

## MASTER

### Revenue development in inner-cities

A study on the factors influencing revenue development of retailers and entrepreneurs and the benefits for the inner-city

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# Revenue development in inner-cities

A study on the factors influencing revenue development of retailers and entrepreneurs and the benefits for the inner-city.

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## Preface

This master thesis presents the results of my graduation project to complete the master track Urban Systems & Real Estate at the Eindhoven University of Technology. This graduation project has been completed during an internship period at BRO and Platform Binnenstadsmanagement.

The aim of this master thesis was to identify relevant factors that influence the revenue development of retailers and entrepreneurs in inner-cities and study how this benefits the inner-city. Moreover, the development phase of a pilot study, which will be conducted after the summer of 2021, has been followed to find a method to collectively measure the revenue of entrepreneurs in the inner-city.

I would like to thank my supervisors Astrid Kemperman, Aloys Borgers, and Pauline van den Berg for their guidance and feedback during the process of this graduation project. I would also like to thank Robin van Lieshout and Felix Wigman for, first of all, the opportunity to conduct my graduation project as part of an internship period at BRO and for their additional guidance and feedback during this research. Lastly, I would like to thank all other colleagues at BRO and Platform Binnenstadsmanagement, who have helped in all kinds of ways during this master thesis and my close friends and family who have always supported me during this process.

P.C. (Pim) van den Broek

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## Summary

Urbanisation is currently a major trend in the world. With an increasing population living in urban areas, it becomes increasingly more important to improve these urban areas and ensure their vitality and viability. Inner-cities are the most diverse part within the urban area with various kinds of land uses and functions and therefore a wide range of stakeholders are involved. Moreover, because of the many businesses located in the inner-city, the inner-city is an important part of a cities' economic functioning. It is important to know which factors influence the revenue development of these businesses within inner-cities because more insight into these factors can strengthen the economic functioning and resilience of inner-cities. Therefore, this research aims to identify factors that influence the revenue development of entrepreneurs in inner-cities and tries to find a measurement method to collectively measure revenue to verify the effects of these factors.

To achieve this, a literature review was conducted to identify relevant factors influencing the revenue development of retailers and entrepreneurs in Dutch inner-cities. Thereafter, the development phase of a pilot study that will be conducted after the summer of 2021 has been followed to develop a measurement method to collectively measure the revenue of entrepreneurs in inner-cities. Lastly, a short survey has been sent to entrepreneurs in inner-cities to get more insight into the most influential factors affecting revenue development from their perspective.

Factors that influence revenue have been divided into two categories in the literature review; factors that affect the economic functioning of inner-cities on a city-wide level and factors that affect the economic functioning on a smaller scale level of the individual entrepreneur. With the information gathered from the literature review, an overview has been established with relevant factors influencing revenue development. The effect of these factors will be explored by employing a pilot study. During this pilot study, which will take place after this research project, revenue data will be collected from retailers and entrepreneurs in five inner-cities in the Netherlands: Arnhem, Eindhoven, Gouda, Tilburg, and Utrecht. Via an online communication platform provided by Chainels, entrepreneurs from these cities can fill in their monthly revenue data, which will be analysed to get more insight into the effect of some of the relevant factors. To test the data collection system and to receive some early feedback from participating entrepreneurs, a 'pre-pilot' will be conducted before the pilot study with a small group of entrepreneurs. Three phases can be identified in the process of the pilot study. Phase 1, the development phase, which will be participated in during this research project, phase 2, the pre-pilot, which will be conducted around August, and lastly, the third phase, the actual pilot study, which will take place after the pre-pilot. During this research, the development phase has been followed, during which the set-up of the pre-pilot and the pilot study have been discussed in online sessions with the organising entities and representatives of the participating cities. Results from the online sessions have proven that it is difficult finding entrepreneurs who are willing to participate in the research. The main reason for this is because of concerns from entrepreneurs about the privacy aspect of the pilot study because, in general, Dutch entrepreneurs are very reluctant in sharing business-sensitive data. Providing retailers and entrepreneurs with information about the set-up of the pilot study, its benefits, and the privacy aspect should encourage them to participate.

In order to get more insight into the most influential factors influencing revenue, a survey has been established which has been sent to retailers and entrepreneurs in the five participating inner-cities. In this survey, entrepreneurs are asked to score factors on their importance and effect on revenue development. Results from this survey show that holidays, the distance of the business to the centre of the inner-city, and footfall in the inner-city are the most influential, positive factors according to entrepreneurs in the inner-city. The factors that have the greatest negative influence are high

temperatures (32°C and above), rainfall, and construction works in the inner-city. There are differences visible between the retail and hospitality sectors.

Because this graduation project ends before the actual pilot study starts, this research has focused on providing a theoretical foundation for the pilot study to build upon. Analysis methods are described, which can be used to visualise the revenue development of the entrepreneurs in the participating inner-cities and show the effect of the identified factors in the literature review and development phase, such as horizontal analysis (for revenue data) and ratio analysis (for ratios such as average revenue per square meter of retail floor area). For more complex analyses, such as using the collected data to forecast future values of revenue, time series analysis can be used. Three time series analysis methods have been elaborated in this study; the ARMA model, ARIMA model, and ARIMAX model. The ARIMA model is used for non-stationary time series and is, therefore, most suited for analyses during the pilot study. The ARIMAX is an extension to the ARIMA model and can include exogenous variables in the analysis. The ARIMAX model is best suited to use during the pilot study because it can include exogenous variables in the analysis. A simulated example has been given to show how this analysis method can be used during the pilot study.

Future research can build upon the findings of this study and conduct the pilot study to measure the effects of the identified factors on the revenue development of retailers and entrepreneurs in inner-cities. Attention should be paid to a sufficient number of entrepreneurs per type of business in order to measure differences between these types. Moreover, further research could increase the representativeness by including more inner-cities. Future research can take this into account and build upon this research to get more insight into the relevant factors affecting the revenue development of entrepreneurs in inner-cities.

# Table of contents

Preface.....	ii
Summary .....	iii
List of figures and tables.....	vii
Figures .....	vii
Tables .....	vii
1. Introduction.....	8
1.1 Problem description .....	9
1.2 Research objectives.....	9
1.3 Conceptual framework.....	10
1.4 Relevance .....	10
1.4.1 Academic relevance.....	10
1.4.2 Societal relevance.....	11
1.5 Thesis outline.....	11
2. Literature review .....	13
2.1 The inner-city and inner-city management.....	13
2.1.1 Attractiveness.....	13
2.1.2 Unique image .....	14
2.1.3 Agglomeration benefits.....	14
2.1.4 Recent developments.....	15
2.1.5 Inner-city management.....	15
2.2 Economic functioning in the inner-city .....	17
2.2.1 Revenue.....	17
2.2.2 Alternative indicators .....	18
2.2.3 Retail resilience .....	19
2.2.4 Threats for the retail system .....	21
2.2.5 Opportunities for the retail system.....	26
2.2.6 Other factors influencing revenue .....	30
2.2.7 Turnover rental agreements .....	30
2.3 Conclusion .....	32
3. Research approach .....	34
3.1 Set-up .....	34
3.2 Phase 1a, data collection methods for revenue data .....	36
3.3 Participating cities .....	37
3.3.1 Arnhem.....	37
3.3.2 Eindhoven.....	38

3.3.3 Gouda .....	38
3.3.4 Tilburg.....	39
3.3.5 Utrecht.....	40
3.4 Phase 1b, online sessions .....	41
3.4.1 First session .....	41
3.4.2 Second session .....	42
3.4.3 Third session.....	42
3.4.4 Fourth session .....	43
3.4.5 Privacy .....	43
3.4.6 Preliminary results phase 1b, online sessions.....	44
3.5 Phase 1c, survey to entrepreneurs in the inner-city.....	45
3.6 Conclusion .....	46
4. Results .....	48
4.1 Factors influencing revenue development.....	48
4.1.1 Individual retail factors.....	49
4.1.2 City-scale factors .....	50
4.1.3 External factors.....	52
4.1.4 Revenue development and resilience of entrepreneurs.....	52
4.2 Preliminary results survey .....	53
4.3 Analysis methods.....	55
4.3.1 Horizontal, vertical, and ratio analysis .....	56
4.3.2 Trend analysis and time series analysis.....	58
4.3.3 Simulated example with an ARIMAX model.....	61
4.4 Conclusion .....	67
5. Conclusion, discussion, and recommendations .....	69
5.1 Conclusions.....	69
5.2 Limitations and recommendations for future research .....	71
5.3 Practical implications and scientific relevance.....	72
References.....	74
Appendix.....	83
Appendix 1. Classification of city centres, Locatus.....	83
Appendix 2. Classification of sectors Locatus.....	84
Appendix 3. flyer with information for entrepreneurs. ....	85
Appendix 4. Most important factors relevant to revenue .....	88
Appendix 5. Questions of the survey .....	89
Appendix 6. Household segmentation based on Whooz data .....	91

## List of figures and tables

### Figures

Figure 1, Conceptual framework. ....	10
Figure 2, Internet shopping usage for people aged 12 years and older. 2012 Compared to 2019. ....	21
Figure 3, Online purchases sorted into age groups. CBS (2020). ....	23
Figure 4, Population composition of the Netherlands in 2020. CBS (2020). ....	23
Figure 5, Population composition of the Netherlands in 2040. CBS (2020). ....	24
Figure 6, Development of the hospitality sector between 2008 and 2021 in various city centres. (Locatus, 2021). ....	28
Figure 7, Development of the leisure sector between 2008 and 2021 in various city centres. (Locatus, 2021). ....	29
Figure 8, Detailed conceptual framework. ....	33
Figure 9, Most important factors in relation to revenue development according to participants in the pilot study. ....	44
Figure 10, Detailed conceptual framework with additions from the development phase of the pilot study. ....	47
Figure 11, Ratio analysis. (Khudir & Ali, 2019). ....	58
Figure 12, Time series. (SAS Institute Inc, 2018). ....	61
Figure 13, Sequence chart for the non-stationary simulated time series. ....	64
Figure 14, Sequence chart with first order differencing for the simulated time series. ....	64
Figure 15, Autocorrelation function for the simulated time series. ....	65
Figure 16, Partial autocorrelation function for the simulated time series. ....	65
Figure 17, Observed and forecasted values of the simulated time series. ....	66

