34	Chain stores total (downtown)	Ratio	High correlation with 'supply facilities total' (0.957)	Merged
35	Stores (main shopping area)	Ratio	Used as a general indicator for stores in main shopping area	Applied
36	Catering (main shopping area)	Ratio	Used as a general indicator for catering in main shopping area	Applied
37	Services (main shopping area)	Ratio	Used as a general indicator for services in main shopping area	Applied
38	Leisure (main shopping area)	Ratio	Used as a general indicator for leisure in main shopping area	Applied
39	Travel distance	Ratio	Unique for each departure location of respondent	Applied
40	Shortest distance to bus stop	Ratio	Little differentiation within variable	Deleted
41	Shortest distance to train station	Ratio	Unique variable within accessibility attributes	Applied
42	Covered parking areas within 150m	Ratio	Assessed as less relevant than 'total public parking spots'	Deleted

43	Accessibility	Open parking areas within 150m	Ratio	Assessed as less relevant than 'total public parking spots'	Deleted
44		Total public covered parking spots	Ratio	High correlation with 'total public parking spots' (0.929)	Merged
45		Total public open parking spots	Ratio	Assessed as less relevant than 'total public parking spots'	Deleted
46		Total public parking spots	Ratio	High correlation with 'square footage indoor area' (0.843)	Merged
47		Parking tariff covered area	Ratio	High correlation with 'parking tariff inner city general' (0.879)	Merged
48		Parking tariff inner city general	Ratio	Assessed as less relevant than 'total public parking spots'	Deleted
49	Atmospheric attributes	Total length of streets	Ratio	Assessed as less relevant than 'Square footage squares & indoor'	Deleted
50		Average width of streets	Ratio	Assessed as less relevant than 'Average no. of storeys in frontage'	Combined
51		Standard dev. of average width	Ratio	Assessed as less relevant than 'Average width of streets'	Deleted
52		Total frontage length	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
53		Square footage streets	Ratio	Used as general indicator for size of main shopping area	Applied
54		Square footage squares	Ratio	Used as general indicator for presence of squares	Applied
55		Square footage indoor area	Ratio	Used as general indicator for indoor shopping/modern/parking	Applied
56		Average no. of storeys in frontage	Ratio	Used as general indicator for height of build environment	Applied
57		Height/width ratio	Ratio	Little differentiation in combined height/width variable	Deleted
58		Building age, <1900	Ratio	High correlation with 'Building type historic' (0.976)	Merged
59		Building age, 1900-1940	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
60		Building age, 1900-2000	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
61		Building age, >2000	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
62		Building type, historic	Ratio	Used as general indicator for historic value variable	Applied
63		Building type, traditional brick	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
64		Building type, trad. (concrete,plast.)	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
65		Building type, modern (glass)	Ratio	Combined with 'Building type, modern (other)'	Combined
66		Building type, modern (other)	Ratio	Combined with 'Building type, modern (glass)'	Combined
67		Building type, modern (combined)	Ratio	High correlation with 'square footage indoor area' (0.775)	Merged
68		Building type, other	Ratio	Little differentiation within variable	Deleted
69		Frontage color, warm	Ratio	Assessed as less relevant than 'pavement color warm'	Deleted
70		Frontage color, cold	Ratio	Perfect negative correlation with 'frontage color warm'	Deleted
71		Pavement color, warm	Ratio	Used as general indicator for pavement color	Applied
72		Pavement color, cold	Ratio	Perfect negative correlation with 'pavement color warm' (-1)	Deleted
73		Pavement, cobbles	Ratio	Assessed as less relevant than 'pavement color, warm'	Deleted
74		Pavement, tiling	Ratio	Assessed as less relevant than 'pavement color, warm'	Deleted
75		Pavement, asphalt	Ratio	Little differentiation within variable	Deleted
76		Pavement, marble	Ratio	High correlation with 'Square footage covered area' (0.841)	Merged
77		Pavement, old natural stone	Ratio	Assessed as less relevant than 'pavement color, warm'	Deleted
78		Pavement, other	Ratio	Little differentiation within variable	Deleted
79		Buildings sides, both sides	Ratio	Little differentiation within variable	Deleted
80		Building sides, one side	Ratio	Little differentiation within variable	Deleted
81		Building sides, other	Ratio	Little differentiation within variable	Deleted
82		Traffic, pedestrians only	Ratio	High correlation with 'Advertisement signs total' (0.814)	Merged
83		Traffic, non-motorized only	Ratio	High negative correlation with 'Traffic pedestrians only' (-0.990)	Deleted
84		Traffic, motorized	Ratio	Little differentiation within variable	Deleted
85	Shape square, rectangular	Ratio	Assessed as less relevant than 'square footage squares'	Deleted	
86	Shape square, triangular	Ratio	Assessed as less relevant than 'square footage squares'	Deleted	
87	Shape square, round/oval	Ratio	Assessed as less relevant than 'square footage squares'	Deleted	
88	Shape square, other	Ratio	Assessed as less relevant than 'square footage squares'	Deleted	
89	Shape indoor area, single street	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted	
90	Shape indoor area, multiple streets	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted	
91	Shape i. area, streets and squares	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted	
92	Shape indoor area, other	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted	

