Location choice in practice

A research about the role of quantitative
data in the location choice process

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Preface

In front of you lays my master thesis titled ´location choice in practice: a quantitative research about the role of quantitative data in the location choice process´. This qualitative research is the last part of my master Human Geography with the specialization Economic Geography at the Radboud University in Nijmegen. This research is the result of months of hard work and gaining knowledge in this specific topic. During this research I also worked in Amsterdam for Bureau RMC, a consultancy bureau specialized in smart retailing. Here I worked on different projects related to my study to gain experience in the field.

At the beginning of this thesis, I already had a particular topic in my head to write about: the role of quantitative data in the location choice process. Therefore, I am very thankful that the director of Bureau RMC, Huib Lubbers, gave me the opportunity to do this research as I wanted to do and combine this with working for the organization.

I would also like to thank a few other people who helped me throughout the process of writing this thesis. I want to thank professor Arnoud Lagendijk for his feedback and for giving me useful insights. Second, I would like to thank my colleagues from Bureau RMC for all the things they taught me. Special thanks to my supervisor Rixt de Jong who supported me throughout the research and for sharing her knowledge on the subject.

A special thanks to everyone to all the people who I spoke to for my interviews. Without your honesty and answers to my questions, it would be impossible to write this research. And last, I would like to thank everyone else who directly or indirectly contributed to my research or helped me throughout the process.

Rutger Koop
Amsterdam, 2020

Summary

The retail world is under high pressure and is changing rapidly (Exterkate & Ploem, 2019; ABN, 2013). Widely known stores have disappeared from our shopping streets, and the number of consumers who are purchasing goods online is increasing (ABN, 2013). These different developments are not necessarily the end of the physical store. Physical stores have a lot to offer. For example, a customer can interact with other customers and feel, see, and experience the product they are looking for (INretail, 2017). The location of a store determines the success or failure of a retailer. Even the smallest differences can significantly affect the performances of a store (Ghosh & McLafferty, 1987). Making a wrong decision can be very expensive (Theodoridis & Bennison, 2009). Throughout the years, location strategy has gained more importance among retailers. Retailers are now, more than ever, willing to invest more capital in gaining better insights to reduce the investment risks (Wood & Tasker, 2007). Nowadays, there are many different planning techniques available that vary in technical expertise and costs. When using more sophisticated techniques the subjectiveness also increases (Hernández & Bennison, 2000).

Research from other scholars is mainly about the usage of different planning techniques and focuses on retailers based in the United States. How retailers use quantitative data in practice remains unclear. This research fills this knowledge gap by zooming in on this particular topic. From a societal perspective, this topic is relevant because there is a growing pressure on the Dutch retail landscape, which makes it even more important to improve location decisions. The insights gathered from the interviewees helps to better understand how retailers use quantitative data in the location decision process. Other retailers can also learn from these experiences. The overall goal of this research is to better understand the role of quantitative data in the decision process of Dutch retailers.

For this research, a literature study was carried out on the existing literature related to this topic. This literature study was input for the interview guide. Semi-structured interviews were held with Dutch retailers and consultants from Bureau RMC to better understand the role of quantitative data in the location decision process. By interviewing the respondents, it became clear how these retailers see the role of quantitative data. The interviews were transcribed, coded, and eventually divided into smaller parts. Combining desk research, the literature study, and semi-structured interviews helped to get high-quality research with credible findings and a representative outcome.

The Dutch retailers who participated in this research clearly see the importance of quantitative data for the location choice process, but the full potential of this data is not always used. More data is available and retailers are setting up different initiatives to work with quantitative data to make better business decisions. Retailers are mainly using data to reduce the risks of making a wrong investment. With the help of data, retailers justify a decision. A decision which is, in most cases, based on intuition and experience. Respondents agree on the fact that location choice will never be 100 percent based on data. Not everything can be expressed in data. Experience and a person's observations are still very valuable.

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1. Introduction

In paragraph 1, the background of this research is discussed. Paragraph 2 discusses the research goal. The third paragraph discusses the research question and the sub-questions. The last paragraph of this chapter, paragraph 4, discusses the relevance of this research. The relevance is divided in the social relevance and the scientific research.

1.1 Background

The retail sector in the Netherlands is changing rapidly (Exterkate & Ploem, 2019; ABN, 2013). Widely known retailers disappeared from our shopping streets and in other cases the number of stores from a specific retailer or sector decreased. Retailers are facing enormous difficulties as a result of increased competition and an increase in online purchases. Six to eight percent of the purchases are bought on the internet and not in a physical store (INretail, 2017). Expected is that the number of people who are ordering goods online will even further increase (ABN, 2013). Consumers are 24/7 online, and it is much easier to buy or compare products/goods online. This change in how people shop has enormous consequences for the physical stores and the Dutch retail landscape.

Although online competition increases, physical stores are still very important. Having a physical store makes it easier for a retailer to get in direct contact with their customers. A customer can ask for advice, but it is also possible to see, feel, and touch the product they are looking for. Visible is that more customers are asking for this personal contact and expertise of a retailer (INretail, 2017). As a result of the growth of online webshops, customers are now better prepared when they visit a physical store. Only selling products is not enough anymore. Customers are seeking for coziness, excitement, and renewal. Coziness, excitement, and renewal are hard to achieve for a retailer when only having an online shop. Physical stores are also places where social interactions take place. In this individualizing world, people are seeking for more social interactions. These social interactions can eventually lead to new (unexpected) encounters between people (INretail, 2017). Another benefit is that having a physical store leads to a third more online traffic (Exterkate & Ploem, 2019). People get familiar with the brand and visit the online website more often.

Having a good location has always been one of the most important aspects for a retailer and is often described as the 'keystone to profitability'. A well-chosen location is determined for the success or failure of a retailer. Even the smallest differences can have a huge effect on market share and profitability in an extremely competitive retail environment (Ghosh & McLafferty, 1987). In this changing retail environment, retailers become more critical when choosing a new retail location (ABN, 2013). Opening a new location is a huge investment and, in most cases, the largest investment that a retailer will make (Walters, 1974). Making the wrong decision for a new location can have a significant impact on a business. When a poor location decision is made, it is hard to change this (Hernandez & Biasiotto, 2001). In most cases, retailers are tied to a specific location for a longer period of time. Hernandez and Biasiotto (2001) argue that location decisions have a long-term impact on the performances of a retailer, and a good analysis of a specific location is required.

Another visible development is that big data has captured a more prominent spot in today's society (Provost & Fawcett, 2013). More and more businesses are using data to make smarter decisions, data-driven decisions. Data-driven decisions can be described as the practice of making decisions based on the analysis of data instead of purely relying on intuition (Provost & Fawcett, 2013). Nowadays, huge amounts of different data sources are available to investigate the potential of a location. Also, technologies and tools are better and more powerful, allowing analysts to make a more complex analysis of a potential location.

1.2 Research goal

This research aims to better understand the role of quantitative data in the location decision process for Dutch retailers and focuses on retailers with multiple stores. What role of quantitative data for the location decision process, and how is quantitative data used to make better choices for locating a new store? Did the role of data change throughout the years? Has quantitative data captured a more prominent spot in the decision-making process? What are the different reasons for the use of quantitative data among retailers? In a rapidly changing world where big data is more important than ever, and the retail sector is under heavy pressure, these questions are very relevant and worth investigating. This research combines the existing literature on this topic with the findings based on nine interviews with Dutch retailers.

1.3 Research questions

Based on the background and the research goal, the following main question and sub-questions are formulated. The main question of this research is: *'what is the role of quantitative data in location choice for retailers?'*

There are multiple sub-questions which help to answer the main question. The first sub-question is: *'what are the reasons given by the different retailers for using quantitative data in the location process?'* This sub-question mainly focuses on the different reasons given by the respondents why they use quantitative data.

The second sub-question is: *'is quantitative data for location choice decisive?'* Has data kept a more prominent place in decision-making, or are there still other elements that are more important than the insights based on data?

The third sub-question focuses on the daily use of quantitative data among retailers and is formulated as follows: *'how is quantitative data used in daily practice among retailers in the location choice process?'* This sub-question gives insights into how, if, and when retailers use quantitative data in the location choice process.

The last sub-question compares the vision of Bureau RMC with the answers given by the different retailers who participated in this research. This vision is based on three interviews with consultants and experts form Bureau RMC. Sub-question four is defined as: *'how sees Bureau RMC the role of quantitative data and matches this with the response given by the different retailers?'* These insights given by these experts are very valuable because Bureau RMC works for many different retailers who are very often dealing with data and finding the best retail locations. The consultants from Bureau RMC have a lot of knowledge about the Dutch retail landscape and have worked on many projects creating new location strategies with quantitative data.

1.4 Relevance

Paragraph 1.4 discusses the relevance of this master thesis. The relevance is divided into the academic and the societal relevance. The first subparagraph describes the societal relevance. What is the societal contribution of this specific research? The second subparagraph describes what this research contributes to the academic field.

1.4.1 Social relevance

Location strategy is one of the key components of a retailer. Economic conditions, preferences, lifestyles, competition, and the demographics of a certain area are all strong factors that can influence the performances of a retailer on a specific location (Ghosh & Craig, 1983). Wood & Tasker (2008) argue that a well-chosen location can create competitive advantages compared to other retailers.

When looking back in time on the process of making a location decision, entrepreneurs and managers were mostly relying on their own judgments, intuition, or experiences from the past (Brown, 1991). When a retailer found a promising location with enough potential, a retailer decided to rent the place without making a more in-depth analysis of the potential. In some cases certain thumb-rules or an experience from the past helped to make a decision. A huge disadvantage of these methods and judgments is that they are very subjective, making these methods dangerous to use, and hard to validate to others. Roig-Tierno et al. (2013) argue that only relying on intuition and experience is no longer enough. A solid and objective analysis of a place is needed. Roig-Tierno et al. (2013) add that these subjective rules for finding a promising location might differ for others.

Due to the growing importance of big data in today's society and an increase in companies providing and collecting (spatial) data, there is more attention to the role of data and software. Quantitative data can help to choose the best location for opening a new store and provides new unseen insights. Although still some location decisions will be made ad-hoc, there is a growing complexity in this process which is hard to grasp. Quantitative data can reveal insights that are otherwise hard to see. Desai (2007) argues that increased competition and a highly fragmented consumer marketplace led to a change in site selection.

Different retail trends led to the fact that retailers are more critical when opening a new store. One of these trends is an increase in people shopping online. People can shop everywhere and anywhere, but argued is that physical stores are still important (Wunderman Thompson, 2019). The growth in online shoppers also has consequences for physical stores. Consumers are looking for a unique experience and skilled staff (Rabobank, 2019). Having a good retail location is still crucial. In a physical store, consumers can experience and feel the quality of a product. Questions as how many shops are necessary and what is the best location to open a store are more important than ever. Research from ABN (2013) shows that retailers are more critical when choosing a retail location.

Understanding the benefits of quantitative data will help to make better business decisions. As a result of the growing pressure on the Dutch retail landscape, it is crucial to improve location decisions. Making the wrong choice can have huge consequences for a retailer. The insights of the people making location decisions contribute to a more general overview of how quantitative data is used in the location decision process. This research explicitly contributes to a future of location choice where the role of quantitative data is more explored and where decisions are better substantiated.

1.4.2 Scientific relevance

Throughout the years, only a few researchers wrote about the use of quantitative data and the different techniques available for site selection. In most cases, researchers only described the use of the different planning techniques available. These different tools vary from highly subjective to more objective techniques that require more technical expertise and specific data knowledge for making an analysis (Hernandez et al., 1999). Many of these tools are already available for a long time, but their usage is low due to the required technical expertise. Experience is the most popular tool among retailers for choosing a new location (Hernandez & Bennison, 2000). However, throughout the years, different planning and decision tools have become cheaper and less for the elite. Also, the quality of the data has improved. Data is now less expensive and focuses more on the retail sector, which makes the usage of this data easier. In the literature is argued that there is a missing link between the complex theory and the daily use of data in practice among retailers (Wood & Tasker, 2006). For example, Hernandez & Bennison (2000) investigated the use of different location decision techniques among retailers, but there is less attention to why retailers are using quantitative data. Besides, the research from Hernandez & Bennison is already more than 20 years old and mainly focuses on retailers in the US.

In the academic literature, there is also a lack of insights for quantitative data usage among retailers in the Netherlands. Are Dutch retailers embracing quantitative data for location planning, or is it similar to the outcomes from research in the US? Besides that, the percentage of retailers using a particular technique only indicates the popularity of a technique. It is crucial for researchers to understand why and how retailers are using quantitative data because only than location decisions can be improved and contribute to the overall performances of a store.

Argued is that decision-makers are not completely rational, and many decisions are based on intuition and experience (Rodrigue, 2020). This particular research tries to bring these different elements together and describes the role of quantitative data from different perspectives. These insights are based on the experiences of retailers with multiple stores in the Netherlands. These insights are very valuable for other retailers to make better use of quantitative data and learn from other retailers. For data companies, this research gives insights into the different reasons why retailers are using quantitative data. With this information, data companies can improve their services and create new products based on the wishes of the retailers.

2. Theoretical framework

This chapter discusses the core issues related to the topic. The first paragraph elaborates more on the importance of having a good location for a retailer. Paragraph two discusses the different location planning techniques and the usage of these techniques. Paragraph three elaborates more on data and the different kinds of data sources that are useful for retailers. The last paragraph, paragraph 4, discusses the role of Geographic Information Systems (GIS).

2.1 The importance of a good location

Making a good location decision is one of the most important decisions to make for a retailer (Pioch & Byrom, 2004). It is for a good reason that one of the most used sayings is: "location, location, and location". This saying stresses the three most important elements for a retailer when making a location decision (Pioch & Byrom, 2004). Argued is that a well-considered location choice can make the difference between a profitable store and a loss-making store. Already in 1975, Davidson et al. (1975) argued that even with excellent marketing, it is not possible to overcome problems concerning a bad location. The chosen retail location is of great importance because the location eventually determines the market area and the consumers in it (Gonzlez-Benito & Gonzlez-Benito, 2005). Hernandez, Bennison & Cornelius (2007) see location strategy as a long-term decision with high financial risks. Making a wrong choice is an expensive mistake and hard to turn back. Due to lease contracts retailers are bound to a specific location for a certain number of years. When a retailer wants to leave earlier than the contract allows, that can have huge financial consequences. Berman and Evans (1983, p. 183) argue: "essentially you are married for 20 to 25 years once you pick a location, and divorce can be very expensive".

2.1.1 Increased interest in location strategies

Throughout the years location strategy has gained more importance among retailers. According to Theodoridis and Bennison (2009), retail location strategies are more often supported by computer tools that can analyze large amounts of marketing and geographical data. Increased competition and a growing complexity forced retailers to use and develop tools to analyze different data sources (Theodoridis & Bennison, 2009). Doing spatial analysis also became easier due to an increase in different data sources and a growing number of consultancy companies specialized in selling data and making 'data driven decisions' (Wood & Browne, 2007). Data was only something for the 'elite' now, due to lower costs of IT hard- and software, data is now widely accessible for everyone. Also visible is an enormous increase in the volume of data available (Hernandez, Bennison & Cornelius 1998). Sensors and other devices are generating tons of data to analyze and use when making important decisions.