### Tables

Table 1, Operating budget for companies. ....	18
Table 2, Relative number of franchisees compared to the total number of businesses in inner-cities between 2008-2021. (Locatus, 2021). ....	25
Table 3, Relative number of franchisees compared to the total number of businesses in large main shopping areas between 2008-2021. (Locatus, 2021). ....	25
Table 4, The three phases of the pilot study with the description and duration/starting date of each phase. ....	34
Table 5, Total number of retail, leisure, hospitality, and service locations in Arnhem. (Locatus, 2021). ....	37
Table 6, Total number of retail, leisure, hospitality, and service locations in Eindhoven. (Locatus, 2021). ....	38
Table 7, Total number of retail, leisure, hospitality, and service locations in Gouda. (Locatus, 2021). ....	39
Table 8, Total number of retail, leisure, hospitality, and service locations in Tilburg. (Locatus, 2021). ....	40
Table 9, Total number of retail, leisure, hospitality, and service locations in Utrecht. (Locatus, 2021). ....	40
Table 10, Factors influencing revenue development included in the pilot study. ....	48
Table 11, Financial factors in the pilot study. ....	53
Table 12, Number of responses for each sector of the survey. ....	54
Table 13, Most influential factors for revenue according to entrepreneurs in inner-cities, all sectors combined. ....	54
Table 14, Most influential factors for revenue according to entrepreneurs in inner-cities, retail sector. ....	55
Table 15, Most influential factors for revenue according to entrepreneurs in inner-cities, hospitality sector. ....	55
Table 16, Horizontal analysis. (Tuovila, 2021). ....	57
Table 17, Vertical analysis. (Grant, 2020). ....	57
Table 18, Example of the monthly revenues of a business in the non-food retail sector. (CBS, 2021). ....	62
Table 19, Monthly meteorological data, average temperature and rainfall, in the past five years. (KNMI, 2021; HetWeerActueel, 2021). ....	63
Table 20, Forecasting values of the ARIMAX model of the simulated time series. ....	66
Table 21, Parameters of the ARIMAX model of the simulated time series. ....	66
Table 22, Model statistics of the ARIMAX model of the simulated time series. ....	67



# 1. Introduction

A significant trend visible in the past decades is global urbanisation. While 30 per cent of the global population lived in urban areas in 1950, this number has increased to 55 per cent in 2018 and is expected to further increase to 68 per cent in 2050 (United Nations, 2019). This trend is even more significant in Europe. According to Nabielek et al. (2016a), the number of people living in urban areas is currently 72 per cent and is projected to rise to 83 per cent in 2050. Urban areas are defined as cities, towns, and suburbs. A city is a densely populated area with a population density of at least 1500 inhabitants per km<sup>2</sup> and a minimum population of 50,000 inhabitants (Eurostat, 2020). Towns and suburbs are intermediate-density areas with a population density of at least 300 inhabitants per km<sup>2</sup> and a minimum population of 5000. The remaining area that does not fall into these categories is categorised as rural areas or thinly populated areas (Eurostat, 2020; Nabielek et al., 2016a). These numbers show that Europe is one of the most urbanised geographic locations in the world, and within Europe, the Netherlands are among the more urbanised areas, with 74 per cent of the inhabitants living in urban areas (Nabielek et al., 2016b).

These numbers show that the urban population is growing, and therefore cities themselves are growing. The inner-city, or otherwise known as the city centre or town centre, is the heart of the city, which connects global competitive factors to local concerns (Roulac, 2003). The inner-city is the most diverse part of the urban area, with various kinds of land uses and functions, and therefore a wide range of stakeholders are involved. Because of the shift in retail development to out-of-town shopping centres, which is not as much of a threat in the Netherlands as in the rest of Europe (van der Krabben, 2009; Coca-Stefaniak, 2014; Teller et al., 2016; Planing et al., 2020) and, more importantly, the competition from e-commerce (Platform 31, 2018; Platform 31, 2014), it is essential for municipalities and city managers to manage their inner-city well to ensure the vitality and viability of these inner-cities (Warnaby et al., 2005).

One of the developments focusing on increasing the vitality and viability of inner-cities is inner-city management or town centre management, as it is often referred to in the literature. Inner-city management is a relatively new concept within the urban sciences. It is first mentioned in the research of Spriddell in 1980, but the first definition for it was published in 1991 by Wells. At this time, town centre management was mainly focused on retail and how the town centres could respond to the competitive pressure from out-of-town shopping centres and retail parks (Coca-Stefaniak, 2014; Coca-Stefaniak et al., 2009; Nisco et al., 2008; Otsuka & Reeve, 2007). Since then, inner-city management has evolved into a more complex approach, in which the focus of inner-city management has shifted from a short-term tactical approach to a long-term strategic approach. While in the 1990's the main focus was on revitalising retail in inner-cities, nowadays, the importance of public-private partnerships within inner-cities (Nisco et al., 2008; Platform Binnenstadsmanagement, 2020; Wigman, 2020), forming strategic visions to address broader concerns than retail such as sustainability (Coca-Stefaniak, 2014; Coca-Stefaniak et al., 2009; Nisco et al., 2008; Warnaby et al., 2005) and developing and improving the public realm (Alexander et al., 2020; Brańka et al., 2016; Källström et al., 2019; Otsuka & Reeve, 2007; Wigman, 2020) are becoming more important to ensure the vitality and viability of inner-cities.

Because of the importance and complexity of the inner-city, a wide array of stakeholders are involved. Medway et al. (2000) arrange these stakeholders in three categories: the public sector, the private sector, and the voluntary sector. The public sector includes stakeholders such as the local authorities, the police, public transport, tourist agencies, and leisure centres. The private sector includes

stakeholders such as retailers, shopping centres, chambers of commerce, property owners, managing/estate agents, restaurants and cafés, pubs and nightclubs, leisure facilities, and hotels. Lastly, the voluntary sector contains stakeholders such as civic societies and conservation-, disabled-, or residents' groups. This research will mainly focus on the public and private sector, with the municipality within the public sector and retailers and restaurants & cafés in the private sector.

In order to help inner-city management organisations measure the performance of an inner-city, Platform Binnenstadsmanagement has developed the "Binnenstadsbarometer". This instrument provides insight into how inner-cities are developing based on a large set of data sources and makes use of standardised indicators. Because the Binnenstadsbarometer makes use of standardised indicators, the data it provides is accessible, scalable, and replicable. This makes it possible for municipalities and policymakers to compare and evaluate inner-cities based on the themes provided in this instrument. This can help municipalities and inner-city management organisations develop a strategic inner-city development plan. The instrument measures the performance of inner-cities based on six categories which have been discussed in the research of Op 't Eijndt (2019). The six categories are economy, inclusion, resilience, governance, identity, and vibrancy. The weights, showing the importance to the inner-city of these themes, show relatively minor differences, ranging from 0.115 (inclusion) to 0.200 (economy) according to Op 't Eijndt (2019).

### 1.1 Problem description

This study will focus on the theme 'economy' for the inner-city and, more specifically, the revenue development of retailers and entrepreneurs. The economy is an important theme of every municipality because cities have a significant contribution to each countries' national economy (Nabielek et al., 2016a; Nabielek et al., 2016b) because of many aspects. These will be discussed in the literature review. Because of the importance of cities for the national economy and the fundamental role that inner-cities play for the economy on a city scale (McGough & Thomas, 2014), it is important to know which factors have an influence on the revenue development of retailers and entrepreneurs within inner-cities. A universal method to measure and track revenue development will help with this, but currently, this is not available in the Netherlands. Therefore, this research aims to identify factors that have an influence on the revenue of retailers and entrepreneurs and tries to find a measurement method for revenue development of retailers and entrepreneurs in the Netherlands to verify the effect of these factors.

### 1.2 Research objectives

To reach this aim, the following research question will be answered in this research:

*Which factors influence the revenue development of entrepreneurs and the economic functioning of inner-cities, and how can revenue development and relevant factors in Dutch inner-cities be measured?*

To complement this main research question, the following sub-questions are discussed:

1. What are relevant factors that have an influence on the revenue development of retailers and entrepreneurs in the inner-city?
2. What role do retailers and entrepreneurs play in the economic functioning of inner-cities?
3. How is revenue measured abroad and used for revenue-based rental agreements?
4. How can revenue development and relevant factors be measured collectively?
5. In the process of collecting revenue data from entrepreneurs, which issues are relevant to get entrepreneurs willing to participate?

## 6. How can revenue data be used in forecasting models?

### 1.3 Conceptual framework

In the literature review, factors influencing the revenue of retailers and entrepreneurs will be identified. The revenue development of retailers and entrepreneurs is dependent on a wide array of factors on multiple scale levels. Some factors can be manipulated and used by retailers to increase their revenue or footfall, and some factors are external and cannot be influenced by retailers and entrepreneurs. Figure 1 illustrates the conceptual framework for this research. The factors influencing economic resilience and functioning of the inner-city have been divided into four categories: City-scale factors influencing revenue, revenue development, and retail resilience of entrepreneurs, individual retail factors and external factors. The first category includes factors on a city-wide scale that municipalities can influence by larger developments or interventions. These are often relatively static such as atmospherics of the inner-city or mobility/accessibility-related aspects. The second category, revenue development and retail resilience of entrepreneurs, is on an individual level. The revenue development and resilience of retailers and entrepreneurs will contribute to the financial stability of the entrepreneurs and therefore contributes to the economic resilience and functioning of the inner-city. Because the main focus of this study is related to the revenue development and resilience of entrepreneurs, this category will be discussed extensively. The revenue development of entrepreneurs is influenced by various factors. For this research, these factors have been divided into two categories: individual retail factors and external factors. Individual retail factors are factors influencing revenue development that individual retailers and entrepreneurs can use to influence their revenue and increase their resilience. External factors do have an effect on the revenue development and resilience of entrepreneurs but cannot be influenced by entrepreneurs.