93	Buildings variation, uniform	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
94	Buildings variation, multiple styles	Ratio	Little differentiation within variable	Deleted
95	Buildings variation, varied	Ratio	Assessed as less relevant than 'Building type historic or modern'	Deleted
96	Music, none	Ratio	Little differentiation within variable	Deleted
97	Music, soft in the background	Ratio	Little differentiation within variable	Deleted
98	Music, clearly present	Ratio	Little differentiation within variable	Deleted
99	Resting points, benches	Ratio	High correlation with 'Resting p., length benches/other' (0.735)	Merged
100	Resting points, terraces	Ratio	Deleted due to irregularity caused by weather conditions	Deleted
101	Resting points, other	Ratio	Little differentiation within variable	Deleted
102	Resting p., length benches/other	Ratio	Used as general indicator for presence of resting points	Applied
103	Resting points, m2 terraces	Ratio	Deleted due to irregularity caused by weather conditions	Deleted
104	Greenery, trees	Ratio	Used as general indicator for greenery variable	Applied
105	Greenery, planters	Ratio	High correlation with 'Greenery, trees' (0.732)	Merged
106	Greenery, grass	Ratio	Little differentiation within variable	Deleted
107	Greenery, plantation	Ratio	Little differentiation within variable	Deleted
108	Water, m2	Ratio	Little differentiation within variable	Deleted
109	Height difference	Ratio	Little differentiation within variable	Deleted
110	Stairs in street	Ratio	Little differentiation within variable	Deleted
111	Minimum sightlines for overview	Ratio	Assessed as less relevant than 'curvatures/angles in streets'	Deleted
112	Artworks present	Ratio	Used as general indicator for presence of artworks	Applied
113	Historic church present	Ratio	Little differentiation within variable	Deleted
114	Curvatures/angles in street	Ratio	Used as general indicator for curvatures/angles in street variable	Applied
115	Advertisement signs on the street	Ratio	Combined with 'Facade signs transverse to street'	Combined
116	Facade signs transverse to street	Ratio	Combined with 'Advertisement signs on the street'	Combined
117	Advertisement signs total	Ratio	Used as general indicator for advertisement/traffic variable	Applied
118	Stores per meter frontage	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
119	Catering per meter frontage	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
120	Services per meter frontage	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
121	Leisure per meter frontage	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
122	Catering, Bar and Restaurant	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
123	Catering, Lunchroom and coffee	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
124	Catering, Cafeteria	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
125	Catering, Ice cream	Ratio	Assessed as less relevant than 'supply attributes'	Deleted
126	Leisure, Cinema	Ratio	Little differentiation within variable	Deleted
127	Leisure, Casino	Ratio	Little differentiation within variable	Deleted
128	Leisure, Other	Ratio	Little differentiation within variable	Deleted
129	Roof indoor area, flat	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
130	Roof indoor area, dome shape	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
131	Roof indoor area, other	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
132	Incidence of natural light, roof	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
133	Incidence of natural light, facade	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
134	Light exposure, Natural light	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
135	Light exposure, artificial light	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
136	Floor maps indoor area	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
137	Entry points indoor area	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
138	Stairs indoor area	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
139	Escalators up indoor area	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
140	Escalators down indoor area	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted
141	Elevators indoor area	Ratio	Assessed as less relevant than 'square footage indoor area'	Deleted