It is not affordable for every retailer to fully investigate the potential of a new location with quantitative data. For example, a small neighborhood retailer is less likely to make a big investment to discover the potential of a new store. According to Wood & Browne (2007), the amount spent on investigating a potential site heavily depends on a retailers budget and scale. In most cases, smaller retailers do not have the resources to invest a lot of money in data or do not have a whole department responsible for site selection. Also, for purchasing external data, the available budget plays a crucial role. External data can give a better insight in the environment, but still can be very expensive. Therefore the insights gathered with the help of quantitative data must be valuable. Another

important aspect is the data expertise level of the retailer. Most small neighborhood retailers do not have the knowledge to analyze this data and develop useful insights for their own business. Due to this, many smaller retailers are still relying on highly subjective tools as experience, intuition, and thumb rules for site selection. Bigger retailers have, in theory, more people available to analyze data and more budget to investigate this in a proper way (Wood & Browne, 2007).

2.1.2 Reducing the risks

Crucial for location choice is a location with enough potential. In many cases, the potential of a place is determined by predicting the potential sales. Cohen and Applebaum (1960, p.1) already underline this in 1960 by saying, "profit is tied to sales". Therefore, a site evaluation begins with an estimation of sales that can reasonably be expected." Wood & Tasker (2007) add that nowadays, retail organizations are willing to invest more capital in gaining better insights to reduce investment risks. A better and more accurate prediction of the sales is crucial. Even the smallest differences can affect the attractiveness of a location. As Wood & Tasker (2007, p.1) argue: "a 10 percent variation in a sales forecast from reality for a medium-sized grocery superstore could change the affordable bid for a site by about £ 5m". Knowing the potential of a place is not only crucial to predict the sales, a wrong estimation could also result in losing a location to a competitor.

In the literature, there are different reasons why it is important to have better insights into a location (Wood & Tasker, 2007). The first reason is that a good location strategy justifies the decisions to the shareholders. In many cases opening a new retail location is an expensive investment. Stakeholders need to be convinced that the investment is worth it. A second reason is that there is a lot of competition for retail sites, which makes it harder to get the desired location. Third, visible is that 'obvious' retail sites have disappeared, which makes it harder to find the optimal retail location. The last reason given by Hernandez, Bennison & Cornelius (1998) is that most of the markets in certain sectors and localities are saturated. This saturation makes it even more important to make the right decisions.

Besides gaining insights into the potential of a place, another important aspect of a good retail location strategy is to look at changes in the environment. Today's retail environment is rather complex and constantly changing because retailers interact with so many different actors: consumers, suppliers, labor, political authorities, banks, and other financial institutions (Theodoridis & Bennison, 2009). The complexness of these networks depends on the number of actors and the connections between them. Not only the environment is an important aspect to look at. Retailers should also be aware of and anticipate on changes in demographics and competition in the area they are planning to locate (Ghosh & Craig, 1983). Roig-Tierno et al. (2013) describe these two elements as geodemand and geocompetition. Geodemand is "the location of the customers who purchase a product or service in a specific market". Gonzlez-Benito & Gonzlez-Benito (2005) add that population density and spatial heterogeneity of the consumers is crucial. In many cases, geo-demographic data is used as an additional source to make detailed segmentations of potential consumers. Geocompetition can be defined as "the location of the competitors of a business and the delineation of their trade areas in a particular market" (Roig-Tierno et al., 2013, p. 191). Analyzing both geodemand and geocompetition is crucial to identify new possible retail locations.

2.2 Location planning techniques

Retailers nowadays have many techniques available to support their location decisions (Hernández & Bennison, 2000). These techniques vary from highly subjective to more objective and scientific methods. Most of these techniques are already here for a long time. Because these tools are sometimes very complex and difficult to use, retailers refused to use them (Simkin et al., 1995). Instead, retailers heavily relied on proven methods as intuition, experience, and common sense. In the literature, there are different reasons why intuition, experience, and common sense are still so important for a retailer. The first reason is that costs are an important factor. Experience and checklists are very low in costs and require less technical experience. However, costs are certainly not the most important reason. Throughout the years, the costs of sophisticated tools have decreased and the price of these tools are only a fraction of the marketing budgets that big retail organizations have (Wood & Tasker, 2007). Hernandez, Bennison & Cornelius (1998) add that the retail sector is an extremely difficult sector, which is highly dynamic and has many uncertainties. For example, a constantly changing and highly segmented consumer market where the competition among other retailers is high. The last reason why these tools are less used than others is given by Clarke et al. (2000). Clarke et al. (2000) argue that objective tools ignore other important elements as a retailer his intuitive judgment and experience. The importance of a retailer his judgment is discussed later in sub-paragraph 2.2.2, which explains the importance of experience and intuition.

Hernández & Bennison (2000) divided the different planning techniques into six groups, see table 1. Each technique has its own characteristics, advantages, and disadvantages. For example, experience is very subjective, has low costs, requires low technical expertise, and low data input. Overall is visible that when the subjectivity decreases, the costs, technical expertise, the computing and data needs are increasing. When using more data, location choice moves away from the intuitive approach and becomes more a factual based approach.

Technique/s	Subjectivity	Cost	Technical expertise required	Computing and data needs	GIS	Typical decision level
Experience	▲▲▲▲	▲	▲	▲	▶▼	✪★☆
Checklists/analogues/ratios	▲▲	▲	▲	▲	▼	★
Multiple regression/ discriminant/analysis	▲	▲▲	▲▲▲	▲▲	▶●	★☆
Cluster/factor analysis	▲	▲▲	▲▲▲	▲▲	▶●	✪★☆
Gravity modelling	▲	▲▲▲	▲▲▲▲	▲▲▲	■	✪★☆
Expert systems/neural networks	▲	▲▲▲▲▲	▲▲▲▲	▲▲▲▲	▶●	✪★

Key: ▲ Low, ▲▲ Medium, ▲▲▲ High, ▲▲▲▲ Very High, ✪ Strategic, ★ Monadic, ☆ Tactical, ▶ GIS limited role, ● GIS information, ▼ GIS information, visualisation, ■ GIS information, analysis, visualisation, modelling

Table 1: The different techniques for site selection (Hernandez & Bennison, 2000).

The planning technique used by a retailer heavily depends on the sector. How the different retail sectors are using the different location planning techniques is visible in the research from Hernández & Bennison (2000), see figure 1. Experience is the most popular technique for all sectors. Visible is that some of the techniques are not used at all in certain sectors. Hernandez, Bennison & Cornelius (1998) add to this that the location strategy used in a company is closely linked to the objectives stated by the headquarters. Other important factors that determine which technique is used are the criteria to investigate, the environment, and the actors involved.
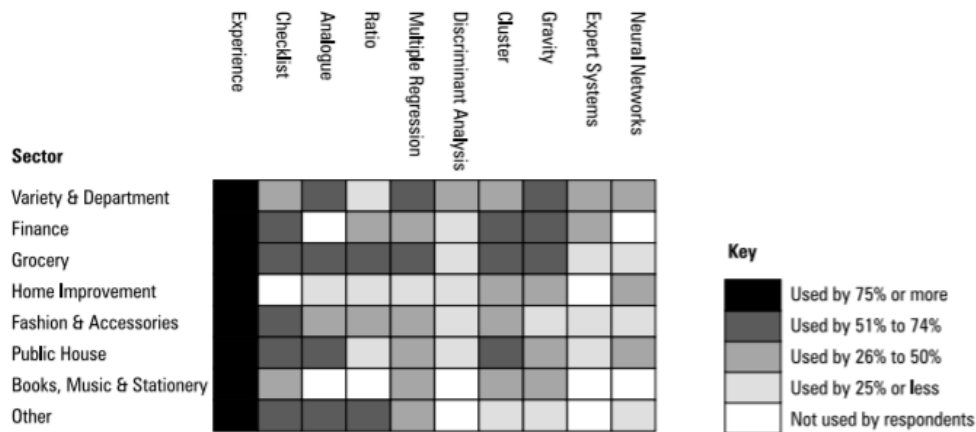
Figure 1: The different location planning techniques used per sector (Hernandez & Bennison, 2000).

2.2.1 Use of the different planning techniques

In a survey conducted in 1998, more than 50.000 retailers from 8 different sectors were asked what kind of planning techniques they used (Hernández & Bennison, 2000). Despite the earlier mentioned fact that the availability of sophisticated planning and decision tools increased, this survey showed that retailers still heavily rely on intuitive approaches as gut feeling, checklists, or analogue techniques. The popularity of these techniques has not changed throughout the years. Already in 1987, Rogers (1987, p. 74) argued that "many if not most locations were chosen on the basis of gut-feel, obscure rules of thumb or, if it was a really important decision, by means of licking a finger and holding it up to the wind". Rogers (1987) also argues that although there are more objective data analysis tools available, retail site selection did not become an objective science. Only the degree of subjectivity has decreased. Models are never comprehensive and the subjective judgment of a retailer still is an important element for a successful site selection decision.

Although these arguments are more than 27 years old, visible is that experience and judgments still play an important role. Many retailers still heavily rely on emotional and subjective methods when looking for a new location. Wood & Browne (2007) argue that only relying on experience and checklists could be very dangerous. Experience and checklists are highly subjective, hard to measure, and hard to compare (Wood & Browne, 2007). Table 2 shows that when a technique becomes more complex, the number of retailers that use this technique is decreasing. The next sub-paragraphs discuss the three most used planning techniques experience, checklist, and analogue.

Technique	Used	Used regularly	Occasionally	Not used
Experience	96	84	12	4
Checklist	55	33	22	45
Analogue	39	24	15	61
Ratio	36	15	21	64
Cluster	42	19	23	58
Multiple regression	40	24	16	60
Gravity	39	27	12	61
Discriminant analysis	12	3	9	88
Neural networks	16	3	13	84
Expert systems	13	5	8	87

Table 2: Percentage of how many retailers are using a certain technique (Hernandez & Bennison, 2000).

2.2.2 Experience

According to Clarke, Mackaness & Ball (2013), experience still is the most important and most used technique to determine a new retail location. The influence of experience in the location decision process should not be underestimated according to Davies (1984). The experience from a staff member who has investigated many other store locations is often very accurate. Experience is developed throughout the years and based on different facts and inputs (Agor, 1986). Experience results in the use of simple rules of thumb. One of these rules, for example, is that if a store is within 5 kilometers of a competitor the store will be less profitable (Hernandez & Biasiotto, 2001). A potential danger of this subjective rules of thumb is argued by Blattberg & Hoch (1990). Decision-makers who rely too much on intuition do not have the right justification for their actions. Dane et al., (2012) add to this that there is a difference between more experienced decision-makers and less experienced decision-makers. Less experienced decision-makers would value more the factual data than the intuition due to a lack of experience.

Research from Agor (1986) among different executives from different big companies showed that experience is frequently used in combination with intuition to make important business decisions. Intuition is in the literature described as a way of knowing or recognizing the possibilities in any situation and is the result of factual information and a feeling (Agor, 1986). Good intuition allows people to see new possibilities. Agor (1989, p. 9) describes different situations where intuition functions best. For example, when a high level of uncertainty exists, when there little previous precedent exists, when the variables are less scientifically predictable, when facts do not clearly point the way to go, when time is limited and there is pressure to come up with the right decision and last, when several plausible alternative solutions exist to choose from, with good arguments for each.

When discussing experience and intuition, it is important to mention that visiting a place to access the nature of a specific location is a crucial step in the location decision process (Wood & Tasker, 2007). A case study from Wood & Tasker (2007) showed that several important elements for the location choice process were not represented in the data or models. The fact that not everything can be expressed in data models is also endorsed by Rogers (2006, p.64), who argues: "technology cannot replace thorough field analysis and good retail intuition - nor cultural understanding. Too many site selection firms - on both sides of the Atlantic - mistakenly believe that the activity involves manipulating databases and models in a comfortable office. While being a great 'assist', location research technology is only as accurate as the data employed, and the judgments and care used to manage the process of application". The most important critique is that many authors who wrote about location decisions neglected the importance of the site visit and put a greater emphasis on the theoretical part instead of the practical part. Especially for micro-scale considerations a site visit plays an important role. Therefore Fenwick (1978) makes a distinguishing between locational advantages and site advantages. Locational advantages determine the characteristics and surroundings of the population and competitors. Site advantages characterize, for example, the layout, proximity of the competition, and the size of the store. Wood & Tasker (2007) emphasize that also the time of the location visit is important. For example, when a retailer wants to open a lunchroom, it is better to check the potential of a place during lunchtime. Table 3 provides an overview of the different reasons why a site visit is such an important element for the location choice process. Overall is argued that highly quantitative models are a simplification of reality and rarely represent all the factors influencing a specific retail site. This stresses the importance of experience, intuition, and visiting a place.

Catchment	
Inventory of the competition	Assess competition specially for: (a) Size of the selling area (b) No. of assistants (c) No. of checkouts (d) Range of goods and services (e) Price policy (f) Opening hours (g) Additional services (eg petrol station, toilets, café) (h) Car parking (no. of spaces and configuration) (i) Condition of store (recently refitted?) (j) Drivetimes to and from site in question (k) Location of competitors (standalone/mall/district center/retail parks, etc) (l) Nature of store performance (eg basket or trolley trade) (m) Observe core customers (eg age, affluence)
Study customers through surveys	Customer 'spotting' surveys to understand: (a) Current customer shopping patterns (b) Perceptions of retail image of competitors and current stores in portfolio (c) To study areas of under-penetration
Check residential areas	Visit residential areas to review: (a) Nature of residential catchment compared to available data (if any) (b) Any areas of new housing development that may affect forecasts (c) Cultural geography of the catchment. Understand divisions between areas that may not be well presented in traditional data sets
Site location	
Accessibility of the site and throughout the catchment	(a) Ease of access and egress in terms of to the site and within the site itself (eg park layout) (b) Role and perception of 'trade barriers' for the customers (eg rivers, motorways topography etc)
Visibility of site	(a) View from pedestrian walkways (b) View from immediate road on entry and egress (c) View from major adjacent roads
Traffic flows around site	(a) Measure flows throughout different types of day (b) Check road speeds and for one-way streets especially for model calibration if using spatial interaction models (c) Check for any new roads not recorded in current data or models
Pedestrian flows around the site	Measure flows throughout different types of day
Crime check	Examine area around the site for evidence of crime, litter, etc
Site development scheme	
Appraise the shape of the store and car park	Appraise the scheme for: (a) Size and shape of store relative to the scheme plans (b) Review the suitability of the car park shape and size relative to the scheme (esp. in terms of access) (c) Review the scheme critically – can it be improved?

Table 3: An overview of different reasons why a site visit is a crucial aspect in the location choice process (Wood & Tasker, 2007).