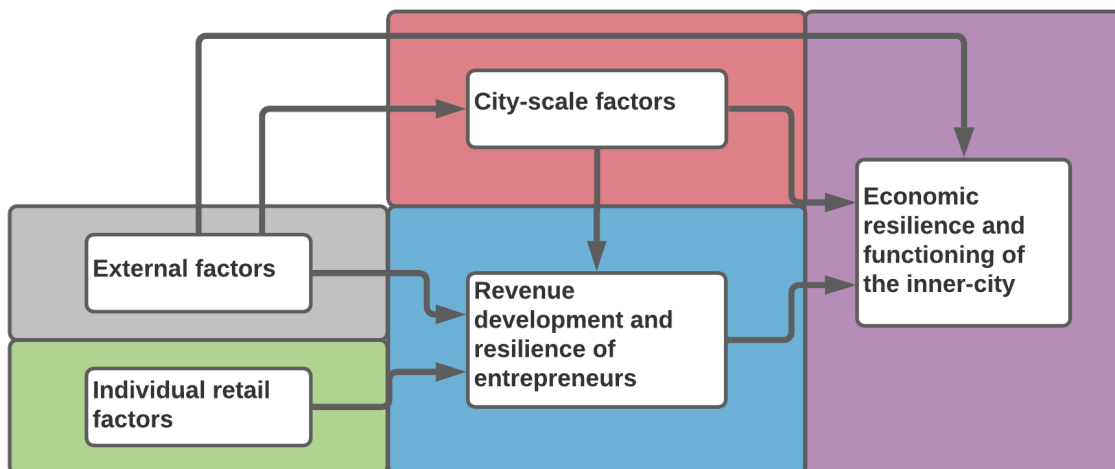


Figure 1, Conceptual framework.

### 1.4 Relevance

This section will first describe the academic relevance, followed by the societal relevance of this research.

#### 1.4.1 Academic relevance

Extensive research has been conducted on the influence of various factors on the revenue development and resilience of retailers and entrepreneurs in inner-cities. City-wide factors that influence the image and attractiveness of the entire (inner) city have also frequently been studied. However, while some of these factors have been studied in relation to the experiential value of

consumers (Van Dijck, 2014), footfall, and the retail real estate value (Pullens, 2018), these factors have not been studied in relation to the revenue development of retailers and entrepreneurs. A reason for this is that entrepreneurs in the Netherlands are quite reluctant with respect to sharing their revenue data. Moreover, while in some countries, some retailers and entrepreneurs are legally obligated to report their revenue data in combination with turnover lease agreements, these types of rental agreements are in the Netherlands uncommon mainly because of distrust between tenant and landlord and legal obstructions. Therefore, this research will identify relevant factors influencing the revenue development of retailers and entrepreneurs by using a literature review. Moreover, it will follow the development phase of a pilot study that will be conducted after the summer of 2021, and describe the issues during this development phase. The process leading up to this pilot study is divided into three phases: Phase 1, the development phase (which will be followed during this research), phase 2, the pre-pilot, and phase 3, the pilot study. The theoretical background provided in this research will form the foundation on which the following phases, phases 2 and 3, can expand.

#### 1.4.2 Societal relevance

Insight into the revenue development of retailers and entrepreneurs contributes to several societal goals. First, in relation to (inner) cities, insight into the revenue data of retailers and entrepreneurs can shed light on the development of revenue over time and the effects of events/holidays in inner-cities. This can be important for inner-cities because it can show if the events have the desired effect (for instance, profit and/or footfall). Moreover, the revenue development over time can show economically good and bad times, which can be used by inner-cities to optimise the economic environment (for instance, supporting retailers and entrepreneurs in economically bad times). Individual retailers and entrepreneurs can use the information from the literature review to optimise their businesses and use factors positively influencing revenue to their advantage and thus increase their economic functioning. The information and results gathered from the development phase, which will be followed during this research, can be used as a guideline for future, similar research in which entrepreneurs have to be made willing to participate in revenue-oriented research. In addition, the (anonymised and aggregated) revenue data, which will be collected in the pilot study after this research project, can be used to compare the individual revenue of retailers and entrepreneurs with the average revenue in their own branch/sector in the inner-city and the Netherlands. Within the inner-city, it can also be compared with subareas. Moreover, the benefit for individual companies with respect to collective actions in the inner-city (such as events) can be assessed. This research emerged as a follow-up study to the research previously conducted on the 'Binnenstadsbarometer' by Op 't Eijndt (2019) in combination with Platform Binnenstadsmanagement, within the theme of the economy. Measuring the revenue of retailers and entrepreneurs could be a good indicator of the economic functioning of the inner-city. Therefore, the results of this research and the results from the pilot study following this research can be used to complement the theme 'economy' within the 'Binnenstadsbarometer', which can be used by municipalities to compare their financial performance to other inner-cities in the Netherlands and to get more insight in their economic functioning.

#### 1.5 Thesis outline

The remainder of the report is structured as follows. Chapter 2 discusses the existing literature regarding inner-cities, inner-city management, and the economic functioning in inner-cities. The literature review has been divided into two parts; first, the inner-city and inner-city management in which factors influencing the economic resilience and functioning on a city-wide scale are discussed. Second, literature about economic functioning in the inner-city will be discussed, with a focus on the individual scale of retailers and entrepreneurs. Chapter 3 discusses the research approach, with the information gathered during the development phase, and will elaborate on the outline of the pilot study after this research project, as discussed during the development phase. Moreover, the data

collection method will be elaborated. In chapter 4, the information gathered in the literature review and the development phase will be combined and used to determine relevant factors influencing revenue development. The results of the analysis methods and the development phase will also be elaborated. Finally, chapter 5 contains the conclusions of the research with the limitations and recommendations for future research.

## 2. Literature review

To identify factors that influence the revenue development of retailers and entrepreneurs in inner-cities, a literature review will be conducted. Two main aspects will be analysed in current literature, the inner-city and inner-city management and the economic functioning of inner-cities. The first part will analyse factors influencing revenue on a large, city-wide scale and discusses the development of inner-city management and its purposes. The second part first analyses financial indicators and examines how they can provide insight into the economic functioning of businesses. Then, factors influencing revenue on a lower scale level for individual entrepreneurs will be discussed along with some external factors which cannot be controlled.

### 2.1 The inner-city and inner-city management.

The inner-city, or city centre, town centre, downtown or highstreet as it is also referred to in existing literature, is a unique area within the urban area. It is the bustling heart of the city with a very diverse mixture of land uses, which often provides many job opportunities and plays an important role in the city-wide economic performance because of the dense population and main business and commercial areas that are often present. Therefore, the inner-city is vital for cities and should be managed well to preserve the vitality and viability, now more than ever because of the changing conditions in the inner-cities. In the past decades, inner-cities have had to deal with threats such as the economic crisis in 2008, the emergence of e-shopping, changing consumer behaviour, and the emergence of out-of-town shopping centres (Evers et al., 2014; Platform 31, 2014; Weltevreden & Van Rietbergen, 2007). Inner-cities in the Netherlands have, unlike other countries abroad, being able to protect their inner-cities from the challenges coming from out-of-town shopping centres for a longer period of time (van der Krabben, 2009). However, nowadays, inner-cities in the Netherlands also experience the threat of out-of-town shopping centres (Planing et al., 2020; van der Krabben, 2009). These threats can result in more vacancies in the inner-city because of the decreased visitor numbers. This is a large problem because more vacancies in the city can lead to a hollowing out of the city, which affects the attractiveness of the city, and a less attractive city or inner-city has in turn effect on the number of visitors. This vicious circle can be prevented by, for example, the transformation of the vacancy into living- or work/office space (Platform 31, 2018; Planing et al., 2020). Moreover, retailers can be concentrated in a compact inner-city, which will decrease the number of vacancies in retail. This can be combined with mixing functions such as retail combined with gastronomy to enhance the attractiveness of the inner-city for various stakeholders (Platform 31, 2018). Another strategy to tackle the decreasing number of visitors because of the aforementioned threats is to transform the inner-cities. Because while inner-cities used to be “*places to buy*” mainly focused on retailing, nowadays consumers see inner-cities as “*places to be*” in which inner-cities need to provide a diverse set of functions (Wigman, 2020; Platform 31, 2014).

The following sections will discuss the impact that inner-cities have on the urban area and the possibilities that it offers.