Interaction variables

142	Interaction var.	Time of the day 1	Nom. 3.1	Indicator for influence of time of the day	Applied
143		Time of the day 2	Nom. 3.2	Indicator for influence of time of the day	Applied
144		Age	Nominal 4	Indicator for influence of age on choice made	Applied
145		Gender	Nominal 5	Indicator for influence of gender on choice made	Applied
146		Work status	Nominal 6	Indicator for influence of work status on choice made	Applied
147		Household size	Ordinal 7	Indicator for influence of household size on choice made	Applied
148		Kids within household	Nominal 8	Indicator for influence of kids within household on choice made	Applied
148		Education	Nominal 9	Indicator for influence of education on choice made	Applied
Applied	= included in further statistical research		Merged	= Merged with other variable due to high correlation	
Deleted	= not included in further statistical research		Combined	= Combined with other variable due to high resemblance	

*Labels for the ordinal and nominal variables

1	0 = No 1 = Yes			
2	Phase one 1 = Free-time spend at home 2 = Recreational shopping 3 = Socializing 4 = Touring / Walking 5 = Sport / Hobby 6 = Other free-time activities		Phase two 1 = Recreational shopping: downtown Eindhoven 2 = Recreational shopping: downtown Tilburg 3 = Recreational shopping: downtown Breda 4 = Recreational shopping: downtown s'Hertogenbos 5 = Recreational shopping: downtown Oss 6 = Recreational shopping: downtown Helmond 7 = Recreational shopping: downtown Weert 8 = Recreational shopping: downtown Nijmegen 9 = Recreational shopping: downtown Arnhem 10 = Recreational shopping: elsewhere	
3	1	-1 = hours 8,9,10 and 11 0 = hours 12, 13, 14 and 15 1 = hours 16,17,18 and 19	2	-1 = hours 8,9,10 and 11 1 = hours 12, 13, 14 and 15 -1 = hours 16,17,18 and 19
4	-1 = Younger than 30 0 = 30 – 55 1 = 55 or older			
5	-1 = Woman 1 = Man			
6	-1 = No work or less than 12 hours per week 0 = 12 to 30 hours per week 1 = more than 30 hours per week			
7	-1 = Less than 3 persons 1 = 3 persons or more			
8	-1 = no 1 = yes			
9	-1 = Not completed/younger than 15/lower, basis college education/ other education 0 = lower, basis vocational education/high school 1 = Higher vocational education/university			
10	1 = Explanatory value for activity undertaken 0 = Activity not undertaken			