2.2.3 Checklists

According to Hernandez & Bennison (2000), 40 percent of the retailers rely on checklists for site selection. This systematic approach is frequently used to value or compare one location with another location (Hernandez & Bennison, 2000). In this case, the retailer his judgment plays an important role and goes beyond factors as the socioeconomic, competitive, and demographic composition of the area. Think for example about accessibility, 'such as traffic count, parking facilities, ease of access and aggress, and visibility' (Wood & Browne, 2007, p.18). Checklists are low in costs, do not require high technical expertise, and the computing and data needs are low. Wood & Browne (2007) argue that checklists are a good first step in the location decision process to explore the potential of a place. Many checklists are based on performances in the past to predict the success for the future.

2.2.4 Analogue

The analogue approach for site selection is a technique developed by Applebaum (1966) and compares the characteristics of a new potential site to the already existing store locations of a retailer (Clarke, Mackaness & Ball, 2010). As is visible in the research from Hernández & Bennison (2000), the analogue approach is still one of the most popular approaches among retailers.

A characteristic of this approach is that different aspects are measured, for example, the market penetration, distance from the store, drivetime, and data from loyalty cards or customer surveys (Wood & Browne, 2007). When all these data sources are available for multiple stores, it is possible to make a comparison between stores with the same characteristics. Crucial for the success of this analysis are the capabilities of the business analyst and his or her judgments. The analyst needs to form causal relationships between the different factors involved, such as competition, population characteristics, and barrier effects. Another important aspect is that the analyst is responsible for selecting the right stores to investigate. Selecting the wrong stores to investigate can result in a totally different outcome. Argued is that some experience is required before using his method (Rogers & Green, 1979).

2.3 Behavioral decision making

Where many location decisions are often based on multiple sources and criteria, the behavioral approach to location theory argues that decision-makers are not completely rational (Rodrigue, 2020). The literature gives two different reasons why decision-makers are not entirely rational. The first reason is that locational information is not fully available and is time-consuming to analyze. A second reason is the ability of a person to use this information. To better understand the complexity of the different behavioral factors for location decisions Pred (1967) developed a behavioral matrix, see figure 2. Pred often criticized normative location theories and developed this model to replace the normative location theories. His main arguments against normative location theory are logical inconsistency, the problem of motivation, and the problem of human ability (Selby, 1987).

The horizontal axis represents the capacity to use the information and the vertical axis the availability of the information. Cell Cnn is called the homo economicus and represents someone who is informed perfectly and has broad access to all the information available (Rodrigue, 2020). People who have a lot of information available and the capacity to use this data make a decision within the margins of profitability. Using this construct can reveal that there is a lot of information available, but a person is not able to analyze this data in a correct manner. Argued is that some decision-makers are better than others. Even if someone has a low capacity and availability to data, the choice they make can be profitable. In these cases, luck plays an important role.
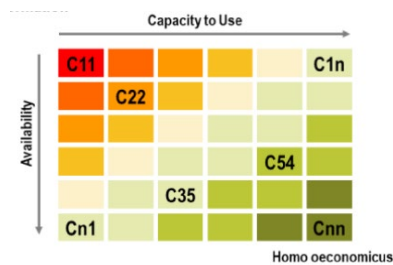

Figure 2: Behavioral approach to location (Rodrigue, 2020).

There is also critique on Pred's behavioral matrix. Most of the critique is coming from Harvey (1969). Harvey argues that Pred puts too much emphasis on the fact that normative economic theory fails to explain what actually happens. Furthermore, Harvey argues that the two concepts of information and ability are vaguely defined, ambiguous, and non-operational (Harvey, 1969). Another point of critique is that the matrix is hard to apply to the real world because there remains a factor of uncertainty. There is no guarantee that a choice is profitable, even with a lot of information in front. Only later, when a choice is made, the revenue and expenses are visible (Rodrigue, 2020). Also Claus & Claus (1971) argue that Pred ignores the validity and reliability of his approach over the other approaches. Pred criticizes the traditional economic-geographic approaches but lacks in explaining the benefits of his approach. Another point of critique coming from Claus & Claus (1971) is that the behavioral matrix is focused too much on economic goals and does not include other important non-economic goals or behavioral factors as the organizational structure and strategy. It could be that the goal of an actor is not purely economic, but more a strategic decision. When this is the case the capacity to use and the availability of information are not the most decisive factors for site selection. Claus & Claus (1971) argue that Pred's explanation would be that the actor's availability of the information and the capacity to use this information has changed. In reality, there has been no change, only the strategy has changed.

2.4 Quantitative data

Digital data plays a more important role in today's society than ever before. For retailers, data is becoming an important source for making business decisions. Wood & Browne (2007) argue that the role of data should be seen as a determining factor for a possible site purchase or lease agreement. Visible is that not only computers but also people are generating huge amounts of data (Power, 2013). Think for example about how many people visit a website, do online purchases, upload photos, and use social media. All these actions are registered and available to analyze. For example, a big chain like Wal-Mart has 1 million customers every hour, who all generate huge amounts of data (Power, 2013). Also, more data is available for public use. For example, in the Netherlands, the Dutch Bureau for Statistics (CBS) has a lot of demographic data which is easily accessible and free to use. Argued is that the possibilities of data are not used effectively. 80 percent of all the data collected has a location element, only 10 percent of this data is used to make smarter business decisions (Azaz, 2011).

2.4.1 Two types of data

To better understand the role of data it is important to make a clear distinguishing between the different data sources available. Power (2013) argues that there are two categories of data: real-time data and non-real-time data. Table 4 shows some examples of real-time data and non-real-time data. The most important difference is that real-time data is accessible everywhere and generates a huge amount of data in a short period of time (Kudyba, 2014). This classification is crucial to better analyze and manage all the different data sources that are available. When discussing data, there are five important dimensions that create new challenges for data analysis and data management, see table 5. It is important to be informed about these dimensions because this will make the use of data easier.

Real-time data	Non-real-time data
Communication via social media, text and e-mail	Demographic profiles
Tracking of visitors on a website	Sales trends
Consumer response on events or advertisements via social media	Consumer response to brand advertising
The energy consumption of different households	

Table 4: Examples of real-time data and non-real-time data (Kudyba, 2014).

The 5 dimensions of data	Description of the dimension.
Data volume	The units of data stored on various media.
Data variety	The many different forms that data can be. Think for example about photo's, e-mail or text documents.
Data velocity	The speed of how data is produced and how the data must be processed to meet the demand.
Data variability	The data can be inconsistent with certain peaks.
Data complexity	The data is from different sources and it is difficult to match, link or transform data across systems.

Table 5: The 5 dimensions of data and a short description (Power, 2013).

2.4.2 Data risks

Quantitative data can give more insights into the earlier defined geodemand and geocompetition (Wood & Browne, 2007). However, retailers also need to be careful with the use of quantitative data. Wood & Browne (2007) mention different difficulties with the use of data for a more in-depth analysis. One of the dangerous aspects of relying on data is that we live in a rapidly changing world. For a retailer it is important to have accurate data to make a decision. When data is not from a recent year, the reality can be different than presented by the data. Another difficulty with data is that not all the data is suitable for an analysis on a small scale. Often data sources contain huge areas with a lot of households in it, which makes it difficult to analyze on a detailed scale level. Analysts should also be crucial on the data they use, generate, and should be more aware of the possibilities of their own data. A proactive attitude is required when searching for external data sources.

The data used in an analysis is based on a specific question. For retailers in the middle of a city center, the most relevant data sources are different from retailers in a shopping mall located further away from the city center. Determining for making a good decision is the quality of the data (Wood & Browne, 2007). High-quality data is necessary to create a reliable outcome. A popular quote to illustrate this is "bad shit in, bad shit out". Important to mention is the fact that data has no value in itself. A person's interpretation is very important. A wrong interpretation of the data can lead to a different outcome. People need to make meaning of the data and need to present it in a way that makes it understandable.

When analyzing data, it is important to be aware of bias. According to Olivier & Van Hamersveld (2019) there are different forms of biases that can occur when working with data. The first bias is the confirmation bias. Humans are inclined to ask for those elements that confirm a person's thoughts. A second bias is the sharpshooter bias and results in the fact that the research goals are changed based on the results. Unintended research results become confirmed hypotheses. When obvious research results become the advantage to be accepted rather than unexpected research results, this is called an outcome bias. The last bias that can occur is the cognitive bias. The cognitive bias is when research outcomes are neglected due to a different company culture or when the outcomes are not matching the pursued policy (Olivier & Van Hamersveld, 2019).

2.4.3 Important data sources

Wood and Browne (2007) provide an overview of the most important data sources for making retail decisions, see table 6. The data sources used by a retailer vary. According to Wood & Browne (2007), the importance of these data is bound to a specific location. Retailers in the city center value more on high-quality footfall data than a retailer located on a retail park.

External data		Internal data
Lifestyle	Local workforce information	Loyalty card data
Family structure	Footfall data	Location of the customers
Income data	Population	Amount spent and the location
Food expenditure	Population classification	
Traffic flow data	Landmarks	

Table 6: Important data sources for location choice (Wood & Browne, 2007).

The fact that the most important data sources are not the same for every retailer makes it complicated to provide a general overview. Each retailer and retail sector has its own important data sources. This is also visible in the overview provided by Roig-Tierno et al. (2013), see figure 3. Roig-Tierno et al. (2013) distinguish four main categories, which are important for opening a new supermarket location. The four main categories are the establishment, location, demographics, and competition. Specific characteristics are added, especially for supermarkets. Visible is that some of these elements are hard to express in data, for example, visibility. These four categories are also important elements for other retailers when investigating the potential of a new location.
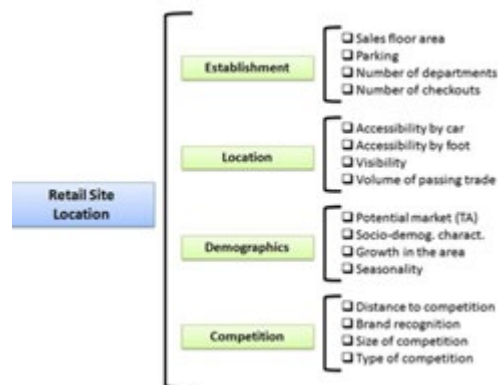

Figure 3: Important elements for location choice for a supermarket (Roig-Tierno et al., 2013).

Census data

Argued is that census data is one of the most popular data sources among retailers (Wood & Browne, 2007). A reason for the popularity of census data is the detailed information of this data. In the Netherlands, the Central Bureau for Statistics (CBS) is the organization responsible for independent and reliable statistical information. As the Central Bureau for Statistics describes: "in a society where the amount of information is growing explosively, free access to reliable and integral data is crucial" (CBS, 2019). Census data can be analyzed on different scales and provides very detailed insights into the characteristics of an area. According to Leventhal (2003), the analysis of census data can fall into two categories. The first category is the demographic analysis, which gives insights into the demographics of a certain area. Second is the locational analysis, which uses census data as a tool for targeting geographical locations. Levental (2003) argues that using census data can help to better understand the characteristics of potential customers. Due to the detailed information, a lot of information can be visible when using census data. The first step in this process is to determine the market area. Based on this input, it is possible to create an overview of all the characteristics of the people within this area. In the literature, this process is called geodemographic segmentation and looks at the demographic socioeconomic or even psychographic characteristics of the people living in the area (Gonzlez-Benito & Gonzlez-Benito, 2005). This information can be used to determine interesting locations that contain people with these specific characteristics. For example, if a retailer has families with children as his main audience, census data can reveal the places where many families with children live to create a so-called 'hit list' (Leventhal, 2003). Identifying these homogenous groups is crucial according to Gonzlez-Benito & Gonzlez-Benito (2005), because people with the same characteristics have similar shopping needs and other habits.

Also other commercial parties have highly detailed geodemographic information about the people living in a certain area. Examples are ACORN from CACI, or MOSAIC from CCN Systems (Gonzlez-Benito & Gonzlez-Benito, 2005). In the eyes of Lavental (2003), these different data sources should not be seen as competitors of each other, but as additional information. Table 7 provides an overview of the key benefits of census data and data coming from commercialized parties. One of the most important differences, which is not mentioned in this table, is the fact that data from the census bureau is free to use. Other geodemographic data from commercial parties is often paid.

Census variables
Describe people and households residing in areas
Same questions can be included in customer surveys
Raw ingredients for bespoke information product developments

Geodemographic classifications
Describe areas according to profiles of their residents
Intensive development and interpretation goes into each development
Can provide insight into populations living in each type of area

Table 7: Characteristics of census data and data from commercialized parties (Leventhal, 2003).

Loyalty card data

For retailers, it is crucial to know who their customers are. Bob Wordes, COO of one of the largest real estate firms in the United States, argues: "demographics are important, but the psychographic—really understanding who the customer is that's coming to a particular shopping center—is critical" (Kantor, 2019). A database with information about customers is very valuable information. Gaining insights about customers is much easier for a retailer who already has a number of stores than for a retailer who starts from scratch. Nowadays, filling this database is much easier due to smartphones, social media platforms, and online shopping (Kantor, 2019). When a retailer knows who his customer is, it is easier to search for a location where this group of people is concentrated. Customers who are already a customer are familiar with the retail concept and can therefore be used as a reference. A first step is to create a customer profile. This profile is often based on socio-demographic characteristics, for example, gender, age, or marital status. Combining these characteristics with the buying behavior of a customer gives a detailed description of the potential.

Visible is that loyalty cards are frequently used among retailers to provide customers special benefits. Retailers link shopping behavior to a digital ID that can be analyzed (Kudyba, 2014). Wood & Browne (2007) argue that loyalty card data is perfectly suitable for location decision-making because it gives insights into customer behavior. A possibility of how loyalty card data can be used is by identifying the gaps in store estate and opening new stores based on the data received from loyalty card data (Wood & Browne, 2007). Another reason for the growing interest in the use of loyalty cards is that retailers are combining online data with the data from the loyalty card (Kudyba, 2014). Combining these two different data sources gives a detailed description of the customers. Wood & Browne (2007) argue that many smaller retailers introduced loyalty cards to collect more information about their customers. Where smaller retailers often have fewer resources and budget, they are more aware of the possibilities of the use of data.

2.5 The role of Geographical Information Systems

The late 1980s was an important period for location analysis (Moutinho et al., 1993). Wrigley (1988) even characterizes this period as the 'Golden Age' for location analysis. In this period, retailers started to move away from the intuitive approach and started using geodemographic databases in combination with the different tools. This change is facilitated by the emerge of Geographical Information Systems (GIS). In the eyes of Morrison (1994), the emergence of GIS was an important event. Morrison even calls this a 'paradigm shift in cartography'. GIS is a decision support tool that makes it easier to analyze, manipulate, visualize, manage, display, and combine different sorts of spatial data. Combining these different data sources is key in discovering new insights and patterns. Patterns that are, in most cases, not visible when visiting a place. Throughout the years, GIS has gained popularity in many sectors, for example, healthcare, real estate, banking and insurance, government, and the transport sector. Also retailers are more interested in the possibilities that GIS has to offer for analyzing possible store locations or for market research (Wood & Browne, 2007).