#### 2.1.1 Attractiveness

A cities’ or inner-cities’ attractiveness is important for attracting visitors to the centre because people will more likely come to cities that have a more attractive centre. The attractiveness of an inner-city is dependent on various factors. Planing et al. (2020) have divided them into eight categories:

1. Mobility (accessibility in the inner-city),
2. Cityscape (the atmosphere of the inner-city),
3. Liveliness of the inner-city (the vitality of the inner-city and events),

4. Additional offers (additional services besides retail such as leisure or gastronomy),
5. Composition of retail spaces (the atmosphere within shops),
6. Trade structure (the offer and variety of retail),
7. Positioning of the city (the city in the wider context),
8. Economical perception (the living standard and image of the city),

Factors one to four are factors relating to the inner-city and the various functions it has to offer. Factors five and six are related to the retail offer, and factors seven and eight are factors that are related to the city itself. The results from the research of Planing et al. (2020) show that the variety of retail, social factors, proximity to living/working spaces, and the short distances within the inner-city are the most important factors for the attractiveness of the inner-city. This is in line with the findings of Van Dijck (2014) and De Nisco & Warnaby (2014), who researched the influence of atmospherics of inner-city shopping areas on the experiential value of consumers and consumers' emotions and approach behaviour. In the study of Van Dijck (2014), exterior characteristics of inner-city retail districts are found to be the most important factors for consumers, including tenant variety, the impact of greenery, and the quality of the buildings' architecture. Tenant variety is also found to influence the consumers' affective perceptions and their actual shopping outcomes (De Nisco & Warnaby, 2014). The attractiveness of the city is important for attracting visitors and investments to the city. But the characteristics of the city structure itself are also important for attracting visitors, investments, and also businesses.

#### 2.1.2 Unique image

Many studies argue that to preserve the inner-cities' vitality and viability, cities or inner-cities should provide and preserve their own unique identity and authenticity (Platform 31, 2018; Platform 31, 2016; Planing et al., 2020). By pursuing this own personal character of a city, it should always be noted that each inner-city is unique and the same approach for developing this unique identity cannot just be used for another city or as stated by Platform31 (2016): "*One size does not fit all*" (Platform 31, 2016). Providing a unique and authentic inner-city helps to offer the broad experience with a diverse set of functions that belongs to the current desired image of cities as "places to be", which attracts more people nowadays. This is not only important for attracting tourists and visitors but also for knowledge workers and investors. Moreover, the uniqueness and authenticity of the inner-city have a large impact on the image of the whole city or urban area, which is important because the image of a city is part of a large set of indicators for the attractiveness of a city (Dolega & Celinska-Janowicz, 2015; Planing et al., 2020).

#### 2.1.3 Agglomeration benefits

Cities are prominent places for business and leisure and play a fundamental role in the national economy (McGough & Thomas, 2014). Moreover, inner-cities have a fundamental role in the economic activities of a city. This is partly because of the agglomeration benefits for businesses and retailers coming from the urban area. The agglomeration benefits for businesses are slightly different compared to retailers. While businesses also benefit from a compact inner-city, this is more related to the possibility to share input and infrastructure, the possibility to recruit from a deep pool of workers, and knowledge spillover with other businesses (McGough & Thomas, 2014; Swinney & Sivaev, 2013). Moreover, the demand for office space for businesses in inner-cities is very high because of the central location and (often) good multimodal accessibility (Van Zwet & Weck, 2019).

#### 2.1.4 Recent developments

Recently a lot of attention has been given to the Covid-19 pandemic and the effects of the pandemic on the economic functioning of cities and retailers. The Coronavirus and the measures undertaken by the national governments to tackle the virus have had a large impact on them. Because of the first lockdown in March 2020 in the Netherlands, the gastronomy sector had to close, and retailers needed to take measures according to the regulations established by the central government. The number of people visiting inner-cities has decreased drastically in this period, to about 20% of the number before the lockdown (Slob, 2020). However, after the lockdown ended, it seemed like the number of visitors in the inner-cities would slowly return to the old levels. Until July, when the number of visitors dropped (caused by the heatwave, according to Slob) and thereafter stabilised in September. Because of the second lockdown in December 2020, the number of visitors has declined again. This decrease in foot traffic in cities has caused major problems for retailers and gastronomy. Fortunately, because of the support measures from the government, the number of vacancies this year is similar to 2019, with an average increase in the vacancy of 0,5% per month in 2019 and a little less in the first eight months in 2020; from a total of 7,3% to 7,5% (Slob, 2020; Slob, 2021; Huisman, 2021). While this number of vacant units is stable, it is expected that the retail vacancy will increase in 2022 (Hanff, 2020; Evers et al., 2020). Moreover, the ongoing trend of more people living in inner-cities has continued and can contribute to solving the vacancy by transforming retail space into living space (Hanff, 2020; Hanff & Paling, 2020; Evers et al., 2020). This completes the circle, with cities first being “*places to buy*”, followed by “*places to be*” (discussed earlier), and now becoming “*places to live*” (Slob, 2020).

#### 2.1.5 Inner-city management

Inner-city management, or town centre management, is focused on increasing the economic functioning of inner-cities. It has undergone many changes in the past few decades. At first, in the early 1980s, it was mainly oriented toward improving the retail structure in inner-cities because cities were seen as predominantly shopping destinations (Coca-Stefaniak, 2014; Otsuka & Reeve, 2007). The main threat for inner-city management, in the English context, was the increasing competition from out-of- and edge-of-town shopping centres and retail parks (Coca-Stefaniak, 2014; Coca-Stefaniak et al., 2009; Otsuka & Reeve, 2007). However, more recent definitions of inner-city management also include physical and socio-economic values of the inner-city such as the definition from Warnaby et al. (1998): “*Town centre management is the search for competitive advantage through the maintenance and/or strategic development of both public and private areas and interests within town centres, initiated and undertaken by stakeholders drawn from a combination of the public, private and voluntary sector.*” (Warnaby et al., 1998). This definition shows that the public realm in inner-cities is gaining attention in later years within inner-city management, but moreover, it stipulates the importance of collaboration between multiple stakeholders in the private, public and voluntary sectors.

Forms of inner-city management have existed in the Netherlands since the end of the 1980s in larger towns and cities (Schutter, 2009; Menger et al., 2005). The development of inner-city management in the Netherlands is similar to the English context mentioned above. However, the Netherlands, like countries such as Germany and Austria, included place branding earlier in the inner-city management philosophy, underlining the importance of the inner-city as an attractive space for visitors (Coca-Stefaniak, 2014). Moreover, the threat of increasing competition from out-of- and edge-of-town shopping centres was much lower in the Netherlands than in the English context because the spatial planning policy in the Netherlands has always been focused on the protection of the existing retail structure in inner-cities (van der Krabben, 2009). The development of inner-city management in European countries followed the first developments of collaboration seen in America in the 1970s. The first business improvement district (BID) was founded in Toronto, Canada, closely followed by business



improvement districts in North-America (Menger et al., 2005). The philosophy of these BID's in Canada and North-America was roughly the same as the first inner-city management developments in Europe with one exception; a financial contribution of entrepreneurs (Schutter, 2009). Furthermore, the role of the municipality in inner-city management in the Netherlands was much greater than the role of the municipality in the BID's in Canada and North-America. This is because in the Netherlands the general belief is that the government (or municipality) is responsible for basic quality of the public space in contrast to North-America where the motto is: 'The less the better' (Menger et al., 2005).

While in the early years the inner-city management was often somewhat informal, the collaboration in inner-cities has professionalised in recent years into formal and commercial forms of inner-city management (Platform Binnenstadsmanagement, 2020). Platform Binnenstadsmanagement currently uses the following definition for inner-city management: *"a structural collaboration of public and private parties in an inner-city, based on equality, with a joint commitment of resources, in order to strengthen the attractiveness and thus the economic functioning of the centre"* (Platform Binnenstadsmanagement, 2020). This immediately shows the most important objectives for inner-city management nowadays, which are strengthening the economic functioning and increasing the attractiveness of the inner-city. Promoting the inner-city and promoting communication, trust, and understanding between all stakeholders are the third and fourth most common objectives for inner-city management. These core objectives are the main tools to tackle current threats to the inner-city, such as reducing vacancy, making the shopping area more compact, and transforming vacant properties. To achieve these goals, it is important to include all stakeholders involved. Originally, the three main stakeholders in inner-city management are the municipality, retailers/entrepreneurs, and property owners. However, in recent years the municipality is less active as the main stakeholder in inner-city management and acts more as an advisor to the inner-city management, but with specific tasks like keeping the public space safe and modern. Instead, other stakeholders such as residents, the hospitality industry, and cultural organisations are becoming increasingly involved in inner-city management. This way, the municipality can fulfil its role as representative of the general interest better, and the broader involvement of stakeholders is positive given the greater diversity of the current tasks in the inner-city. Working efficient and with respect for each other's roles and positions is key for a good governance system between the stakeholders.

## 2.2 Economic functioning in the inner-city

The functioning of an inner-cities' economic activities is a complex and diverse system, with many stakeholders involved and which can be measured through various indicators. The retail landscape within these economic activities is equally complex (Dolega & Lord, 2020) because it is constantly evolving and is continuously affected by, as Dolega and Celinska-Janowicz (2015) describe it, unexpected shocks and gradual processes of change, or 'slow burns'. The economic functioning of the retail landscape can be measured by various indicators. Firstly, there are indicators that can be directly measured, such as revenue, foot traffic, and vacancy, but there are also indicators that can be derived from these 'primary' indicators; floor space productivity, employment, and labour productivity (Platform de Nieuwe Winkelstraat, 2020).

### 2.2.1 Revenue

Revenue is defined as: *"Income generated from normal business operations and includes discounts and deductions for returned merchandise. It is the top line or gross income figure from which costs are subtracted to determine net income. Sales Revenue = Sales Price × Number of Units Sold (Investopedia, 2020)"* by Investopedia. Whereas this definition is quite basic and straightforward, as a consequence of the rise of internet shopping, this definition has become more multi-faceted. Internet shopping is increasingly more popular in the last couple of years, and the number of online sales has therefore been growing in recent years (House of Commons, 2019; Rao, 2019; Dolega & Lord, 2020; CBS, 2020a). Because of this increasing number of sales via online channels, the actual amount of revenue achieved by individual stores is often difficult to interpret. This is because of the various combinations of offline and online stores available. First, there were solely offline retailers, or brick-and-mortar retailers, followed by the multichannel retailers who combine the offline and online channels. Nowadays, because of the digitalisation and the integration of mobile channels and social media in online and offline retailing, retail is moving from a multi-channel strategy to an omnichannel retailing strategy. Omni-channel retailing gives the consumer an integrated sales experience in which the advantages of the brick-and-mortar store are combined with the advantages of online shopping (Lazaris & Vrechopoulos, 2014; Verhoef et al., 2015). Moreover, the allocation of revenue from online sources compared to offline sources can differentiate for independent retailers and franchisees. This is because oftentimes, franchisors do not have an individual webshop for each location but rather have one overarching webshop for all franchisees. Therefore, determining the value of an individual affiliate concerning the total revenue of a franchisor is rather difficult.