Appendix 6, Shopping center attributes

Supply attributes										
Variable name	Scale	Eindh.	Tilburg	Breda	D.Bosch	Oss	Helm.	Weert	Nijme.	Arnhem
Supply facilities total (Dt)	number	851	651	1014	982	439	334	431	960	900
Vacancy (Dt)	number	71	66	102	59	43	38	42	58	84
Daily supplies (Dt)	number	43	49	68	74	39	26	35	65	49
Luxury and fashion (Dt)	number	279	186	277	318	112	108	115	262	264
Free-time supplies (Dt)	number	48	44	62	54	23	18	22	57	59
Household supplies (Dt)	number	45	43	84	72	47	27	40	82	68
Other retail stores (Dt)	number	10	13	34	29	12	7	12	40	17
Leisure bar/restaurant/hotel	number	224	151	215	216	84	56	83	235	216
Leisure culture (Dt)	number	12	13	21	30	5	4	6	22	15
Leisure relaxation (Dt)	number	12	8	10	11	4	3	5	9	11
Services (Dt)	number	107	78	141	119	70	47	71	130	117
Chain stores total (Dt)	number	310	235	304	276	147	124	147	272	301
Stores (main shopping area)	number	252	164	254	192	133	122	145	222	176
Catering (main shop. area)	number	39	24	40	33	22	21	33	37	18
Services (main shop. area)	number	17	9	11	12	10	8	20	8	14
Leisure (main shopping area)	number	7	5	2	1	0	0	4	1	2
Accessibility attributes										
Variable name	Scale	Eindh.	Tilburg	Breda	D.Bosch	Oss	Helm.	Weert	Nijme.	Arnhem
Travel distance	Hectometer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Shortest distance to bus stop	Meter	0	70	60	0	30	130	150	0	60
Shortest dist. to train station	Meter	150	620	800	460	680	530	130	750	350
Covered park.areas in 150m	Number	5	4	3	4	2	3	3	3	3
Open park.areas within 150m	Number	1	0	1	0	5	4	7	2	1
Public covered park. spots	Number	2420	1743	1325	1449	329	839	650	1250	1530
Public open parking spots	Number	87	0	405	0	687	230	654	376	70
Total public parking spots	Number	2507	1743	1730	1449	1016	1069	1304	1626	1600
Parking tariff covered area	Euro	2.00	1.80	2.00	2.20	1.40	1.80	1.10	2.35	2.20
Parking tariff city general	Euro	2.20	2.20	1.60	2.50	1.30	2.00	1.10	2.35	2.60
Atmospheric attributes										
Variable name	Scale	Eindh.	Tilburg	Breda	D.Bosch	Oss	Helm.	Weert	Nijme.	Arnhem
Total length of streets	Meter	885	650	930	775	505	435	764	1010	930
Average width of streets	Meter	9.69	7.91	7.37	11.26	8.51	9.14	7.83	11.95	7.36
Std. dev. of average width	-	2.49	1.05	1.71	2.88	1.20	2.75	1.57	3.62	0.35
Total frontage length	Meter	8578	5140	6858	8725	4300	3978	5986	12065	6845
Square footage streets	Square meter	4050	2560	2930	2260	1760	1745	2405	2990	2075
Square footage squares	Square meter	9750	8990	4900	8700	6200	4600	4500	7500	882
Square footage covered area	Square meter	8650	1840	3780	2500	770	1600	2300	2800	480
Aver.no. of storeys in frontag	Number	3.81	3.21	3.01	3.16	2.55	2.81	2.66	3.64	3.22
Height/Width ratio	Storeys/meter	0.39	0.41	0.41	0.28	0.30	0.31	0.34	0.30	0.44
Building age, <1900	Per m. frontage	0.01	0.10	0.15	0.39	0.01	0.16	0.12	0.10	0.17
Building age, 1900-1940	Per m. frontage	0.07	0.30	0.41	0.36	0.09	0.15	0.39	0.17	0.50
Building age, 1900-2000	Per m. frontage	0.73	0.46	0.21	0.25	0.86	0.68	0.49	0.59	0.16
Building age, >2000	Per m. frontage	0.20	0.14	0.22	0.00	0.03	0.00	0.00	0.14	0.17
Building type, historic	Per m. frontage	0.07	0.10	0.14	0.39	0.01	0.15	0.10	0.09	0.15
Building type, trad. brick	Per m. frontage	0.31	0.31	0.36	0.21	0.60	0.43	0.39	0.47	0.59
Building type, trad. conc/plast	Per m. frontage	0.10	0.29	0.27	0.34	0.21	0.10	0.23	0.09	0.22