2.5.1 Benefits of GIS

One of the key benefits of using a GIS is the spatial representation. Trends and patterns are easy to visualize and combine to discover new insights, also for non-GIS experts (Wood & Browne, 2007; Pioch & Byrom, 2004). Hernández & Bennison (2000) argue that retail organizations are more often using GIS systems to support their decisions. In 1998 almost 53 percent of the total 500 respondents used GIS for their location analysis (Hernández & Bennison, 2000). The use of GIS has increased the speed and impact of an analysis because the potential of an area becomes clear within a few clicks. Due to lower costs of such information systems, retailers are more often using GIS software. A reason for retailers to rely more on a GIS is to move away from gut feeling and rely more on the factual data (Hernández & Bennison, 2000).

Another benefit of using a GIS is that GIS gives more details about a specific location, which is otherwise hard to find. Models or tools to predict the optimal site location are not always the solution. It still is important to visit the possible location, as argued earlier, to find information that is not visible when relying on data. An example of something that is hard to see when only using data and sitting behind a computer is accessibility. Hernandez, Bennison & Cornelius (1998) argue that GIS should not be seen as a locational planning technique, but more as a facilitator.

Retailers are still a bit reserved in using a GIS system. The use of a GIS system also depends on the capabilities and the degree to which a company is open to innovation. Companies that use data more frequently in their decision process are more likely to adapt data-rich techniques. Another important aspect that is important for the use of a GIS are the skills and people to run an analysis. Due to the high costs of skilled staff, smaller retailers are often relying on consultancy firms who help them with their location questions. Consultancy firms have the knowledge, skills, and software to easily investigate the potential of a new location. This can be identified as an outsource strategy.
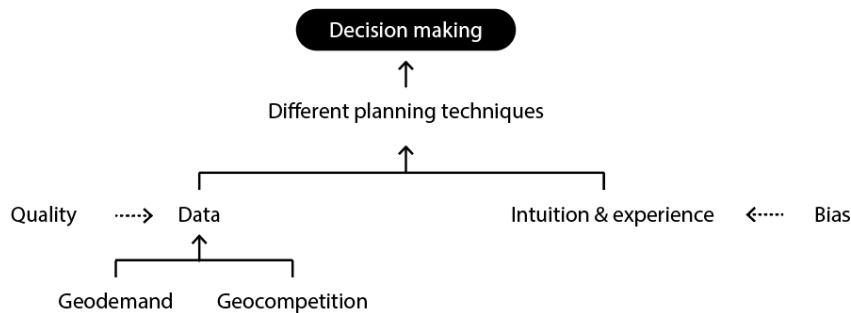
2.6 Conceptual model

Figure 4: Conceptual model.

Figure 4 illustrates the conceptual framework. The conceptual framework describes the different concepts discussed earlier in this chapter and the relationship with each other. In the literature is discussed that when making a locational decision, two kinds of different inputs are very important: data and intuition. Both have a huge impact on making a decision. For a very long time, intuition was the most popular approach to define the optimal retail location. Retailers also heavily relied on the expertise of the person who was responsible for location choice. In many cases, simple rules of thumb or checklist are used to select a particular location (Rogers, 1976).

Argued is that decision-makers are not completely rational. Different biases can occur when working with data and influence decisions. Due to increased competition and lower costs of ICT, a shift is visible from 'feeling' to a more statistical approach where data plays an important role. Big data plays a more important role in today's society and also businesses are seeing the huge potentials of big data (Power, 2013). The environment is quite complex due to the many actors involved (Theodoridis & Bennison, 2009). To investigate this environment, it is crucial to define geodemand and geocompetition. The establishment and the location characterize the geodemand. Geocompetition is characterized by demographic data and data about the competition. For both geodemand and geocompetition, the quality of the data plays an important role. When the data used for an analysis has a bad quality, it will influence the outcome and eventually, the decision. Together geodemand and geocompetition define possible new retail locations. Assumed is that a person responsible for a new retail location balances between a decision substantiated by data or a making a decision based on intuition and experience.

3. Methodology

The methodology chapter provides an overview of the research methods used and explains why certain choices are made. Paragraph 3.1 describes the research methods used for this research, paragraph 3.2 discusses the interviewees who participated in this research, and the last paragraph elaborates more on how the data is analyzed.

3.1 Research methods

The main research question and sub-questions, as described in chapter 1, are answered by using a qualitative research strategy and triangulation. The different methods used are desk research, a literature study, and semi-structured interviews with nine different Dutch retailers. Combining these different methods helps to prevent biases that can arise when using only one single method. Furthermore, these different research methods combined will help to get high-quality research with credible findings and a representative outcome.

3.1.1 Desk research & literature review

Desk research and a literature study helped to find relevant concepts and findings from earlier research about this particular topic. This knowledge is crucial. The insights gathered from the literature are used to compare the answers given by the participants. An overview of the theory is presented earlier in chapter 2.

3.1.2 Semi-structured interviews

An important source for answering the research question and the sub-questions are the semi-structured interviews. The reason to choose for semi-structured interviews is to get detailed information and insights about this topic from the most important actors (Harrell & Bradley, 2009). The biggest advantage of interviews is that interviews focus more on the why and how. This makes it possible to in-depth talk about the topic. Another reason to choose for semi-structured interviews is that it is not directly clear how data is used in a particular retail organization. There is a list of pre-determined questions that need to be covered, but there is also the possibility to ask other relevant questions that come up during the interview (Creswell & Poth, 2018). If some aspects are more important than others, the focus of the interview could shift to that specific case or topic. Therefore, the questions asked during the interviews are not always the same. Which questions are asked depends on the situation of the respondent and the insights that are gained during the interview. The pre-determined questions give a certain structure to the interviews and make it possible to determine a pattern in the answers.

All the interviews started with an introduction explaining the purpose of the interview. After explaining the purpose, the 'rules' of the interview are explained. For example, the length of the interview and the type of reporting. The interviews are recorded, which makes it easier to transcribe and analyze. At the beginning of every interview, permission is asked to record and publish the findings of the interview in this master thesis.

3.1.3 Interview guide

At the start of the interview, it was not clear if the interviewee uses quantitative data. Therefore there are two interview guides. The first interview guide has a strong focus on data. The other interview guide focuses more on the possibilities of data for the future. During the interview became clear if quantitative data already plays an important role or if the focus of the interview should shift more to the possibilities of data. Input for the interview guide is the literature study and the conceptual model.

The interview guide contains different kinds of questions. Every question has its own goal and is linked to a specific sub-question. The different forms of questions used in the interview guide are descriptive questions, structural questions, and contrast questions (Harrell & Bradley, 2009). Descriptive questions ask the respondents to describe certain things and give new insights that are not very familiar to the researcher. Structural questions reveal the relationship between two things and help to categorize groups of things or processes. Contrast questions help to understand what a certain term means.

3.2 Interviewees

In total, twelve people participated in this research: nine retailers and three consultants from Bureau RMC. Most of the interviews are face-to-face interviews (7), but due to the busy agendas of the interviewees, some of them are telephone interviews (5). All the retailers who participated in this research have multiple stores. This is done on purpose because the focus of this research is on the bigger retailers with multiple stores. Another advantage of interviewing retailers with multiple stores is that they are more often dealing with location choice.

Directly after every interview, a transcript has been made and is determined if it is required to interview more persons or that there is enough input to answer the research questions. A list of contacts is used to select the first group of respondents. This list is provided by the internship organization and contained contact information of customers or other relevant contacts. In the second phase, the snowball or chain sampling method is used. Snowball sampling or chain sampling "identifies cases of interest from people who know people who know what cases are information-rich" (Creswell & Poth, 2018, p. 159). A big advantage of the sampling method is that this method leads to new interesting persons to interview, which can be hard to find otherwise. After an interview, the interviewee is asked if they have other relevant contacts at other organizations. Experience with data is not essential because also people who are not using data yet can be interesting. While most research projects benefit from snowball sampling, there is also a dangerous aspect of snowball sampling: overrepresentation of certain groups (Harrell & Bradley, 2009). During the selection process, this aspect is constantly monitored.

According to Longhurst (2003), confidentiality and anonymity are the most important aspects of an interview. To ensure this, the participants are informed that the information they share during the interview will be anonymous. The real names of the organizations are not visible in the research due to the possible sensitivity of the information shared during the interview. The benefit of ensuring the anonymity of the person being interviewed is that people are more willing to participate and that people can talk more freely. Only general/basic information, for example, the sector and the number of employees, will be mentioned. Tables 8 and 9 give an overview of the people who participated in this research. The last column shows how a person is anonymized. Each quote ends with this code and refers to this specific person.

Position of the person being interviewed	Sector	Number of stores in NL	#
Director retail	Leisure	More than 50	I1
Real estate advisor	Supermarket	More than 400	I2
Acquisition and development manager	Leisure	More than 10	I3
Property manager	Health & Wellness	More than 150	I4
Manager Expansion & Real Estate	Lingerie & Underwear	More than 350	I5
Real estate advisor	Supermarket	More than 50	I6
Real estate officer	Supermarket	More than 50	I7
Manager retail	Clothing	More than 10	I8
Retail director	Telecom	More than 150	I9

Table 8: an overview of the interviewees who participated in this research.

Name	Position of the person being interviewed	#
Rixt de Jong	Consultant	RMC1
Jeffrey Meinders	Consultant	RMC2
Huib Lubbers	Director and senior consultant	RMC3

Table 9: an overview of the consultants from Bureau RMC who participated in this research.

3.3 Data analysis

The data retrieved from the interviews helps to better understand the role of quantitative data in the decision process of retailers and is used to answer the research questions, as mentioned in paragraph 1.3. First, the interviews are transcribed in Word. The transcribed interviews are then coded. Coding the transcripts gives the possibility to better analyze the interviews and find patterns in the answers given by the respondents. A first step in analyzing was to re-read the interviews to better understand what is been said in what the specific context is in the interviews. In the next step, the interviews are divided into smaller parts, called meaning units (Erlingsson & Brysiewicz, 2017). The meaning units are labeled with specific tags. The labeled meaning units are eventually grouped into categories, which makes it easier to get a bigger picture and see patterns in the codes. The different meaning units also act as the input for the results paragraph.

4. Findings

Chapter 4 discusses the outcomes of the interviews. These outcomes are the result of 9 semi-structured interviews with people responsible for the location choice process within a retail organization. More information about the interviewees can be found in paragraph 3.2. The results are divided into different themes. Quotes from the interviews are used to show how retailers see or experience the role of quantitative data for the location choice process. The quotes are translated from Dutch into English. The original Dutch quotes are visible in appendix II. The first paragraph discusses why retailers are using quantitative data. The second paragraph focuses on if data is decisive, paragraph three discusses the use of data among retailers, and the last paragraph discusses the future of data for location choice.

4.1 Why are retailers using data

Essential to better understand the role of quantitative data for location choice are the different reasons why retailers are using quantitative data. This paragraph provides an overview of the different reasons why quantitative data is used among the different retailers who participated in this research.

Based on the interviews is visible that many retailers are using quantitative data to get more insights in the potential of a place. Data makes it easier to quantify certain elements, but data also gives an objective analysis of the potential of a place. The different retailers who participated in this research agree with Wood & Tasker (2007) that it is crucial to know the potential of a place. Quantitative data reduces the risks of making a wrong investment. Respondent 6, a real estate advisor from a supermarket chain, who uses data to estimate sales and argues: *"we (...), need to know how much potential a place has. Is it 150.000 euro or 200.000 euro? That can be the difference between a loss-making store and a profit-making store. So that estimation needs to be correct. [1]"* Visible is that respondent 6 is looking for an objective way to predict how much potential a place has. Argued is that even the smallest differences between a place can lead to a different outcome. For an analysis, these insights are crucial for a retailer to know. Besides that, each place has unique characteristics that can influence the performances of a store. Visible is that in many cases, the potential of a place is quantified by the predicted sales. For example, respondent 5, an expansion and real estate manager of a lingerie and underwear company, seeks for places where the turnover is as high as possible. *"We try to earn as much profit as possible on the investment that we make. We try to find a location where the potential revenue is as high as possible, where the rent is acceptable so it will fit in our business plan and keep most of the profit. [2]"* Based on the predicted revenue, which is supported by data, respondent 5 makes an estimation of how much a possible location can cost. This input is crucial for making the decision to locate on a specific place.

The respondents who contributed to this research use different methods to predict sales. The first way of predicting sales is to determine how many people are living in the catchment area. In the theory, this is defined as the geodemand: "the location of the customers who purchase a product or service in a specific market" (Roig-Tierno et al., 2013, p.191). Additional research, for example, internal sales data from other stores or data about the average spendings, is used to determine the average amount spent per person. The average amount a person spends is multiplied by the people living in the earlier determined catchment area. For example, respondent 7, a real estate officer of a supermarket chain, calculates the predicted sales by looking at the catchment area. *"It is possible to calculate the number of people living in the catchment area, they have an average income that is this*

and this is how much they can spend. And then you get a better feeling for the revenue. ³" Respondent 6, uses a similar approach as respondent 7. *"I know what kind of numbers I need for a store. An average person spends 40 euro, so if I have a location with 2.000 inhabitants, I know that their total spendings will be around 80.000 euros per week. Assuming everyone is doing their groceries by the nearest supermarket. And for the higher incomes it will be 42 euros, and for lower incomes it will be 38 euros. ⁴"* Different data sources are combined and used to calculate the potential sales. Based on other research and data from other already existing stores in a comparable area, respondent 6 knows how many an average person spends. Based on the number of inhabitants in the catchment area, it is possible to predict the sales for this specific location. With the help of quantitative data calculations, retailers get a better feeling of the potential sales for a specific location. Visible is that these predictions are based on assumptions. One of these assumptions is that the average person spends 40 euro. Respondent 6 also assumes that in areas where the average income is higher, the amount a person spends will be higher. Multiplying the number of people living in the catchment area with the average income and average amount a person spends gives respondent 6 a good indication of the potential sales. The information retrieved via this method is very valuable for retailers because, based on these calculations retailers know if it is worth it to invest in a specific place. In some cases, the data output leads to a different location strategy. In the opinion of respondent 5, an expansion and real estate manager of a lingerie and underwear company, better insights into the potential could be a reason to accept higher rents. The data gives respondent 5 the confirmation that a place has enough potential. Respondent 5 argues: *"when you have more data, you have more certainty to determine your potential sales and potential revenue. When you are more certain, there are less risks for renting a location. It makes it also easier to accept a higher rent due to the fact that you know that there is a high probability that you will get a return on the investment. ⁵"* For respondents 6 and 7 the predicted sales are a very valuable insight, respondent 5 changes his location strategy and also considers locations with a higher rent than they would normally accept.