While determining the allocation of online and offline sales could prove difficult for some retailers, the basic principles for the financial picture of a company are, more or less, the same. The financial part of a company, as explained by the Chambre of Commerce (KvK, 2019) in their 'Geldboek voor ondernemers', is part of a company's business plan. The financial plan can be used by companies to determine if their business plan is financially feasible and can therefore provide insight into the question if a company is financially stable or resilient (Zanen, 2020). A financial plan of a company comprises several partial budgets: the investment budget, financing budget, operating budget, and liquidity budget. The investment- and financing budget are used for getting insight into the required investments for the start-up of a company and how it is financed. The operating budget is used for visualising the expected costs and revenues in a specific period. Lastly, the liquidity budget gives insight into the amount of money available for payment obligations (KvK, 2019). Table 1 shows the operating budget as specified by the KvK (2019). The operating budget consists of several components; revenue, variable costs (cost of goods sold, promotion, transportation, personnel costs), fixed costs (rent, administration, insurances), non-cash expenses (depreciation), and non-operating expenses (interest

and bank costs). All the figures in the operating budget are exclusive of Value Added Tax (VAT). This is most common for these types of budgets because oftentimes, VAT is charged over supplier costs. However, this VAT can generally be deducted from the bill because the VAT can be charged as input tax (Belastingdienst, 2020).

Table 1, Operating budget for companies.

Operating budget	
<b>Revenue (offline)</b>	€
<b>Revenue (online)</b>	€
Minus: Cost of goods sold	€
<hr/>	
<b>Gross profit</b>	€
Depreciation	€
Rent	€
Promotion	€
Transportation	€
Administration	€
Personnel costs	€
Interest and bank costs	€
Insurances	€
Other expenses	€
<hr/>	
<b>Minus: Total costs</b>	€
<hr/>	
<b>Net profit</b>	€

Getting insight into these financial figures gives a more complete overview of the economic performance of a company than mere data about the revenue of a company. This is because a company's economic performance is a complex system dependent on more factors than just revenue. For instance, when the revenue of a company is increasing, this does not necessarily mean that the company is performing better financially. If the revenue is increasing, but the costs are increasing relatively more, this will not result in better performance of the company. Moreover, revenue streams from similar retailers can be very different depending on where they are located geographically. A retailer located in a very urbanised area, such as a large city, will receive more footfall and therefore generate more revenue (Dolega & Lord, 2020) than retailers located in smaller municipalities (assuming that the conversion rate of the customers is the same). But again, this does not necessarily mean that this retailer in the highly urbanised area is performing better financially than the retailer in the less urbanised area.

### 2.2.2 Alternative indicators

This shows that mere data about revenue streams are not necessarily enough to determine the financial stability of a company or the stability of companies in the inner-city in general. The financial stability of a company is a complex system and is dependent on not just income flows but is also dependent on many costs from different sources. Revenue is not the only indicator of economic performance. Various alternative indicators can be used to reflect the economic performance of a company or a region. Below, some of these will be discussed.

#### 2.2.2.1 Foot traffic

A straightforward indicator for economic performance is the amount of foot traffic or footfall a region generates. Koster et al. (2019) define footfall as the number of pedestrians that pass by a shop. Therefore, intuition suggests that more footfall in a retail centre will eventually result in more retail sales. Consumers are attracted to areas with many shops in close proximity, and therefore footfall is often higher in areas with high retail density. This is evidenced by Perdikaki et al. (2012) in their study about the effects of footfall on retail sales and the retail conversion rate. They state that footfall is an important measure for the number of sales made in stores, and therefore retailers should invest in marketing activities to attract more customers. The results from their research undertaken in the United States show that increasing average foot traffic per hour by one unit will result in an increase ranging from \$8,14 to \$11,80 in average sales volume per hour (Perdikaki et al., 2012). Footfall is therefore highly correlated to revenue development. Conversely, with the increasing importance and relevance of online shopping, the physical place of a retail store becomes less important for some retail sectors. This will be discussed in section 2.2.5.1 Usage of the online channel.

#### 2.2.2.2 Vacancy

Multiple studies have argued that vacancy can be used as an indicator of economic performance in town centres (Cachinho, 2014; Dolega & Lord, 2020; Wrigley & Dolega, 2011). Factors related to vacancies such as retail and service-unit closures and empty units are also given as indicators for economic performance (Wrigley & Dolega, 2011). However, while the vacancy rate is a good measure for the economic performance of inner-cities, it should be noted that particularly the structural vacancy is insightful for economic performance (Dolega & Celinska-Janowicz, 2015; Dolega & Lord, 2020) and can be used to compare the economic health of retail centres. This is because the short-term vacancy is part of the dynamic retail environment and, therefore, not as detrimental as structural vacancy.

#### 2.2.2.3 Employment, labour productivity, and floor space productivity

Employment can also serve as an alternative indicator for economic performance. When specific regions are functioning well, thus increasing current business, labour productivity should increase, or extra personnel can be hired, thus increasing employment (Platform de Nieuwe Winkelstraat, 2020). Moreover, employment is often an indicator for stimulating local economic development within municipalities, next to the number of inhabitants and touristic attractiveness (Platform 31, 2014). Floor space productivity is used in traditional calculations for the economic functioning of shopping areas. It is calculated by using a combination of consumers inside and outside the catchment area of a shopping area and average numbers for expenditures to calculate revenue, divided by the number of retail floor area. This floor space productivity can then be compared to a regional or national average to determine the possibility for retail expansion (Platform de Nieuwe Winkelstraat, 2020; van der Krabben, 2009).

#### 2.2.3 Retail resilience

These indicators can give insight into the economic performance of a retailer or a region. Alternatively, the economic performance of a company, in this instance a retailer, is described as retail resilience in recent literature. The term resilience has been used in many scientific disciplines. It has first been introduced by Holling (1973) as *“a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist”* in the ecological field. Later resilience gained attention in social science studies (Guimarães, 2018), but also in economics and human geography, which required the addition of socio-economic entities (Dolega & Celinska-Janowicz, 2015). The term resilience has been used most in ecology or socioecology and psychology, according to Pu and Qiu (2016). The literature in these various scientific fields shows a wide range of approaches to resilience. However, in general, three different interpretations can be recognised: engineering

resilience, ecological resilience, and adaptive resilience. Engineering resilience relates to the definition of Holling (1973), which focuses on the ability of systems to return to a state of balance after a shock. This interpretation is mainly used in physical sciences. Ecological resilience focuses on the scale of a shock or disturbance a system can absorb before it is destabilised and moves to a new configuration or equilibrium state, which has been adapted in the social and biological sciences. The third type of resilience, adaptive resilience, relates to the anticipatory or reactive reorganisation of the form and function of a system in which the system minimises the impact of a destabilising shock. This interpretation is mainly used in complex systems theory (Barata-Salgueiro & Guimarães, 2020; Dolega & Celinska-Janowicz, 2015; Guimarães, 2018; Rao, 2019; Wrigley & Dolega, 2011). The adaptive resilience of systems is the most important interpretation for urban systems and retail systems because these systems are constantly changing and therefore need to adapt themselves to remain competitive and face technological challenges. Retail resilience has been defined in the study of Erkip et al. (2014) as: *“the ability of different types of retailing to adapt to changes, crises or shocks that challenge the system’s equilibrium without failing to perform its functions in a sustainable way”* Erkip et al. (2014). These changes, crises, or shocks have been described by Pendall et al. (2019) in their study with two types of disturbances for retail systems: Shocks and ‘slow burns’. Shocks are related to discrete events such as disasters, and often regions will recover from them and return to their pre-shock state instead of transforming into new regions, which relates to the ecological resilience of systems. In contrast, slow burns are long-term processes that have the capacity to gradually transform existing economic systems. Therefore, regions often transform in light of these slow burns and adapt to the new situation. Slow burns, therefore, relate to the adaptive capacity of retailers and regions, as explained by the adaptive resilience from the literature.

Three key factors that influence retail resilience have been identified in scientific literature by Rao, (2019): Control, tenant mix, and typological mix. These factors relate to the urban system being adaptive and resilient (control), consisting of the right tenant mix (retail/gastronomy/leisure) and a beneficial typological mix; as various urban structures can supplement and benefit from each other such as the main street and a suburban mall in close proximity. These key factors are supported by the research of Dolega & Celinska-Janowicz, (2015), who divide retail resilience into two topics; retail as an economic sector and retail as a (geographic) space. In this research, retail as an economic sector corresponds to the key factor tenant mix, and retail as a geographic space relates to the typological mix of Rao, (2019). Dolega & Celinska-Janowicz, (2015) state that an urban retail system consisting of all kinds of retail or consisting of just a few broader types can both be resilient. However, the definition of resilience will be different for these two types of urban retail systems. Retail as a geographic space is related to the geographic position of retail in urban areas. Oftentimes this is the central part of an urban area, or the inner-city, in which retail is concentrated. Moreover, Dolega & Celinska-Janowicz (2015) report that the economic aspect is not the only aspect of overall inner-city performance. They state that, for example, the quality of the public space, tourist attractiveness, and the image of a town or city have also influence on the inner-city performance, which is in line with the findings of (Planing et al., 2020) discussed in section 2.1 ‘The inner-city and inner-city management’. This resilience of retailers and the overall town centre is important for the vitality and viability of the town centres (Dolega & Celinska-Janowicz, 2015). Another important factor for the resilience of town centres is competitiveness, which has a complex relation with resilience. Competitiveness can lead to a strong and diverse business network because of the competition between businesses which drives technological change and innovation. Therefore competition helps support regional resilience (Bristow, 2010).