Atmospheric attributes

Variable name	Scale	Eindh.	Tilburg	Breda	D.Bosch	Oss	Helm.	Weert	Nijme.	Arnhem
Building type, modern (glass)	Per m. frontage	0.19	0.11	0.00	0.04	0.05	0.00	0.00	0.09	0.01
Building type, modern (other)	Per m. frontage	0.31	0.14	0.24	0.02	0.00	0.28	0.28	0.24	0.01
Building type, modern combi.	Per m. frontage	0.49	0.25	0.24	0.05	0.05	0.28	0.28	0.33	0.02
Building type, other	Per m. frontage	0.03	0.04	0.00	0.01	0.13	0.03	0.00	0.03	0.02
Frontage color, warm	Per m. frontage	0.63	0.33	0.29	0.52	0.36	0.48	0.43	0.57	0.60
Frontage color, cold	Per m. frontage	0.37	0.67	0.71	0.48	0.64	0.52	0.57	0.43	0.40
Pavement color, warm	Per m2 street	0.63	0.10	0.20	0.33	0.95	0.67	0.67	0.58	0.94
Pavement color, cold	Per m2 street	0.37	0.90	0.80	0.67	0.05	0.33	0.33	0.42	0.06
General color, warm	-	0.99	1.23	1.09	1.19	0.40	0.81	0.76	0.99	0.66
Pavement, cobbles	Per m2 street	0.45	0.17	0.00	0.26	0.93	0.67	0.47	0.45	0.49
Pavement, tiling	Per m2 street	0.21	0.76	0.29	0.30	0.02	0.31	0.25	0.05	0.47
Pavement, asphalt	Per m2 street	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pavement, marble	Per m2 street	0.33	0.06	0.20	0.00	0.09	0.02	0.19	0.13	0.02
Pavement, old natural stone	Per m2 street	0.00	0.01	0.51	0.44	0.00	0.00	0.09	0.37	0.00
Pavement, other	Per m2 street	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Buildings sides, both sides	Per m2 street	1.00	1.00	1.00	1.00	0.79	1.00	1.00	1.00	1.00
Building sides, one side	Per m2 street	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building sides, other	Per m2 street	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00
Traffic, pedestrians only	Per m2 street	0.79	0.34	1.00	0.13	1.00	1.00	1.00	0.40	1.00
Traffic, non-motorized only	Per m2 street	0.21	0.61	0.00	0.68	0.00	0.00	0.00	0.60	0.00
Traffic, motorized	Per m2 street	0.00	0.05	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Shape square, rectangular	Per m2 street	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00
Shape square, triangular	Per m2 street	0.00	0.49	0.00	0.24	1.00	0.00	0.00	0.29	0.00
Shape square, round/oval	Per m2 street	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shape square, other	Per m2 street	0.00	0.51	0.00	0.76	0.00	1.00	1.00	0.71	0.00
Shape indoor, single street	Per m2 street	0.00	1.00	0.18	0.00	1.00	0.00	0.00	0.00	1.00
Shape indoor, multiple str.	Per m2 street	0.00	0.00	0.82	0.00	0.00	0.00	1.00	1.00	0.00
Shape i, streets and squares	Per m2 street	0.57	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00
Shape indoor, other	Per m2 street	0.43	0.00	0.00	1.00	0.00	0.13	0.00	0.00	0.00
Buildings variation, uniform	Per m2 street	0.32	0.12	0.24	0.13	0.07	0.16	0.18	0.22	0.06
Buildings var, multiple styles	Per m2 street	0.28	0.39	0.00	0.14	0.07	0.00	0.31	0.00	0.13
Buildings variation, varied	Per m2 street	0.40	0.49	0.76	0.74	0.86	0.84	0.51	0.78	0.81
Music, none	Per m2 street	0.86	0.88	0.80	0.87	1.00	0.86	0.82	0.87	1.00
Music, soft in the background	Per m2 street	0.14	0.06	0.00	0.13	0.00	0.00	0.18	0.00	0.00
Music, clearly present	Per m2 street	0.00	0.06	0.20	0.00	0.00	0.14	0.00	0.13	0.00
Resting points, benches	No. Per 100m2	0.07	0.12	0.05	0.11	0.12	0.32	0.17	0.04	0.11
Resting points, terraces	No. Per 100m2	0.11	0.08	0.20	0.09	0.13	0.15	0.16	0.07	0.11
Resting points, other	No. Per 100m2	0.00	0.00	0.00	0.02	0.01	0.00	0.04	0.00	0.01
Rest p., length benches/other	No. Per 100m2	0.33	0.38	0.15	0.67	0.28	0.65	0.59	0.16	0.41
Resting points, m2 terraces	m2 Per 100m2	6.54	6.07	8.12	4.14	4.76	6.34	5.01	9.46	1.71
Greenery, trees	No. Per 100m2	0.11	0.39	0.11	0.15	0.58	0.42	0.10	0.16	0.01
Greenery, planters	No. Per 100m2	0.15	0.06	0.03	0.03	0.49	0.47	0.00	0.06	0.18
Greenery, grass	m2 Per 100m2	0.00	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greenery, plantation	m2 Per 100m2	0.00	0.20	0.00	0.00	0.00	0.03	0.03	0.00	0.02
Water, m2	m2 Per 100m2	0.03	0.00	0.00	0.05	0.13	0.02	0.12	0.00	0.00
Height difference	m. per 100m2	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.03
Stairs in street	No. Per 100m2	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Min. sightlines for overview	No. Per 100m2	0.10	0.11	0.13	0.07	0.12	0.14	0.13	0.10	0.19