Knowing the potential is crucial because opening a new store is a costly investment, as is discussed in the literature by Berman & Evans (1983) and Hernandez, Bennison & Cornelius (2007). The different respondents agree on this. Respondent 1, a retail manager of a leisure company, argues: *"it is not a small investment that you do, it is an investment of more than hundred thousand euros. And you can only spend the money once, so you need to have evidence that you have a good case. ⁶"* As argued, money can only be spent once, so proof of the potential of a location is crucial. The bigger the investment, the more important it becomes to have evidence that a new store has enough potential. Sometimes, based on insights found in the data, retailers decide not to choose for a specific location. Respondent 7 argues*: "you can better let a location go than making the wrong choice. What someone here always says is having a problem is annoying, but buying a problem is stupid ⁷".* Respondent 1 sees data as a way to determine if a new location fits the requirements that the company is looking for. In many cases, huge investments are made and retailers want a guarantee that it is worth to make an investment. *"Especially if you are dealing with places where you have to pay a high rent, you cannot think let's try. Because we are talking about rents from 2, 3, 4, thousand euro on an annual basis. That are huge expenses. ⁸"* As a result of long-term contracts, retailers are often bound to a specific place for a certain number of years. A 'divorce' can be very expensive (Hernandez, Bennison & Cornelius, 2007). This results in the fact that retailers are not in the position to sit back and see how it will turn out if they rent a place. Visible is that quantitative data helps to justify an argument. Respondent 1 argues: *"so yes we try to, independently of feeling, make things more demonstrable. Because we have people here who need to give their approval to an investment.*

You need to be prepared for questions as why is this the best location. [9]" Respondent 1 clearly wants to make an objective analysis which is not based on feeling and intuition. Especially to convince other people in the organization, data plays a crucial role. Respondents 2 (a real estate advisor from a supermarket chain), 8 (a retail manager of a clothing company), 6, and 9 (a retail director of a telecom company) see that data contributes to justify a certain choice or argument. *"An argument for a certain choice, that is why we use data in our case [10]"*, *"it substantiates our choice and gives trust when you see that it works [11]"* and *"the fact that there is more data available helps to substantiation your choice, is it right or is it wrong? [12]"* Based on the input from the respondents the biggest advantage of the use of quantitative data is that an argument becomes more powerful when it is substantiated on a proper way. The respondents know that relying on intuition and feeling is not the most reliable way to choose a new retail location. The use of quantitative data also gives a certain trust, as indicated by respondent 8, a retail manager of a clothing store.

For respondent 6, a real estate advisor of a supermarket chain, quantitative data is more a confirmation of a feeling: *"a confirmation of what we already think of a place. [13]"* Based on experience and intuition, respondent 6 developed a clear opinion about a specific place and later in the process quantitative data confirmed this feeling. The first impression of a location might be promising, but this feeling is not always the reality. It could be that there are very specific local characteristics that are hard to see. Respondent 2 underlines this by saying that predictions will be better because this is now substantiated by data. *"You always make predictions, now these predictions are more based on numbers and less on feeling. Maybe that makes a prediction better because it is now more substantiated by numbers [14]"*. Instead of relying on feeling, data becomes more important. Respondent 2 adds that without the use of data, predictions of potential sales are much harder to make. *"With data, we can make accurate predictions. Without the data, you are guessing [15]"*. Guessing is something that retailers want to prevent. Sub-paragraph 4.2.4 elaborates more on other important aspects that play a role in the choices that retailers make, such as feeling, intuition, and experience.

Overall is visible that these reasons all contribute to a much broader argument, which is argued by respondent 7, a real estate officer of a supermarket chain: *"to make a responsible investment [16]"*. The investment of a retailer becomes more secure because there is more certainty of the predicted sales, better insights in characteristics of a place that are otherwise hard to see, and the objective data helps to justify a decision. Table 10 shows an overview of the most important conclusions discussed in this paragraph.

Overview of the different arguments: why retailers are using quantitative data?
To have better insight and improved predictions in the potential of a place by estimating the sales.
As a justification for making the right decision to others.
To make a responsible investment.

Table 10: most important conclusions, why retailers are using quantitative data.

4.2 Is data decisive?

Based on the previous findings as discussed in paragraph 4.1, it becomes clear that quantitative data helps to get insights into the potential of a place by predicting the sales. Quantitative data eventually helps to make a responsible investment. Data also substantiates an argument and gives an objective analysis of a location. Do retailers fully rely on data when making a location decision? Rogers (2006) argues that the use of data cannot replace other important elements in the location decision process. Many retailers agree with Rogers. Respondent 7, a supermarket real estate officer, and respondent 4, a property manager of a chain in health and wellness, argue *"it is not possible to rent a location only based on data, that is impossible* [17]*"* and "*it is not only the data that determines if a location is suitable or not* [18]*"*. During the interviews, different reasons are given why data is not the only important input. Paragraph 4.2 discusses the different reasons why quantitative data is not decisive.

4.2.1 Not everything can be expressed in data

One of these reasons that not everything can be expressed in data is that there are different other important aspects for location choice, which are hard to see in quantitative data (Wood & Tasker, 2007). During the interviews, different respondents came up with examples of elements that are hard to express in data. For example, respondent 4, a property manager of a chain in health and wellness, gives an example of something which is hard to see when only using quantitative data. *"Do you need to have a store on the left side of the road or on the right side of the road. That is something that you will not find in the data. Is there a tree right in front of the door? Or is there perhaps one of these underground trash containers right in front of you? That is crucial to know. Because than you are not going to rent that place.* [19]*"* For respondent 4, this kind of information is very valuable and determines if a location is suitable. These aspects look very simple and basic, but it is important for a retailer to take these elements into consideration. For customers, these kinds of negative experiences can be a reason not to visit a place. These small differences can make the difference between a profitable or loss-making store.

Another example of something that is hard to express in data is argued by respondent 1, a retail director of a leisure company. *"We also look at the locations of other retailers. If you could open a store next to the Bijenkorf or H&M, those stores attract a lot of people. So you are also checking where does my store fit.* [20]*"* The proximity of other retailers can attract new customers who spontaneously visit other stores as well. Although it is possible to retrieve this information as a data source, respondent 1 is not using this kind of information. Also, the ambiance of a certain location is something that the interviewees find important and which is hard to see when a retailer fully relies on data. As respondent 3, an acquisition and development manager from a leisure store, argues: *"there are all kinds of soft aspects that you cannot see in the data. If you want to open a new store, that place needs to be a pleasant place to visit. That is something you cannot see in the data.* [21]*"* Also, respondent 1 agrees on this and mentions: *"if a place is lively and the dynamics of a certain place. That is not visible when sitting behind your desk.* [22]*"* Here becomes clear that especially for subjective elements as the dynamics or ambiance of a place, data is not the most useful source to get these specific insights. A person's own experiences and observations are still very important. This is also one of the main critique points given in the literature. The fact that objective data techniques ignore important subjective elements is something that is also experienced by the different retailers who participated in this research (Rogers, 2006).

It is also important to mention that data only gives an indication of a situation and not explains why something is. Crucial is the interpretation of the data. The right interpretation of the data is crucial as respondent 8, a retail manager of a clothing store, argues: "you need to leave space for interpretation. You should not say oh here is a decline, that is really bad. No, why is this decline there? Maybe there are other things that compensate that decline [23]". And in some cases, it is even possible to explain a situation due to previous experiences. Respondent 8 adds: "in the past months we saw a decline in revenue. So what is happening there? Everyone gets their holiday allowance at the end of May. So before everyone starts complaining, I explain that next week the people receive their holiday allowance. And indeed, the next weekend was a big game changer because everyone got their money" [24]. So instead of relying too heavy on the data respondent 8 argues that the right interpretation of the data is crucial.

4.2.2 The importance of a site visit

According to Wood & Tasker (2007), visiting a location is a crucial step in the location decision process. Rogers (2006, p.64) even argues that "technology cannot replace thorough field analysis and good retail intuition - nor cultural understanding". Because not everything can be expressed in data or the fact that the soft elements are ignored, the respondents in this research often combine their quantitative data analysis with a site visit. For example, respondent 2, a real estate advisor from a supermarket chain, and respondent 9, a retail director of a telecom company, combine their quantitative analysis with a site visit. *"Before we look in the system we do fieldwork [25]"* argues respondent 2. Respondent 9 adds: *"there are a certain number of things that become visible during a site visit and which you cannot see in the data. So, in my opinion it is not 100 percent desk research. You should have this combination. [26]"* When in the location process the site visit happens varies among the different retailers. This is because retailers strongly depend on the availability of a location. Some retailers plan a site visit first and check the potential of a place later, see quote 25 mentioned earlier in this sub-paragraph. Others retailers first check the potential of a place, for example respondent 5, a manager expansion & real estate of a lingerie and underwear company, who argues: *"we see the model that we are using as a basis. It is not possible to fully rely on a model. It is also important that a location has the right appearance for us. You cannot base your argument only on data, that is impossible. You always need to visit a place. [27]"* The respondents are not using data to determine potential locations, often there is already a location. Based on this specific location, an analysis is made. Especially supermarkets are limited in opening a new supermarket due to strict rules. Visible is that retailers use different tools in the process of location choice to gain these insights. These different tools and reasons why retailers are using these tools are discussed later in sub-paragraph 4.3.6.

Even though some elements can be expressed in quantitative data, many respondents highly value their own observations. For example respondent 1, a retail director of a leisure store: *"for me the most important aspect is to go to a place and observe what you see, apart from the data that you can find online. Determining for me is to go to a place for one hour and look how many people are there and how are they walking. [28]"* A reason why respondent 1 values his own observations is because his observations function as a check on the data. An observation also gives insights in the ambiance of a location. Respondent 1 argues that the importance of an observation has changed. *"Back in the days, observations were the truth. [29]"* Now retailers can confirm their observations with objective data. The different retailers who participated in this research see this as a positive development.

4.2.3 Experience

Another reason why location choice will not be 100 percent based on quantitative data is that experience still plays an important role. The literature explains that the influence of experience for location choice should not be underestimated (Clarke, Mackaness & Ball, 2013). Research from Hernandez & Bennison (2000) showed that 96 percent of the retailers used experience as a technique for location planning. Throughout the years, a person's experience contributes to better insights into potential locations for a new store. The popularity of experience as a technique is also visible in the answers given by the different respondents who participated in this research. Respondent 4, a property manager of a health & wellness company argues: *"I am doing this work for already 20 years now. I drive 75.000/80.000 kilometers through the Netherlands. I, and my colleagues, know the interesting locations. We know where there are interesting shopping streets and where we want to locate, and of course we know our own footprint.* [30]*"* Visible is that as a result of experience, someone's opinion is more colored than for others who have less experience. Also, quantitative data plays a less important role. Experience is not the only input, but certainly has an influence on their decisions.

For respondent 1, a retail manager of a leisure company, experience also plays an important role when making a location decision. *"On the one hand you have data available to compare certain things, and on the other hand, it is sometimes just a guess based on experience. Than that looks the best to me.* [31]*"* In this case, a combination is made between experience and quantitative data. Due to the fact that it is not 100 percent certain if a retail formula fits on a specific place, it also becomes a guess based on experience. In some cases it could be that objective data is overruled by experience as respondent 2, a real estate advisor from a supermarket, argues: *"eventually our board decides if we open a store yes or no. They have a lot of experience. If they have a bad feeling then the store won't open. But, if they have a good feeling than they go for it.* [32]*"* Also respondent 3 argues: *"if someone has more trust in data, then they would support your analysis, but another person can have more doubts.* [33]*"* A person's belief in data is crucial for how quantitative data for location choice is used within an organization. Respondent 7, a real estate officer of a supermarket chain, adds: *"some of the board members are easier to convince with data. Others, mostly the older board members, rely on their experiences* [34]*".* Another reason given by respondent 7 is age. *"Younger people can process all the different kinds of information more easily and can use the different technologies to analyze the data in a right way.* [35]*"* Again becomes clear that making a location decision is based on much more than only relying on objective and quantitative data. Experience gained throughout the years can overrule the insights provided by the data.

4.2.4 Intuition and gut feeling

Experience is closely linked to intuition or gut feeling. As argued in the literature, intuition is mainly developed throughout the years and based on facts and experiences (Agor 1986). Intuition is hard to measure, very subjective, and decision-makers who heavily rely on intuition do not have the right justification for their actions (Blattberg & Hoch, 1990). Another negative aspect of intuition or gut feeling is argued by respondent 8, a retail manager of a clothing store, who argues that intuition or gut feeling varies among people. *"The gut feeling from a person who chose this specific location might be different from the gut feeling that I have.* [36]*"* Making decisions based on intuition is very dangerous because it is unclear for others on what basis a decision is made. Respondent 8 adds that he sees gut feeling as the biggest problem for location choice and wants to move away from this gut feeling. *"Gut*

feeling is the biggest problem, in my opinion. (...). So I want to stay away from gut feeling. Of course, it still plays a role, to check if the ambiance is good, is the rent good. (...). But at the same time, that good feeling of a place needs to be substantiated. [37]" Although respondent 8 says that he wants to move away from gut feeling, he admits that this still plays an important role. "Data is an important pillar, but if I did not like the property, I would not have chosen to locate there. Even when the data showed potential, the ambiance needs to be right. It is like a puzzle. The soft elements need to be good. [38]" Since a short period of time, respondent 8 is now using quantitative data for location choice. Before he used quantitative data, his location decisions were purely based on gut feeling and intuition. Gut feeling did not always result in the best results. Respondent 8 even argues that the use of quantitative data would have shown him not to go for a certain location. *"In (...) we hired a place which was really nice, nothing wrong with the location, it had an interesting rental price, but eventually this location was not suitable for us. (...). I think that data has shown us not to choose this location. [39]"* Also for respondent 9, a retail director of a telecom company, gut feeling still plays an important role. However, he argues that throughout the years, his location decisions are less based on gut feeling. *"Gut feeling still plays important role. I must say I am doing this job now for 30 years and I am also using my gut feeling. How did I do this in the beginning of my career? Well, then it was completely based on gut feeling. [40]"* Due to quantitative data, some elements can now be seen in data instead that they are based on a feeling. Also respondent 1, a retail director of a leisure store, argues that throughout the years, gut feeling became less important. Nowadays, there is more data to use and much easier to access. *"I think ten years ago, data was less used and it was much more about having knowledge about a certain place. A decision was more based on gut feeling and because general knowledge about high-traffic locations. That is a busy location, so that is where we should locate. [41]"*

==Based on the interviews is visible that site visits, experience, and gut feeling are still very important.== However, more retailers want to move away from making decisions based on intuition. Quantitative data has kept a more prominent place in the decision-making process, but it is certainly not the case that data can be the only input when making a decision. ==Especially for the older generation, experience still plays an important role==. Also, gut feeling and intuition are still important, but the respondents argue that throughout the years the awareness rises of the risks of using intuition and the fact that the use of data could have led to other insights. Also argued is that not everything can be expressed in data. Especially soft elements as the ambiance of a place is something which is hard to see in the data. Table 11 provides an overview of the most important conclusions for the question is data decisive?

Overview of the different arguments: is data decisive?
Gut feeling and experience are still important, but retailers are more aware of the risks. In some cases experience and intuition overrule an objective data analysis.
A site visit is still an important step in making a locational decision because not everything can be expressed in data, especially the soft elements.
Quantitative data can also be used as a confirmation of an observation or feeling.

Table 11: conclusions is data decisive?