## 2.2.4 Threats for the retail system

Dolega and Celinska-Janowicz (2015) distinguish four trends that can be related to slow burns, described earlier, which can constitute a threat to the current retail system. The adaptive resilience of retailers will be an important measure to counteract these threats.

### 2.2.4.1 Rise of online shopping

The most prominent threat for retailers in the inner-city is the rise of online shopping. As mentioned earlier, the share of online shopping compared to traditional, physical shopping has been rising in recent years (Weltevreden, 2007; Mosquera et al., 2018; Reinartz et al., 2019; Verhoef et al., 2015). The CBS conducts yearly questionnaires to people aged 12 and older with questions about whether or not the person has used the internet for shopping in the last 12 months. This research uses 13 categories of products, and for all 13 categories, the number of people buying online has been growing in the period between 2012 and 2019 (CBS Statline, 2019). However, the outcomes differ per product group. In the research, the product group clothing or sports goods is most frequently bought online (55.0% of people) followed by travel and accommodations (51.5%). Least online bought product groups are medicines (9.2%) and digital study or learning materials (13,7%). Overall, the percentage of people buying online has risen from 64.0% to 79.4% between 2012 and 2019 (see figure 2).

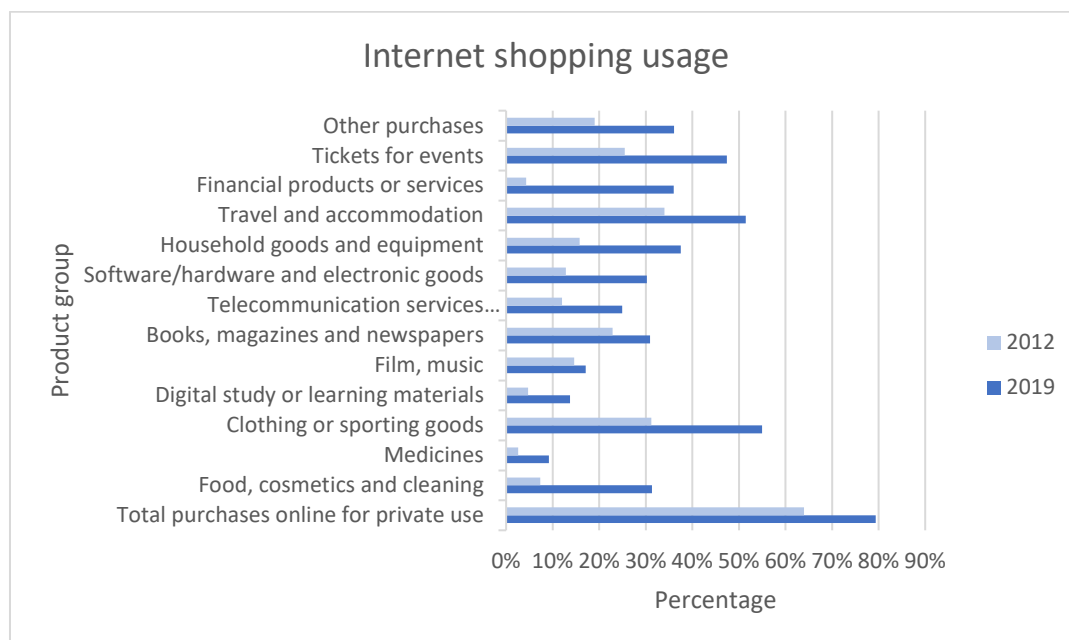


Figure 2, Internet shopping usage for people aged 12 years and older. 2012 Compared to 2019.

When analysing the number of online sales compared to the total retail sales, the share of online sales is still relatively small. However, because the number of people buying online in recent years has been increasing, the share of online sales has been rising as well. The total online sales have increased from 11% in 2015 to 18% in 2019 in the Netherlands (Retail insiders, n.d.). Within these results, again, the share of online sales differs between product groups. The largest share of online sales in this research is visible in media & entertainment (58%) and information technology (IT) (55%). The product groups with the lowest share of online sales are Food/nearfood (5%), Health and beauty (13%), and sport & recreation (15%).

### 2.2.4.2 Changing consumer behaviour

The rise in the number of online sales is partly due to changing consumer behaviour, which is the following threat to retailers in the inner-city. The main reasons for changing consumer behaviour in the past years are the amount of information that is available to them (Alexander & Blazquez, 2019;

Clemons, 2014; Reinartz et al., 2019) and the role that physical retail stores play to the consumer (Alexander & Blazquez, 2019; Cachinho, 2014; Mosquera, Olarte-Pascual, et al., 2018). Because of the rise of e-commerce and digitalisation, with, for example, the development of mobile technology, consumers have huge amounts of information readily available to them at any place and any time. This has changed their shopping behaviour in the way that they can make more informed choices about the various kinds of products available and can more precisely search for the product that best suits them (Clemons, 2014).

Nowadays, customers can search online for information while being inside a physical store to substitute products and compare prices with similar products. This activity can be described as showrooming; customers searching for products in physical stores, but ultimately using the online channel to search for comparable products and buying these products online. The opposite of showrooming is webrooming which is the usage of the online channel to gather information about a product and then buy it in a physical store. This is described as the main omnichannel behaviour (Mosquera, Olarte-Pascual, et al., 2018). These two practices are related to the changing role of physical retailing to their customers. Because online retailing gives consumers more convenience and consumers are therefore more likely to use the online channel (Reinartz et al., 2019), as evidenced by the number from the CBS earlier, the physical retailing environment has to adapt to this new situation. (Mosquera, Olarte-Pascual, et al., 2018). Various researchers have recognised the changing role of physical retailing. Physical retailing should focus on the aspects that are missing in online retailing. Therefore physical retailing should focus on the customer experience (Alexander & Blazquez, 2019; Cachinho, 2014; Mosquera, Olarte-pascual, et al., 2018; Patten et al., 2020; Reinartz et al., 2019) and embrace the development of omnichannel retailing. Many technological advancements can increase the customer experience. However, increasing the customer experience is not just affected by retailing. The hospitality sector and leisure activities in the inner-city also play an important role in this. These will be elaborated on later in the literature study.

#### *2.2.4.3 Changing demographics*

The amount of online-channel usage by consumers differs according to their age. Yearly research from CBS shows that older people (aged 75 years and older) use the online channel less frequently than younger people. 62.5% Of people aged between 65 and 75 used the online channel in 2019. People aged 75 years and older use the online channel even less, with 29.9% (CBS Statline, 2019). The age group that shops the most online are aged between 18 and 25 years (93.4%). However, this number is increasing in recent years, as can be seen in figure 3. Recent numbers from 2020 show an even larger share of online shopping for these older age groups. 78.2% Of people aged between 65 and 75, and 44.5% of people aged 75 years and older shop online, according to CBS (CBS Statline, 2020a). This shows that internet shopping is increasingly more important across all age groups in the Netherlands, and therefore demographic change is identified as another important threat to conventional retailing.

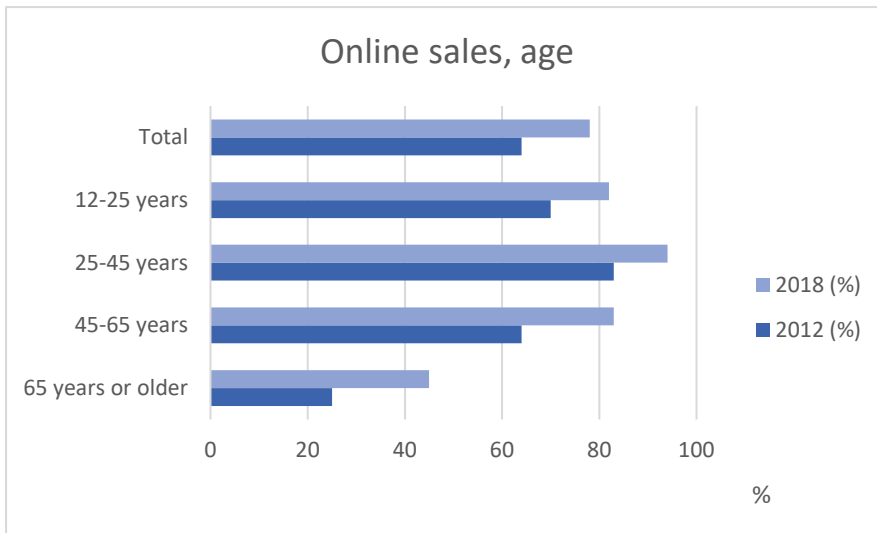


Figure 3, Online purchases sorted into age groups. CBS (2020).

On January 1, 2020, the Netherlands consisted of 17.407.585 inhabitants (CBS Statline, 2020b). 19.5% Of this population is aged 65 and older. The population is expected to grow in the future, mainly because of migration but also because of the increasing life expectancy of the population (CBS, 2020b). With the growing population, the share of people aged 65 years and older will also rise. While this share was 19.5% in 2020, the share of people aged 65 years and older is expected to increase to 25% around 2040, caused by the post-war baby boom and the large number of births in the 1960s, as well as by the increasing life expectancy (see figures 4 and 5). Because older people buy less frequently via online channels, the ageing of the Dutch population should be carefully monitored. Moreover, while the share of older people using the online channel is increasing (CBS Statline, 2020a), in general, the older generation has a greater need for accessibility, safety, and helpful personnel. The demand for service and attention is important for this older-aged group because they value luxury, comfort, and convenience (Platform 31, 2014).