Atmospheric attributes

Variable name	Scale	Eindh.	Tilburg	Breda	D.Bosch	Oss	Helm.	Weert	Nijme.	Arnhem
Artworks present	No. Per 100m2	0.03	0.01	0.03	0.02	0.02	0.16	0.04	0.00	0.02
Historic church present	Number	0.00	1.00	2.00	0.00	0.00	0.00	1.00	0.00	0.00
Curvatures/angels in street	No. Per 100m	0.34	0.62	0.54	0.65	0.59	0.46	0.26	0.69	0.86
Advert. signs on the street	No. Per 100m	0.77	2.27	3.89	0.88	5.17	1.89	2.95	1.10	0.77
Facade signs transverse str.	No. Per 100m	5.46	2.23	7.92	2.57	7.50	7.62	7.69	8.43	9.20
Advertisement signs total	No. Per 100m	6.22	4.49	11.81	3.45	12.67	9.51	10.64	9.53	9.98
Stores per meter frontage	Per m. frontage	0.81	0.73	0.82	0.77	0.81	0.72	0.67	0.81	0.85
Catering per meter frontage	Per m. frontage	0.12	0.09	0.13	0.15	0.13	0.16	0.17	0.12	0.07
Services per meter frontage	Per m. frontage	0.03	0.03	0.03	0.05	0.04	0.05	0.08	0.02	0.05
Leisure per meter frontage	Per m. frontage	0.03	0.03	0.01	0.00	0.00	0.00	0.03	0.00	0.01
Roof indoor area, flat	Per m2 roof	0.94	0.59	0.18	0.00	0.84	0.30	0.30	0.80	0.33
Roof indoor area, dome	Per m2 roof	0.05	0.41	0.82	0.00	0.07	0.00	0.70	0.20	0.67
Roof indoor area, other	Per m2 roof	0.01	0.00	0.00	1.00	0.10	0.70	0.00	0.00	0.00
Incidence of nat. light, roof	Per m2 roof	0.68	0.41	0.38	0.90	0.16	0.20	0.70	0.20	0.60
Incidence of nat. light, facade	Per m frontage	0.07	0.00	0.00	0.00	0.00	0.01	0.20	0.00	0.09
Light exposure, Natural light	Per m2 street	0.77	0.46	0.72	1.00	0.26	0.58	0.70	0.30	0.73
Light exposure, artificial light	Per m2 street	0.23	0.54	0.28	0.00	0.74	0.43	0.30	0.70	0.27
Floor maps indoor area	No. Per 100m2	0.04	0.00	0.02	0.00	0.00	0.01	0.03	0.02	0.00
Entry points indoor area	No. Per 100m2	0.03	0.06	0.05	0.02	0.04	0.07	0.05	0.02	0.05
Stairs indoor area	No. Per 100m2	0.02	0.04	0.03	0.02	0.00	0.03	0.01	0.01	0.02
Escalators up indoor area	No. Per 100m2	0.03	0.03	0.02	0.01	0.00	0.01	0.00	0.00	0.01
Escalators down indoor area	No. Per 100m2	0.02	0.02	0.02	0.01	0.00	0.01	0.00	0.00	0.01
Elevators indoor area	No. Per 100m2	0.01	0.01	0.02	0.01	0.00	0.02	0.02	0.00	0.04