4.3 The use of data

Paragraph 4.3 discusses how quantitative data is used among the different retailers. Therefore it is necessary to discuss the fact that there is nowadays more data available to use. The second sub-paragraph discusses the most important data sources among retailers. Sub-paragraph 3 discusses the data sources that are currently missing to make a better location choice according to the respondents. This paragraph also discusses the importance of selecting the right input, the importance of quality for the data, and the different tools used to make a spatial analysis. .

4.3.1 More data available

The literature states that nowadays, there is more data available than ever before (Power, 2013). Not only open data, for example, data from the CBS, but also retailers have more internal data at their disposal. For example, information about where their customers are coming from and what the most popular products are. This increase in the availability of data is also something that is mentioned during the interviews. Respondent 9, a retail manager of a telecom company, argues: *"there is more data available for us and there is much more data that we are using now. The fact that there is more data available absolutely helps in substantiating an argument, is it right or is it wrong. [42]".* According to respondent 3, an acquisition and development manager of a leisure company, data is not completely new. 30 years ago there was also data and retailers already used this data. The most important change is that there is more data available to use and easier accessible. *"Data has, of course, always been there. 30 years ago, there was also data and were decisions also based on data, but than it was less accessible and much harder to analyze. With books for example. Now the data is better accessible and there is much more data available. [43]"*

The fact that there is so much data available also raises new questions among retailers. For example, for respondent 3. *"It is hard to decide when do you think it is worth it to purchase this expensive data? That is often very difficult. What do you think is this data worth? That are complicated processes. Often the decision is to not purchase the data because it is too expensive. Sometimes you don't know what the added value is. It could be that that data is then unused [44]".* For this retailer, it is not directly clear what data can contribute to the business. The price of data versus the uncertainty of the contribution to the business is unclear. To convince these retailers, it is important to show success stories and show the possibilities of certain data sources. For other retailers, the overload of data results in the fact that they are not sure which data sources are the best input for their analysis. This is something experienced by respondent 7. *"Which data are you using? Because there is so much data available. The art is to select the right data sources and make a decision based on that input [45]".* Selecting the right input is crucial in the eyes of respondent 7: *"if you dive too deep in the data, then you draw in the details. And those details are important, but you can also dive too deep. Then you will find all kinds of different elements which makes it harder and nothing is possibly anymore [46]".* So on the one hand is argued that more data leads to better insights, but on the other hand is visible that retailers argue that too much data can act as something negative.

The overload of data can also result in the fact that retailers find certain data that is not helping to substantiate an argument and negatively influence the attractiveness of a location. Respondent 1, a retail manager of a leisure store, argues: *"sometimes you can also have data with a certain risk. For example, we know that there is a lot of crime or that there are plans to change the environment of the place. These changes can lead to the fact that it is no longer the best place for us to locate, but we really want to open a store and make a statement. Then it is possible that you give*

that specific data a less prominent place in a presentation or you leave if for what it is. [47]" Here is visible that respondent 1 chooses to make specific input less important in a report or presentation. The statement is more important than the possible negative aspects visible in the data. <mark>Just as in doing research the location choice process can be influenced by a person´s bias (Olivier & Van Hamersveld, 2019). In the case of respondent 1 a cognitive bias is visible. The outcomes are not in line with the chosen strategy and are made less important. The validity of the results is strongly determined or influenced by the person collecting the data or doing the analysis. Bias is also seen in the answers given by the other respondents. For example in the case of respondent 6, a real estate advisor of a supermarket chain, who argues: *"data provides a confirmation of what we already think of a place. [48]"* This quote illustrates a confirmation bias. The data confirms the previously existing beliefs or biases. A bias is not necessarily something negative, but it is necessary to be aware of.</mark>

4.3.2 Most used data sources

During the interviews is asked what kind of quantitative data retailers use in the location choice process. Among the respondents, CBS data is the most used data source. Statements by respondents 1 (a retail manager of a leisure store), 3 (an acquisition and development manager of a leisure company), and 7 (a real estate officer from a supermarket chain) illustrate this. *"CBS data. For example, we are interested in how many people have their own house, then we compare that with the national average. What is the percentage of older people versus younger people. What did they vote? [49]". "The most important data source? That is very simple, the population of a certain area. And other information available from the CBS: the wealth index, income level and we compare those numbers with the national average. [50]" "The data from the CBS about the development of a neighborhood. What is the average income? What is the average household size? [51]"* This geodemographic data is used to get insights into the characteristics of the people living in the catchment area and determines if there is enough potential for opening a new store. This information is crucial because this is something that is not possible to see otherwise.

Another important data source that is mentioned in the literature as a useful data source is customer data. This data is collected in different ways, for example via loyalty programs, customer cards, or via a webshop (Wood & Browne, 2007). With the help of customer data, retailers get better insights into their customers. This makes it possible to look if those specific characteristics are present in the area where a retailer wants to locate. Based on the interviews is visible that not every retailer is currently using the full potential of their own customer data for location choice. Many retailers are collecting data about their customers, but this data is mostly analyzed and used by the marketing departments and not for location choice. A retailer who uses customer data is respondent 1 and argues that customer data can be good input for location choice. *"We know a lot of things about our customers. (...) We have so much data about our customers that we could decide that is an excellent spot for us based on that data" [52].* Also respondent 9, a retail director of a telecom company, uses customer data. Based on this data respondent 9 looks if it is beneficial to open a new store in an area. Opening a new store too close to another store can influence the performances of already existing stores. *"Based on our customer data that we have. And then we look if we get our fair share. Than it is our decision to determine if it is interesting for us to open a new store. [53]"*

Although there are many other data sources available, the use of data among the retailers who participated remains very basic and mainly focuses on the geodemographics of a certain area. For example, lifestyle data is not mentioned as a source used by the different respondents. Respondent 7 argues: *"lifestyle data, can we do more with that? Yes, but are we doing that right now? No inadequate. But that is definitely a chance for us.* [89]*"* Respondent 7 argues that he is aware of the possibilities of this data source however, he is not using it. Other respondents did not mention lifestyle data as the most important data sources for location choice. Overall is visible that the kind of data that used remains very basic and focuses mainly on the geodemographics of a certain area.

Hernández & Bennison (2000) argue that how retailers use data is also determined by the industry and the phase of maturity an industry is. Respondent 9 agrees on this by saying: *"20 years ago you never made a mistake in renting a property because it was always an addition. So it really depends on in which industry you are and in which phase of maturity an industry is.* [54]*"* Nowadays, many markets are saturated and it becomes more important to make the right decision (Hernandez, Bennison & Cornelius, 1998).

4.3.3 Missing data

In the previous sub-paragraph became clear that CBS data is the most important data source to get insights in the geodemographics of an area. What are data sources that retailers are missing and could help to make a better location decision?

Several retailers would like to know more about future developments in the external environment. Respondent 2, a real estate advisor of a supermarket, argues: *"where are they building new houses, where are they planning to build new houses. That is crucial information that is not available in a system but is certainly coming due to an increasing population.* [55]*"* Respondent 1, a retail director of a leisure company, adds to this that if they are better informed about future developments, it is possible to decide if it is worth it to open a store in a certain area. *"Are they developing a whole new neighborhood with new possibilities for retail? Because that is something that is finished in 2 or 3 years. That can create new possibilities where you did not think about, but you might have wanted to do.* [56]*"* Respondent 1 gives an example of a situation where better insights of the future could have led to another decision. *"(...) has developed itself very positively. We could have decided to open a store there 3 years ago, but we did not do that due to that situation, but the area has developed itself very positively. (...). Looking back you would say yes, we should have opened a store there. But we did not expect that this area was going through such a change.* [57]*"*

On the one hand, retailers are looking for data that helps them to anticipate better in the future, but on the other hand, retailers want more detailed information about their customers to make better location decisions. As indicated by respondent 3 and respondent 6: *"for us it would be very interesting if we have more detailed information about the sport participation and how much money people spend on sports in a certain area* [58]*"* and *"deeper insights in customer profiles. How are people doing their shoppings and maybe a link with the effects of online.* [59]*"* This sort of data could eventually help to make a better location decision with the highest potential. Also respondent 2, a real estate advisor from a supermarket chain, wants to know more details about his future customers, but argues that this is very hard to know in advance.

"Much data is not available yet. You want to know where are my customers from and if I open a new store are my customers coming from that specific neighborhood. Those are things that are very hard to investigate. Until you open the store, this information remains uncertain, but you can try to make an estimation that is as close as possible to the reality. ⁶⁰" It is striking that this kind of information is needed because the overall variety of the data used among retailers is quite low.

4.3.4 Right input

Due to the huge availability of different data sources, it is important to select the right data sources. Before using data, retailers need to know what kind of information is important for their business. An example which illustrates that the right input is crucial is given by retailer 4, a property manager of a health & wellness company, who did a data analysis to find the most attractive places to locate. *"2 years ago we worked with a reputable company who tried to search for the 50 most attractive locations. We compared those locations with our own top 50. Then there are five examples where you did not think about, we need to check that. However, there are also several locations that are absolutely not suitable in our view of a good store. In these cases, there is a high vacancy rate or it is in a part of the Netherlands with an aging population. ⁶¹"* The outcome was in some of the cases surprising, but there were also locations that were not suitable at all. A reason for this is the wrong selection of the data sources. Important other data sources for this specific retailer were not included in the analysis. If those data sources were included in the analysis, it would give a totally different outcome. Visible is that each retailer has its own specific requirements in the form of data for finding a new location to locate.

4.3.5 Quality

Besides selecting the right input, the quality of the data is very important (Wood & Browne, 2007). As discussed in the literature, the quote 'bad shit in, bad shit out' illustrates this. High-quality data will improve the accuracy of the outcome and makes it more reliable. Visible is that the interviewees trust the quality of the external data sources that they are using. For example, respondent 7 (a real estate officer from a supermarket chain) who indicates this by saying, *"you may assume that data coming from CBS is correct ⁶²"* and respondent 1 (a retail manager of a leisure company) who argues, *"I do not doubt data coming from the CBS. I do not doubt about the data that is available. ⁶³"* Based on these quotes, it is visible that an independent organization as the CBS provides a certain trust to the quality of the provided data. In general, visible is that external data is trusted. Also respondent 8 highly values validated data. *"I like to orientate for different data sources, but I highly value data that is validated. ⁶⁴"*

Respondents 1 and 2 (a director retail of a leisure company and a real estate advisor from a supermarket chain) are not doubting the quality of their own data. A reason for this is because it is their own data. They are the ones responsible for the quality of this data. *"If we talk about our own data, then I think our data quality is fine because it is ours ⁶⁵"* and *"maybe because we collect a lot of data ourselves. ⁶⁶"* Overall is visible that the quality of the data should not be a problem for using quantitative data. Data from, for example, the CBS is trusted because it is a well-known organization with a high trust.

4.3.6 Tools

Tools are very useful in gaining the right insights into the data. The theory explains that due to lower costs more retailers are using computer tools to analyze their data (Theodoridis and Bennison, 2009). Visible is that a lot of retailers who participated in this research use GIS to analyze and visualize their data. The reasons why retailers use GIS differ. Respondent 2 for example, a real estate advisor of a supermarket chain, uses a GIS system to check the potential of a new store by determining the catchment area, which is based on travel distance. *"We have our own GIS system. We look at how many people are living in a catchment area when we open a new store. We determine the possible catchment area and our GIS system calculates, for example, based on 5 minutes driving time, that there are living 20.000 people living in this catchment area. [67]"* Respondent 8, a retail manager of a clothing company, also uses GIS to better understand the geodemographics of an area and argues: *"yes, so we are using Esri, a familiar tool for you I think. We use GIS to look at the demographics of a certain area, for example, average income. First we used GIS for something else, but that data can also be perfectly used for retail. [68]"* Respondent 3, an acquisition and development manager of a leisure company, says this about the tool that they are using: *"yes we developed software where we can bundle all those important data sources. It looks like a GIS system and is very user friendly. Very easy to use for everyone. [69]"* Based on these inputs, it is possible to make an objective analysis and determine if the specific location matches with the retail organization. Visible is that retailers are using already existing tools as Esri. Other respondents developed their own systems, which matches their requirements.

Respondents 2, 8, and 3 mainly use GIS systems to get insights into the geodemographics of an area, respondent 7 uses GIS to get insights into the geocompetition. *"Yes, we are using a GIS system. Because it is very easy to analyze data of our competitors. But we are more often using GIS systems because it is easy to plot your CBS data and we are using zip code areas to determine our market area. [70]"* Overall, the retailers who are currently using GIS are very positive about it. Respondents 3 and 2 argue that one of the benefits of a GIS system is that it directly gives detailed information about a specific area. *"You click on a point on the map and the system looks how many people there are living within 10 minutes driving time of the chosen location. Based on this information, we can calculate our market shares and revenue [71]"* explains respondent 3. Also respondent 2 argues: *"it is great that you can click on a catchment area and directly shows how many people are living there. [72]"* Although retailer 2 uses a GIS system, he would like to add more data sources which are currently not used: *"I think that we should add more data for example spending patterns, average income and household size. That is something we do not see in our GIS system. That makes it possible to make a better decision based on the data. [73]"*

The reason why retailers are using GIS systems is mostly because GIS systems have proven to be successful. Respondent 2 explains: *"I don't know when exactly, but GIS is something that we are already using for a long time. (...), that worked so well that we decided to develop our own GIS system. [74]"* This is also the case for respondent 7, who argues that big companies like Ahold are using GIS systems for their location choice: *"I believe that the real estate department of Ahold someone is full time working with GIS. In my opinion, that says a lot about how useful GIS is. [75]"* The fact that GIS already exists for a long time and the success stories of other retailers contribute to the usage of GIS

among retailers. Where respondents 2 and 3 are explaining that their GIS systems are very easy to use and user-friendly, respondent 7, a real estate officer of a supermarket chain, argues that specific knowledge is needed to make a proper analysis. *"You can do a lot of things with it, but you need the knowledge to use it. I have learned that myself to make a deeper analysis, but I am missing the knowledge.* [76]*"*

Based on the interviews is visible that GIS systems are frequently used among the retailers. Not all respondents are using GIS. For example, respondent 1, a retail manager of a leisure company, *"we use websites as cijfers.nl or the CBS website or you use Google and search for a place. Or purchase flow surveys, also very interesting. (...). You try to bring those different data sources together.* [77]*"* Another example is retailer 9, a retail manager of a telecom company, who is currently using Excel to analyze data, but who is now working together with another company to experiment and do deeper analysis. *"No, we are using Excel.* [78]*"*

Data has kept a prominent spot in the decision-making process of the retailers who participated in this research. Retailers see an increase in the availability of data, which is experienced as a positive development. At the same time, this huge availability of data also makes it hard to know which data to use. In most cases, the added value of the data is unclear. When working with a lot of data, bias is something that unconsciously occurs. The way how data is interpreted varies among people and their personal bias is hard to neglect. Although there is so much data available and a huge variety in different data sources retailers are arguing that they miss certain data sources to make a better locational decision. Because many data sources have a geographical component, retailers use tools as GIS to analyze this data. These tools are also very suitable to combine multiple data sources and define patterns. The reason why retailers use GIS tools is because it is a proven tool that has a lot of potential. Table 12 provides a short overview of the most important conclusions, as discussed in this paragraph.