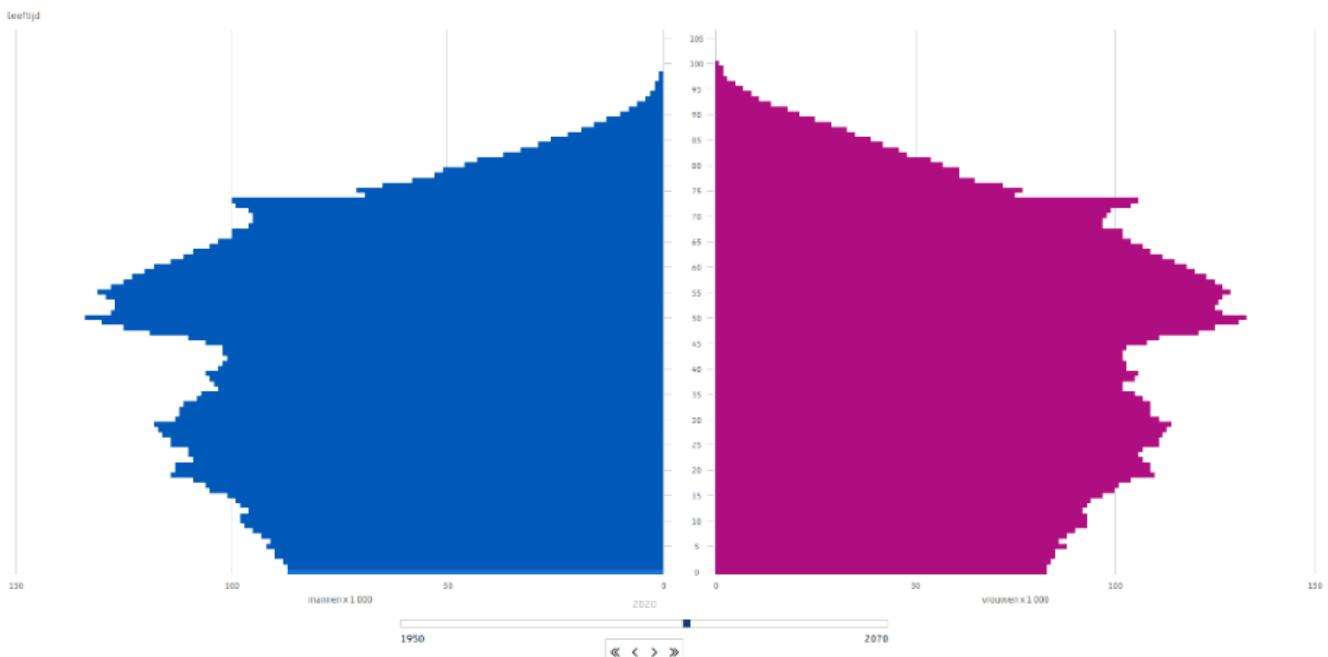


Figure 4, Population composition of the Netherlands in 2020. CBS (2020).



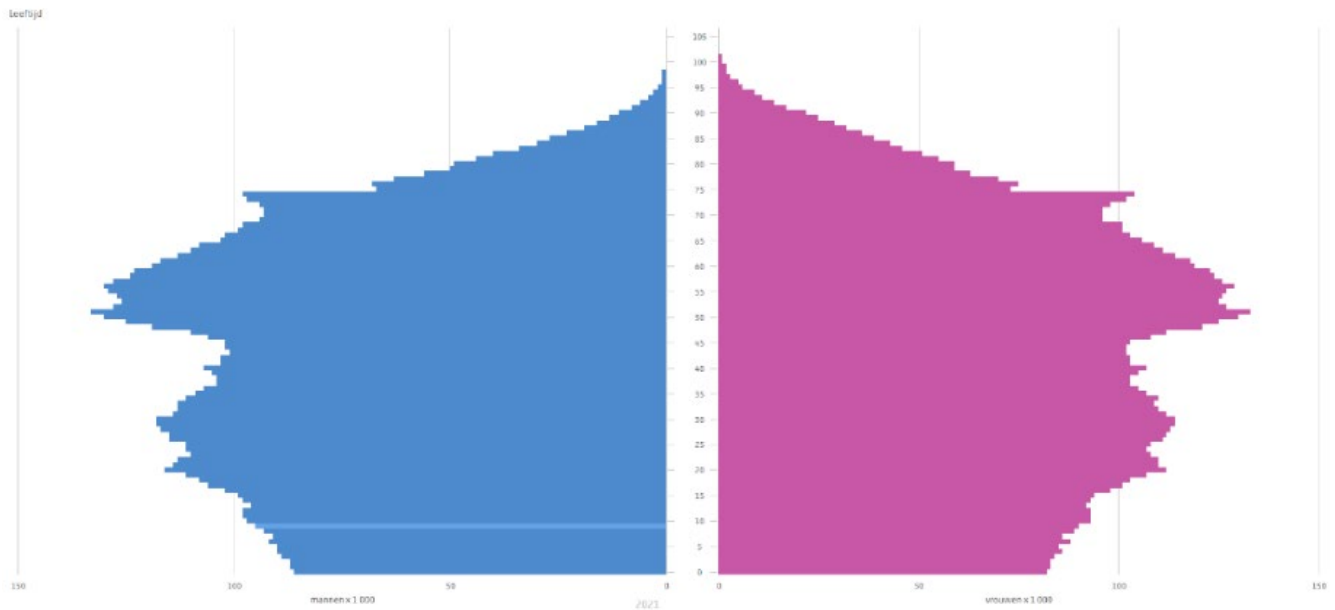


Figure 5, Population composition of the Netherlands in 2040. CBS (2020).

#### 2.2.4.4 Competition from large-scale retailers

The fourth long-term threat for urban retailing identified by Dolega and Celinska-Janowicz (2015) is the impact of competition from large-scale retailers, which is a threat that is mentioned in many studies (Coca-Stefaniak et al., 2009; Källström et al., 2019; Nisco et al., 2008; Otsuka & Reeve, 2007; Warnaby et al., 2005; Teller et al., 2016). As stated by Dolega and Celinska-Janowicz (2015), the impact of this competition is related to the strictness of the spatial planning regulations of a country and their attitude towards large-scale retailing. In contrast to many other (European) countries, the spatial planning policy in the Netherlands has always been focused on the protection of the existing retail structure (van der Krabben, 2009). Evers (2002) describes it as follows: *“While most other Western nations have, at one time or another, allowed retailers to construct large-scale hypermarkets and shopping malls outside or at the edges of major cities, the Dutch planning system has consistently frustrated, blocked, and redirected this development”* (Evers, 2002). The share of large-scale retailers is therefore considerably lower in the Netherlands than in other countries, and as a result, the competitive threat of large-scale retailers on the edge or outside inner-cities is lower. However, while the threat from large-scale retailers outside inner-cities is low, there is another threat in inner-cities related to large scale retailers namely the threat for the inner-city to become monotonous because of franchising. Locatus has information about all retailers, hospitality, and services in the Netherlands which can be used to assess the trend in franchising in the past years. The number of franchisees in has been increasing in inner-cities and large main shopping areas. These two groups represent the inner-cities of large and middle sized cities respectively. Appendix 1 and 2 shows which cities are included for each category (and based on which factors the classification is made), as well as which branches belong to each sector. However, while the trend of increasing franchisees in inner-cities and large main shopping areas is also visible for inner-cities in most recent years, the number of franchisees in large main shopping areas is decreasing in recent years (see tables 2 and 3). This difference is partly due to international franchisors settling in inner-cities (Retailtrends, 2016). As can be seen, the affiliate rate for daily retail and fashion & luxury is the highest in inner-cities and large main shopping areas in the Netherlands. A rising number of franchisees has some advantages as well as some disadvantages. Franchisees often are less sensitive and are less likely to go bankrupt in times of economic decline. Moreover, large franchisees attract many customers because they are familiar to the consumer, and

because of their economies of scale, they can often offer their products for lower prices than smaller, independent retailers. This is mainly advantageous for the municipality and property owners because it gives more certainty than independent retailers who are more vulnerable to the cyclical fluctuations (L'Ortye, 2011). On the other side, because the number of franchisees in inner-cities is increasing, cities can become monotonous and lose their unique identity and authenticity (Platform 31, 2014). In addition, because franchisors want to establish themselves in places where customer flows are the highest (often the inner-city area) combined with the scarcity of retail properties, resulting in an increase in rental prices of these properties. This makes it increasingly difficult for independent retailers to establish themselves in inner-cities (L'Ortye, 2011).

Table 2, Relative number of franchisees compared to the total number of businesses in inner-cities between 2008-2021. (Locatus, 2021).

<b>Inner-cities</b>	<b>2008</b>	<b>2010</b>	<b>2012</b>	<b>2014</b>	<b>2016</b>	<b>2018</b>	<b>2020</b>	<b>2021</b>
Daily retail	38.1%	41.3%	43.1%	44.2%	43.8%	44.8%	45.6%	45.1%
Fashion & Luxury	33.9%	37.3%	39.9%	42.0%	42.1%	42.6%	44.3%	45.0%
Leisure time	33.1%	38.0%	40.7%	39.5%	35.7%	32.0%	33.2%	31.8%
In/around House	28.4%	31.9%	30.7%	29.8%	26.3%	24.7%	23.1%	23.5%
Other retail	9.5%	10.3%	10.9%	12.2%	10.9%	10.3%	10.5%	11.2%
Culture & Leisure	6.0%	8.9%	10.5%	33.1%	14.1%	13.7%	14.4%	14.5%
Hospitality	6.3%	7.3%	8.2%	9.5%	9.6%	9.9%	11.3%	12.0%
Crafts	6.2%	6.4%	7.5%	6.4%	6.4%	6.2%	5.9%	5.9%
Services	47.1%	46.9%	44.3%	43.9%	56.3%	36.7%	32.3%	32.2%

Table 3, Relative number of franchisees compared to the total number of businesses in large main shopping areas between 2008-2021. (Locatus, 2021).