Overview of the different conclusions: the use of data
The fact that there is now more data available makes it hard to know the added value of the data.
People always have a certain bias which is hard to neglect.
Retailers are mainly missing data about future developments and more detailed information about their customers.
Retailers are using proven tools to analyze the data for example GIS. GIS tools are for most of the respondents easy to use and provide detailed information about a specific place.

Table 12: overview of the different conclusions, why retailers are using quantitative data.

4.4 The future of quantitative data

The retailers who participated in this research see data as very valuable and think that data becomes more important for location choice. This is illustrated by respondent 1 (a retail manager of a leisure company), respondent 4 (a property manager of a health and wellness company), and respondent 6 (a real estate advisor of a supermarket). *"I think that the importance of data will grow. And that data helps to make calculations for the ideal situations.* [79]*"*, *"I think that we will make more use of data* [80]*"* and *"data is not going to be less important. I am sure about that* [81]*"*. Respondent 1 adds that in his belief, data is made more important by data companies. *"It also becomes more important by the ones who are selling this data.* [82]*"* The reasons why data will become more important are strongly linked to the earlier mentioned reasons why retailers are using data.

Visible is that retailers have a lot of data and see the importance, but not always the full potential of this data is used. Retailer 6 underlines this by saying: *"you can have those insights, but it is also required that you need to do something with these insights.* [83]*"* Having the data is no longer enough. The next step is to do something with those insights. For the future retailers think, as already discussed in sub-paragraph 4.3.3, that making predictions will become more important. In the eyes of respondent 9, a retail manager of a telecom company, retailers need to be much smarter in the use of data than they are now. *"I think that we become much smarter in the interpretation of the data and that we should switch from a reactive model to a more proactive model. So that we can make more predictions based on the current data.* [84]*"* According to respondent 9, retailers should, instead of only looking at the current situation, make more use of predictions as a result of better computer models.

Although retail is often characterized as traditional, the participants clearly see data as important input for their decisions. Respondent 4, a property manager of a health and wellness chain, argues: *"data for retail is essential. Because data is knowledge and knowledge is power. Therefore it is crucial to know who your customer is, what your potential revenue is, and how much revenue you can make.* [85]*"* The fact that retailers see the importance of data also becomes clear by the different steps and data projects that retailers are doing. For example, respondent 7, a real estate officer of a supermarket chain, explains that the company mainly focused on collecting data in the last couple of months. *"The previous months, we have been very busy collecting data. Data becomes more important. Yes it is expensive, but if you do it well it could also give you a lot of benefits and that is why do it.* [86]*"* In the eyes of respondent 7, it is worth it to make a big investment which eventually contributes to a better decision. Other respondents are seeking collaborations with IT companies to develop smarter data insights. For example, respondent 9, a retail director of a telecom company. *"We are now working with (...). (...). Where we fully rely on the data. (...). But this is something we have never done before.* [87]*"* Visible is that there is not a specific reason for starting these projects right now. Retailer 9 calls it a coincidence. Also respondent 6 is seeking more collaboration with external parties. *"Yes, a few weeks ago I gave the assignment to work that out for us. In this project, we make use of a lot of data, which is something we have never done before.* [88]*"* In all of these projects, the goal is to use data for gaining more detailed information to make better business decisions.

Retailers clearly see the importance of the data, but argued is that the right interpretation is needed. Without this interpretation, the data is less valuable. Different respondents recently started with projects to do more with data. A specific reason for doing this right now is not mentioned. In the future, the respondents argue that data will be used to make predictions of a situation. Eventually, these predictions will help to make a better business decision for the future. Table 13 summarizes the most important conclusions of this paragraph.

Overview of the different arguments: the future of data
Data is very valuable and crucial, but the right interpretation is needed.
Retailers think that in the future the added value of data is to make more **accurate predictions for the future.**

Table 13: an overview of the consultants from Bureau RMC who participated in this research.

5. Vision of Bureau RMC on the role of qualitative data

Chapter five describes the vision of Bureau RMC in relation to the role of quantitative data for the location choice process. The consultants of Bureau RMC have a lot of experience in creating location strategies for various retailers. For Bureau RMC, it is crucial to know if this vision matches the wishes and needs of the retailers. Better insights can eventually lead to new products or services. This vision is based on three interviews with consultants from Bureau RMC: director of Bureau RMC and senior consultant Huib Lubbers, senior consultant Rixt de Jong and consultant & data analyst Jeffrey Meinders. Quotes from these interviews are used to substantiate this vision. At the end of this chapter, this vision is compared with the answers given by the different retailers.

5.1 Vision of Bureau RMC

Bureau RMC sees data as an important factor and addition for retailers to make a smart location decision. Instead of relying on a feeling or experiences from the past, retailers now have more factual data available when making an important decision. In comparison, a few years ago, this information was not available. This is also one of the reasons that Huib Lubbers, the director of Bureau RMC, created the CityTraffic-method. *"I noticed that there was a lack of data in one of the most important elements for retailers: the potential of a shopping street".* The CityTraffic-method is the research method used by Bureau RMC to count the crowds in city and shopping centers. Many retailers are using this data to determine their capture rate. The capture rate is the average amount of shoppers of a store divided by the people walking on the streets. Based on the capture rate, it is possible for retailers to determine their success. As mentioned in the literature and visible in the findings, data is not the only input for making a location decision. For example gut feeling, observations, and experience are also very important aspects. This is also something experienced by Bureau RMC.

Rixt de Jong argues: *"it is often the case that retailers go to a place and sit down for one hour and look around."* Observing and feeling the ambiance of a place is crucial for retailers even when they received a whole analysis of a potential location. Bureau RMC also sees gut feeling as an important element in the location choice process and not necessarily as something negative. Due to experience, a person's gut feeling becomes better and more accurate. The problem with gut feeling is that it is very hard to communicate to others. Retailers are more and more seeking for better arguments to justify a decision. Huib Lubbers argues: *"retailers have a good developed gut feeling and know in which cities they can be successful. Gut feeling is something that can work well. Especially when that gut feeling is based on success, experience. If you have made a correct decision a number of times, then gut feeling is certainly something that you can trust. But, the point is that within an organization, gut feeling is very hard to communicate."* Gut feeling is very subjective and for every person different. When a person is leaving the organization it is not clear on what basis a decision is made. With the help of quantitative data, retailers can substantiate their gut feeling. As Jeffrey Meinders argues: *"you want to confirm your choice with the use of independent and objective data. If you have high-quality data, it makes it easier to describe a situation is, instead of relying on your own feeling."* In the eyes of Bureau RMC, data gives a better insight into the potential of a location. This potential is often hard to see and can show new insights that lead to a different strategic choice. Bureau RMC strongly believes in a future for location choice where data plays a more important role than ever before. Location choice will be more about quantifying all kinds of different elements. *"The art of location choice is to quantify as much as possible and collect as many data sources as possible. Eventually, retailers should*

make a decision based on these different outputs" argues Huib Lubbers. Crucial in this is that data used in an analysis needs to be specific. Otherwise, it will not give the advantages that retailers need. Each situation is unique and has local different important elements that determine the success of a location. This is also one of the biggest advantages of the footfall data collected by Bureau RMC. Due to a nationwide network, these local differences in footfall become visible in the data. Other data sources can be much harder to analyze. A big disadvantage of, for example, census data are the limitations due to municipal boundaries. *"Consumers do not think in boundaries"* argues Huib Lubbers. And this makes it sometimes hard to analyze this kind of data. Due to the huge availability of these data sources, census data is one of the most popular sources among retailers. Director Huib Lubbers also argues that retailers nowadays have more tools to analyze their data. *"20 years ago I used a pair of compasses as a tool. I had a list of all the postcode areas and the number of people living there to determine the catchment area of a store."* The fact that there is more data available, sometimes even called a data overload, is not something negative. Because gaining insights is very valuable for retailers. Data is certainly not the only reality in the vision of Bureau RMC. Data can show the potential of a place, but there are a numerous of other factors important that contribute to the success of a store. For example competition, Huib Lubbers argues: *"competition can be very strong locally. This local reality is often very hard to predict"*. Nevertheless, it is important to make the right estimation of how much influence certain competitors have. Therefore the importance of the local context should not be underestimated when using quantitative data.

Bureau RMC believes that retailers clearly see the importance of data. This also strongly depends on the kind of business and the people who are in charge of a company as Rixt de Jong argues: *"how progressive a company is with data strongly depends on a particular person who believes in data or not."* Also the size of a company can be determining for how quantitative data is used. For a small retailer with a concept in his head, quantitative data could play a less important role than for a bigger retailer with multiple shops. As Huib Lubbers argues: *"for someone who wants to open a small shop, the focus is different. You are convinced of your concept and are focused on your concept, the creative mode. Those people often already made the decision to locate on a specific place."* In these situations, data becomes less important due to the strong beliefs of the shop owner. Retailers have a lot of data about their own performances, for example about their sales, most popular products, and how many people are visiting their store, but as Huib Lubbers argues: *"this data is not always used for location choice."* This results in the fact that retailers often rely on experiences or elements from the past that were very successful for already existing stores. It is not always the case that the same characteristics are a guarantee for success. *"Better insights in data and other components are crucial. To blend external components with internal components to get other and new insights"*. The combination of internal and external data is crucial to get a complete overview before making an important decision. A first step is then collecting all the relevant data. The next step, the interpretation of this data, is more difficult. As Rixt de Jong argues, *"collecting data is something that everyone can do. But to ensure that you are using this data is something else, now retailers are more in a phase of collecting the data and eventually we will go to a phase where retailers need to do something with this data"*. Especially retailers who are active online and offline, the so-called omnichannel retailers, can benefit from the large amounts of data they have. The more data they have about their customers the better they can use it also use this data for location choice.

Bureau RMC expects that the importance of data will further increase. *"There is an increase in the number of retailers who want to do something with data and retailers also find it more important to do more with data"* argues Jeffrey Meinders. This need for data was always there, but argued is that the ways how this data is collected has changed. *"Because we now have smartphones we get more insights into the shopping behavior of people. The fact that you know all this information and the possibilities to use this in an analysis is very valuable."* Huib Lubbers argues that data should have the same characteristics as a driving car: *"Data needs to be better every time, machine learning, actual data, and real-time data should be blended together. This blended data needs to be better and better that retailers can make fast and reliable decisions based on this data."* This also creates possibilities and chances for data companies as Rixt de Jong argues: *"We are constantly working with data. For retailers that is maybe only a few times every year. That is much more difficult"*. Argued is that due to experience, it is easier to analyze and gain useful insights into the data because bureau RMC has the knowledge of data and can combine this with the knowledge of retail. Therefore the role of a data company as Bureau RMC should be seen as someone who gives retailers an independent judgment of a location. An expert who has the knowledge about both data and retail. This is also one of the key propositions of Bureau RMC. Especially retailers who do not have the resources to work with data, companies like Bureau RMC can gain better data insights by using internal and external data blended together.

5.2 The vision of Bureau RMC compared

This paragraph compares the vision of Bureau RMC with the answers from the different retailers who participated in this research. The insights gathered in this research are valuable for a data company like Bureau RMC. Before this research, the motives of how and why retailers used quantitative data remained unclear. Eventually, these insights can lead to better services, new products, and a better understanding of data usage among retailers.

Based on the interviews is visible that retailers have a lot of data available to use. However, retailers are not always using the full potential of this data. Most of this data is used by the marketing departments, but not for location choice. Many relevant questions for location choice can be answered when using quantitative data. For example, where are my customers coming from, what are the characteristics of my potential customers, and what are the preferences of my customers? The low usage of internal data creates possibilities for Bureau RMC. A combination of the expertise of Bureau RMC and the internal data of a retailer could lead to new relevant insights for location choice. For a data company as Bureau RMC, it is crucial to show the possibilities of data for location choice. During the interviews became clear that for some retailers, the overload of data results in a situation where they do not know what certain data can contribute. A possibility to do this is by presenting similar cases that benefited from the use of data.

Another interesting finding is that the retailers who participated in this research are seeking and willing to collaborate with smart data companies to gain better insights. A reason for this is that retailers do not have the people, time, or skills to analyze all the different data sources that they own. The fact that retailers are more looking for external parties to help them with data questions is a positive development for Bureau RMC.

In the vision becomes clear that Bureau RMC strongly believes in the added value of data for businesses. As director Huib Lubbers argues, gut feeling can work for some people, but is very hard to communicate to others. These beliefs are similar to the answers given by the different retailers. ==Retailers are using quantitative data a lot, however experience and gut feeling are still used as important input.== Bureau RMC has a unique proposition with years of experience in retail and a lot of data experience. Besides that, the CityTraffic-method gives Bureau RMC the opportunity to analyze the footfall in city or shopping centers. If this data is available, this data could be one of the inputs used for site selection. Bureau RMC also frequently uses lifestyle data. This data is often used to better understand the characteristics of an area. This data is not about how many people live in an area, but describes the preferences of people. During the interviews, it became clear that lifestyle data is not very known or used among retailers.

Retailers and Bureau RMC expect that the importance of data will further increase. Retailers are investing more money in data and tools to analyze data. Investigating the needs of retailers is important to reveal what kind of wishes or data needs retailers have now or for the future. Future developments are important because these developments require actions or preparations in advance. Besides that, most of these projects are very time-consuming.

A last comment to make is that retailers are very interested in the topic of data and possibilities of data. Retailers are more than willing to talk about this topic. On the one hand, this is because retailers clearly see the importance of data, but at the same time, retailers also realize that their data usage can be better. Talking with retailers is crucial to investigate what retailers need.

6. Conclusion and future research recommendations

6.1 Conclusion

The retail sector is under high pressure and changes quickly. An increase in online purchases is visible, which has a huge effect on physical stores. A retailer's location has always been an important aspect and still is. A good location is described as the 'keystone to profitability' and determines the success or failure of a retailer. Physical stores still have a lot to offer. In today's retail world, personal contact and advice are very important. Another development is that (big) data is more important than ever. Many different data sources are freely accessible and also retailers have more data available. By using this data in a smart way, retailers can make better data-driven decisions for location choice.

This qualitative research aims to better understand the role of quantitative data in the decision process of retailers. Where earlier research focused on other countries as the US or the UK, this research focuses on retailers active on the Dutch market. Until now, most of the motives for the usage of quantitative data remained unclear. The main question of this research is, 'what is the role of quantitative data in location choice for retailers?'. There are multiple sub-questions which help to answer the main question. The first sub-question is: 'what are the reasons given by the different retailers for using quantitative data in the location process?' The second sub-question is: 'is quantitative data for location choice decisive?' The third sub-question focuses on the daily use of quantitative data among retailers and is formulated as follows: 'how is quantitative data used in daily practice among retailers in the location choice process?' The last sub-question is: 'how sees Bureau RMC the role of quantitative data and matches this with the response given by the different retailers?'. The different methods used for this research are desk research and semi-structured interviews. Nine different retailers participated. All the interviewees are Dutch and are responsible for the location choice process within their organization. Another criterium for the respondents was that they have multiple stores in the Netherlands. All the interviews took place in May and the beginning of June 2019.

This research shows that there are different reasons why retailers are using quantitative data. The first reason is that data functions as a substantiation of an argument. Retailers often have a certain feeling about a place, but only having a feeling is, in many cases, not enough for making a decision. Especially because opening a new store is an expensive investment. Feeling and experience are highly subjective, hard to measure, and hard to compare (Wood & Browne, 2007). Objective data is needed to underpin someone's feeling. With the use of quantitative data, retailers are moving away from the intuitive approach to a more factual approach. Combining all kinds of different data sources helps to get a complete overview of a location that is otherwise hard to find out. For other retailers, quantitative data functions as a confirmation of this feeling. This feeling is very subjective and developed throughout the years or based on earlier experiences.

An interesting finding is that proof of the potential of a place can lead to the fact that retailers are willing to pay a higher rent for a location. Factual information proves that there is enough potential for opening a new store. Retailers investigate this by defining the geodemand and geocompetition. This research also makes clear that data cannot be the only factor when making a location decision. Experience and intuition are still very important and should not be underestimated. A reason for this is that it is expensive to make a wrong decision. Experience and lessons learned from the past are very valuable for the different retailers who participated in this research. This is also something mentioned by Hernandez, Bennison & Cornelius (2007).

Based on the interviews, it is possible to conclude that data contributes to a much broader goal, to invest on a responsible way. This is in line with the conclusions from Wood & Tasker (2007), who conclude that retail organizations are willing to invest more capital in gaining better insights to reduce the investment risks. Investments become much more valuable when using quantitative data in the location choice process. Where some of the retailers are already using data for a long time, others recently started using data for the location decision process. The retailers who recently started with the use of data did not give a specific reason for this. Most of these retailers said that due to coincidences or internal changes, they started using data for their location strategy. Retailers often described the sector as traditional, where data is never used for location strategy. The usage among other departments within organizations is much higher, but retailers are positive about the developments of data usage for location strategy. Omnichannel retailers, retailers who are active online and offline, see this as a strategic advantage. However, the data they receive from their online activities is not used for location strategies. Retailers see the possibilities of using this data, but it is not the case that new retail locations are based on online data. Retailers need to be convinced of these possibilities.

The retailers who participated in this research agree on the fact that location choice never will be 100 percent based on data. One of the most important reason given by the different retailers is that there are many elements that cannot be expressed in data. Examples given during the interviews are the presence of a garbage bin in front of a location or something else which can influence the attractiveness of a potential location. Also argued by the different retailers is that there should be space for interpretation. Take for example footfall data. The data can indicate that there is a lot of traffic on a specific location, but this data does not show if this is the case for the side where a retailer wants to open a store. Therefore a site visit still plays an important role in the location decision process. Many of the retailers who participated in this research argued that it is impossible to rent a place without visiting the location. The retailers who participated in this research agree on the fact that data gives an indication of the reality. A very good indication which reveals insights that would not be visible otherwise. Working with data can also be influenced by bias (Olivier & Van Hamersveld, 2019). Selecting the right input is crucial for making a good objective analysis. Visible is that biases influence how data is used. Some data sources are not used in an analysis because it could break the business case. In these cases, retailers were looking for data to confirm a feeling. Before making an analysis, it should be clear what kind of information is needed. The fact that there is so much data available can make this hard. Argued by Wood & Browne (2007) is that the quality of the data is essential for making a good analysis. This specific research shows that retailers trust the data they use. On the one hand, this is because they trust the supplier of the data, for example the CBS or Locatus, and on the other hand, because they are using their own data. If the quality of the data is low, retailers will not use it for analysis.

The usage of complex techniques that requires a lot of expertise, as described by Hernandez & Bennison (2000), is low among the retailers who participated. However, open data from the CBS is used a lot. Retailers are positive about the fact that there is more data available and easy to find. The data coming from the CBS is used to define the geodemand and geocompetition as described by Roig-Tierno et al. (2013). GIS systems are used only by some of the retailers. The use of GIS makes it possible to make a more in-depth analysis on a much more detailed level. Other retailers only use "CBS in uw buurt" to check the characteristics of a potential new location. Important data sources are internal data, footfall data, travel time and CBS data. Combining these data sources gives a complete overview of the potential of a new store. Another question asked during the interviews is what kind of data

retailers need to make better location decisions. Retailers want more detailed information about their customers. Expected is that this is something that will not happen soon because of privacy concerns.

Based on this research, it becomes clear that the vision of data from Bureau RMC correspondents with the answers given by the different retailers. In the eyes of Bureau RMC, there is more data available to make a well-considered decision. A decision that is no longer subjective but underpinned with factual data. RMC believes in the added value of data for businesses, but it is important to combine data insights with retail knowledge. Only then it is possible to get the best results. This research also shows that retailers are willing to use more data. For Bureau RMC, this is a positive development because Bureau RMC actively promotes the use of data for retailers.

Overall is visible that the importance of data is clear among the different retailers. However, in practice, the data usage is low. Intuition and experience still play an important role and are therefore hard to neglect. The retailers who participated in this research expect that data will become more important in the future and that retailers will make more use of data for the location choice process. Although data is important and can reveal insights that are not visible when relying on experience, a feeling or intuition there are other important elements which are important for making a location decision. This is in line with the findings from Clarke et al. (2000), who argue that objective tools ignore other important elements as for example a retailer's intuitive judgment. Data provides a solid and objective analysis of a place. Concluding, it is possible to say that the use of quantitative data is one of the many steps that retailers should take when investigating the potential of a new location.

6.2 Recommendations for further research

Due to a lack of research on the different motives, this specific research investigated if and how quantitative data is used among different retailers with multiple stores based in the Netherlands. To gain these insights nine different Dutch retailers were interviewed. Because the respondents all represented a different retail sector, it is hard to say something about a specific sector, as Hernandez & Bennison (2000) did in their research. This research can only say something about the retail sector in general. In the research from Hernandez & Bennison, there was a clear difference visible in the planning techniques used by the different retail sectors. Future research could focus more on a specific sector or two retail sectors to eventually compare these sectors and see if there are significant differences in the usage of data between these sectors.

It is important to mention that the respondents who participated in this research can be biased. This is because most of the respondents are contacts or customers of Bureau RMC, a consultancy bureau specialized in smart retailing and the use of data. Due to the fact that these contacts were already known they were easier to contact and more willing to participate in this research. If a person is not convinced of the power of data they would not be working with Bureau RMC. Only a limited amount of respondents have no link with Bureau RMC. These respondents are contacts from the other respondents who participated in this research.

Another recommendation for further research is to speak with multiple people within an organization. Speaking with more people makes it possible to find out the broader vision of using quantitative data for the location choice process. It could be that for other people within the same organization experience, intuition, or the use of data plays a more important role than for others. A second interesting perspective is to look at a person's place in the organization. For example, leads a higher place in the organization to an increase in the use and trust of data or plays experience a more important role.

A third and last recommendation for further research is to conduct this research again in 5 or 10 years to see if the role of data for the location choice process has changed. Nowadays, data is a hot topic among retailers and other businesses. It is expected that the usage of data in general, data availability, and the possibilities of data will increase in the future. This makes it interesting to conduct the same research and see if the role of data has changed and if intuition and experience are still very important for location choice.

References

ABN Amro. (2013). Retaillocaties 2020. De nieuwe winkelkaart van Nederland. Retrieved from http://www.overbewinkeling.nl/wp-content/uploads/2014/11/Trendrapport-ABN-Initiatief-Overbewinkeling.pdf

Agor, W. H. (1986). The logic of intuition: How top executives make important decisions. *Organizational Dynamics, 14*(3), 5-18.

Applebaum, W. (1966) 'Methods for determining store trade areas, market penetration and potential sales', Journal of Marketing Research, 3(2): 127–41.

Azaz, L. (2011, December). The use of geographic information systems (GIS) in business. *Int. Conf. Humanit,* 299-303.

Berman, B. and J.R. Evans. (1983). Retail Management: A Strategic Approach. New York: MacMillan.

Blattberg, R. C., & Hoch, S. J. (1990). Database models and managerial intuition: 50% model+ 50% manager. Management Science, 36(8), 887-899.

Clarke, I., Horita, M., & Mackaness, W. (2000). The spatial knowledge of retail decision makers: capturing and interpreting group insight using a composite cognitive map. The International Review of Retail, Distribution and Consumer Research, 10(3), 265-285.

Clarke, I., Mackaness, W., Ball, B., & Horita, M. (2003). The devil is in the detail: visualising analogical thought in retail location decisionmaking. Environment and Planning B: Planning and Design, 30(1), 15-36.

Clarke, I., & Rowley, J. (1995). A case for spatial decision-support systems in retail location planning. *International Journal of Retail & Distribution Management, 23*(3), 4-10.

Claus, R. J., & Claus, K. E. (1971). Behavioural location theory: a review and discussion of Pred's dynamic location model. *Australian Geographer, 11*(5), 522-530.

Cohen, S. B., & Applebaum, W. (1960). Evaluating store sites and determining store rents. Economic Geography, 36(1), 1-35.

Davies, R.L. (1984). Retail and Commercial Planning , Croom Helm, Beckenham.

Exterkate, M., & Ploem, H. (January 10, 2019). 10 cruciale trends voor detailhandelsbeleid. Retrieved from http://stec.nl/10-cruciale-trends-voor-detailhandelsbeleid/

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine, 7*(3), 93-99.

Fenwick, I. (1978). *Techniques in store location research: a review and applications*. Retailing and Planning Associates.

Ghosh, A., & Craig, C.S. (1983). Formulating retail location strategy in a changing environment. *Journal of Marketing, 47*(3), 56–68.

Ghosh, A. and S. McLafferty. (1987). Location Strategies for Retail and Service Firms. Lexingtion, USA: DC Heath.

Gonzlez-Benito, S., & Gonzlez-Benito, J. (2005). The role of geodemographic segmentation in retail location strategy. *International Journal of Market Research*, *47*(3), 295-316.

Guy, C. (1999). Retail location analysis. *Applied Geography: Principles and Practise. London: Routledge*, 450-462.

Harrell, M. C., & Bradley, M. A. (2009). *Data collection methods. Semi-structured interviews and focus groups.* Rand National Defense Research Inst santa monica ca.

Harvey, D. (1969). Behavior and Location: Foundations for a Geographic and Dynamic Location Theory, Part 1.

Hernández, T., & Bennison, D. (2000). "The art and science of retail location decisions". *International Journal of Retail & Distribution Management, 28*(8), 57-367.

Hernandez, T., Bennison, D., & Cornelius, S. (1998). The organisational context of retail locational planning. *GeoJournal, 45*(4), 299-308.

Hernandez, T., & Biasiotto, M. (2001). Retail location decision-making and store portfolio management. *Canadian Journal of Regional Science, 24*(3), 399-421.

INretail. (2017). Shopping 2020. De nieuwe winkelstraat. Retrieved from https://www.platformdenieuwe winkelstraat.nl/Uploaded_files/Zelf/shopping2020-de-nieuwe-winkelstraat-in-beeldwoorden.759d02.pdf

Kantor, M. (2009). How leading companies are seeing customers in new ways. Retrieved from https://www.esri.com/about/newsroom/publications/wherenext/customers-drive-strategy/

Kudyba, S. (2014). *Big data, mining, and analytics: components of strategic decision making*. CRC Press.

Leventhal, B. (2003). Leveraging the census for customer analysis. *Journal of Targeting, Measurement and Analysis for Marketing, 12*(1), 11-19.

Longhurst, R. (2003). Semi-structured interviews and focus groups. *Key methods in geography, 3,* 143-156.

Morrison, J. L. (1994) 'The paradigm shift in cartography: The use of electronic technology, digital spatial data, and future needs', in Waugh, T and Healey, R Eds, *Advances in GIS Research*, Taylor and Francis, London, 1-1

Moutinho, L., Curry, B., & Davies, F. (1993). Comparative computer approaches to multi-outlet retail site location decisions. *Service Industries Journal*, *13*(4), 201-220.

Olivier, L., & Van Hamersveld, M. (2019). Kennis delen - meer inzicht. *Clou, 93, 25-27.*

Pioch, E., & Byrom, J. (2004). Small independent retail firms and locational decision-making: Outdoor leisure retailing by the crags. *Journal of Small Business and Enterprise Development, 11*(2), 222–32.

Power, D. J. (2014). Using 'Big Data' for analytics and decision support. *Journal of Decision Systems, 23*(2), 222-228.

Pred, A. (1967). Behaviour and location, foundations for a geographic and dynamic location theory. Part I. *Behaviour and location, foundations for a geographic and dynamic location theory. Part I.*

Provost, F., & Fawcett, T. (2013). Data science and its relationship to big data and data-driven decision making. *Big data, 1*(1), 51-59.

Rabobank. (2019). Detailhandel non-food. Retrieved from https://www.rabobank.nl/bedrijven/cijfers-en-trends/detail-en-groothandel/detailhandel-non-food/

Rodrigue, J. P. (2020). The Geography of Transport Systems 5th Edition. Routledge.

Rogers, D. (1987). Shop location analysis. *Retail and Distribution Management*.

Rogers, D. (1992) 'A review of sales forecasting models most commonly applied in retail site evaluation', *International Journal of Retail and Distribution Management*, 20(4): 3–11.

Rogers, D. (2006). Location research planning: The need for less hype, *European Retail Digest, 49:* 63-64.

Rogers, D. S., & Green, H. L. (1979). A new perspective on forecasting store sales: applying statistical models and techniques in the analog approach. *Geographical Review*, 449-458.

Roig-Tierno, N., Baviera-Puig, A., Buitrago-Vera, J., & Mas-Verdu, F. (2013). The retail site location decision process using GIS and the analytical hierarchy process. *Applied Geography*, *40*, 191-198.

Schwenk, C.R. (1995) 'Strategic decision making', Journal of Management, 21(3): 471–93.

Simkin, L. P., Doyle, P., & Saunders, J. (1985). How retailers put site location techniques into operation: An assessment of major multiples' practice. *Retail and Distribution Management, 13*(3), 21-26.

Theodoridis, C., & Bennison, D. (2009). Complexity theory and retail location strategy. *The International Review of Retail, Distribution and Consumer Research, 19*(4), 389-403.

Walters, D. (1974). RETAIL SITE LOCATION— TIME FOR A NEW APPROACH?. *Retail and Distribution Management, 2*(6), 28-31.

Wood, S., & Browne, S. (2007). Convenience store location planning and forecasting–a practical research agenda. *International Journal of Retail & Distribution Management, 35(4)*, 233-255.

Wood, S., & Tasker, A. (2008). The importance of context in store forecasting: The site visit in retail location decision-making. *Journal of Targeting, Measurement and Analysis for Marketing*, *16*(2), 139-155.

Wrigley, N. (1988). Retail restructuring and retail analysis. Routlegde, London, 3-34.

Wunderman Thompson. (2019). De klant van de toekomst Nederland. Retrieved from https://insights.wundermanthompsoncommerce.com/nl/klant-van-de-toekomst-2019