<b>Main shopping area large</b>	<b>2008</b>	<b>2010</b>	<b>2012</b>	<b>2014</b>	<b>2016</b>	<b>2018</b>	<b>2020</b>	<b>2021</b>
Daily retail	46.8%	50.7%	50.3%	50.8%	50.8%	49.8%	52.1%	50.7%
Fashion & Luxury	44.6%	47.9%	49.1%	49.4%	48.5%	47.8%	48.4%	47.4%
Leisure time	43.9%	51.3%	50.4%	47.7%	47.1%	43.9%	44.2%	40.9%
In/around House	38.7%	42.4%	41.9%	41.0%	37.5%	31.7%	29.9%	30.2%
Other retail	18.8%	24.4%	22.6%	28.8%	26.7%	24.9%	25.8%	25.3%
Culture & Leisure	9.4%	12.5%	53.6%	14.5%	14.3%	15.6%	16.7%	16.4%
Hospitality	6.3%	7.6%	7.9%	8.6%	8.9%	8.7%	10.4%	10.5%
Crafts	8.8%	9.3%	9.3%	8.6%	8.4%	7.6%	6.3%	5.9%
Services	58.0%	58.1%	58.5%	57.5%	58.0%	54.0%	48.7%	46.4%

#### 2.2.4.5 Scattered ownership

Another threat visible in the Dutch inner-cities to the retail system is not about the exploitation of retail but the ownership of the buildings. Ownership of buildings in general, not only retail, consists of many different parties; large assets are often held by professional commercial owners, but smaller assets or individual shops are often owned by individual owners. Because the ownership of all assets is divided over multiple parties, referred to as fragmented ownership, it is difficult to create a 'coordinated response' with all relevant parties to challenges faced by towns and inner-cities (House of Commons, 2019; Horst, 2015).

### 2.2.5 Opportunities for the retail system

The threats mentioned above have a large impact on the urban retail system. To face these challenges, the adaptive resilience of retailers will be tested. As stated earlier, adaptive resilience is the adaptive capability of a system in which the system minimises the impact of a destabilising shock. Various factors can have a positive effect on the resilience of retailers, which will be discussed below.

#### *2.2.5.1 Usage of the online channel*

While the rise of internet shopping forms a threat to the current retail system, the retail system can adapt to this new situation, especially in light of the developments in omnichannel retailing. Retail has always been a rapidly evolving landscape, driven by the needs and desires of their customers. The rise in usage of the online channel can be used to the advantage of entrepreneurs. As is stated in an article by van Lieshout & Simons (2021), the online channel offers several chances for businesses: The online channel is an extension to the offline service because it can save the consumer time and therefore offers convenience. Companies can also more easily be found online via the internet and social media, and are therefore not completely dependent on consumers walking past the business. Finally, showrooming can be a positive development for businesses. Because when consumers search for products in the physical store and thereafter buy products online, less floor space and less warehouse space is needed in the physical store. Therefore, the physical store can act as a showroom for products without having all products available in-store because they can be bought online, thus embracing an omnichannel retailing environment in which the offline and online channels are integrated to provide a seamless experience to the customer. Moreover, while the economic value of a certain place in the inner-city is still there, this physical exposure doesn't always lead to direct physical sales anymore but leads to online sales in the long term. Therefore, new types of retailers start opening brand- and concept stores on high traffic locations in inner-cities like Tesla, Kwantum and other classical periphery retail.

#### *2.2.5.2 Customer segmentation*

Understanding the customer, and especially the customer behaviour can be important for designing suitable marketing strategies, which are essential because more suitable marketing strategies can have a positive influence on the purchase decisions of customers (Gogoi, 2020). To understand customer behaviour, it is essential to know which types of customers there are and what their characteristics and preferences are. Typically, consumers are divided into two categories; "economic" and "recreational", or more commonly classified as; "hedonic" and "utilitarian" (Scarpi, 2012, 2020; Teller et al., 2008). In this classification, hedonic shoppers are customers who shop for fun, want to be immersed in the shopping experience, and pursue sensory gratification and fun rather than efficiency. This is in contrast to utilitarian shoppers who are more goal-oriented: they shop based on rational necessity and consider shopping a necessary task or an instrumental means to an end (Scarpi, 2012).

Patten et al. (2020) divide customers even further; they divide German multichannel fashion customers into four categories; hedonists, phlegmatic shoppers, smart shoppers, and connoisseurs. Each of these types of customers has its own social characteristics. The customers are studied according to their available income level and their involvement with fashion products in this study, emotional or rational. This classification can be related to the hedonic and utilitarian shopping types. The largest group of these four are the hedonists; they have a low or medium income and show high levels of emotional involvement in the study. Their main shopping interests are shopping experience and amusement as well as price-awareness. They value the efficiency of multi-channel retailing. The smallest group are the connoisseurs. They also show high emotional involvement but have a medium to high income level. This group is considered to be the most demanding customer because they have a clear idea of what they want beforehand and have high expectations of the service quality. Once they are satisfied with

their needs and desires, they are considered to be loyal customers. When they leave because of unsatisfying experiences, it is generally hard for retailers to win these customers back. The other two groups, smart- and phlegmatic shoppers, are of equal size in the sample and are both characterized by their rational involvement instead of emotional involvement. Smart shoppers have a low to medium income level. These characteristics make that this segment is the least loyal; they go to the retailer that offers them the lowest price. They, therefore, prefer the online channel instead of the offline channel because price comparisons can be made more easily online. Phlegmatic shoppers have a medium to high income level and are mainly driven by convenience. They are similar in behaviour to connoisseurs in the sense that they also have high expectations of the service quality and are loyal customers, except when they experience service failure.

Insight in customer segmentation offers useful information for managerial practice in retail. Retailers can positively influence their economic performance by responding to consumers' wishes and desires. For example, improving the ambience in-store with light and music can positively affect a (hedonic) customer's experience and therefore increase the chance that they will come back to the store. Hedonic shoppers are the dominant group in shopper segmentation (Patten et al., 2020; Scarpi, 2020). They show higher loyalty and spend, in general, the most in the retailing environment, both in monetary terms and in the number of items purchased as well as the average expense per product (Scarpi, 2020). For utilitarian shoppers, the main appeal is convenience, which the retailer can ensure by providing efficient store layouts and certain technological applications and innovations.

#### *2.2.5.3 Technology*

Integration of technology is not only important for fulfilling the needs of utilitarian shoppers, it is also essential in an omnichannel retailing environment. It can help retailers create a competitive advantage by increasing revenues and decreasing costs (Inman & Nikolova, 2017). Moreover, it can help retailers target customers more efficiently and with the right information for specific customer groups (Grewal et al., 2017). Many technological innovations have been implemented in the retailing environment in the past decades, such as barcode scanning in the 1970s. Current day technological innovations include mobile apps, self-checkout, Quevision (to monitor customer capacity), smart shelf technology, scan-and-go technologies (Grewal et al., 2017; Inman & Nikolova, 2017), and fitting-room technologies in fashion retailing (Mosquera, Olarte-Pascual, et al., 2018).

Mobile apps are very common nowadays and give the customer the ability to get tailored information about special deals and new collections. Retailers can use it to target customers more efficiently through several retail formats, such as mobile, smart TV, and smartwatches (Grewal et al., 2017; Mosquera, Olarte-Pascual et al., 2018). Self-checkout systems give customers the ability to scan and pay for their products themselves without a cashier. Customers like the convenience of the self-checkout, and it gives retailers the advantage of fewer labour costs for cashiers (Grewal et al., 2017; Inman & Nikolova, 2017). Quevision is a system with infrared sensors over doors and cash registers, predictive analytics, and real-time data feeds from point-of-sale systems that give retailers insight into how many cash registers are needed and the expected waiting times. This has reduced waiting times in-store, which increases the customer experience. Moreover, because shoppers spend less time waiting in line, they can spend more time shopping, which results in an increase in revenue (Grewal et al., 2017; Inman & Nikolova, 2017). Smart shelves detect if products are low on stock via weight sensors and can therefore reduce the number of out-of-stock products. Moreover, it allows the retailer to change the prices of products remotely via digital price tags. Scan-and-go technologies allow users to use their mobile phones to scan their products and pay later via the retailers' app (Grewal et al., 2017; Inman & Nikolova, 2017). Fitting-room technology gives customers the possibility to try on clothes virtually and browse through alternative products without leaving the fitting room, which adds to the

convenience of the customer, thereby improving the customer experience (Mosquera, Olarte-Pascual, et al., 2018).

The aforementioned technology adds to the customer experience: It integrates strengths of the online channel; the ability to browse through a wide offer of alternative products and compare prices, with strengths of the offline channel; the experience of trying on products and service from in-store personnel as well as the pleasure from shopping itself. Moreover, technology such as self-checkout and scan-to-go provides a more efficient shopping experience to customers. These two aspects to the customer experience, integration of the online- and offline channel and a more efficient shopping experience, relate to the preferences of respectively hedonic shoppers and utilitarian shoppers. However, increasing the customer experience is not only done in-store. Increasing the customer experience can also be tackled on a larger scale, e.g. the spatial distribution and function mix of the inner-city.

2.2.5.4 Hospitality and leisure

The hospitality and leisure sector can play an important role in improving the customer experience in inner-cities. In recent years, the number of businesses in the hospitality sector has been increasing, as can be seen in figure 6. The graph shows the number of hospitality businesses in central areas of cities in the Netherlands as defined by Locatus. Figure 6 shows an increasing trend for most inner-city areas for the number of hospitality businesses.

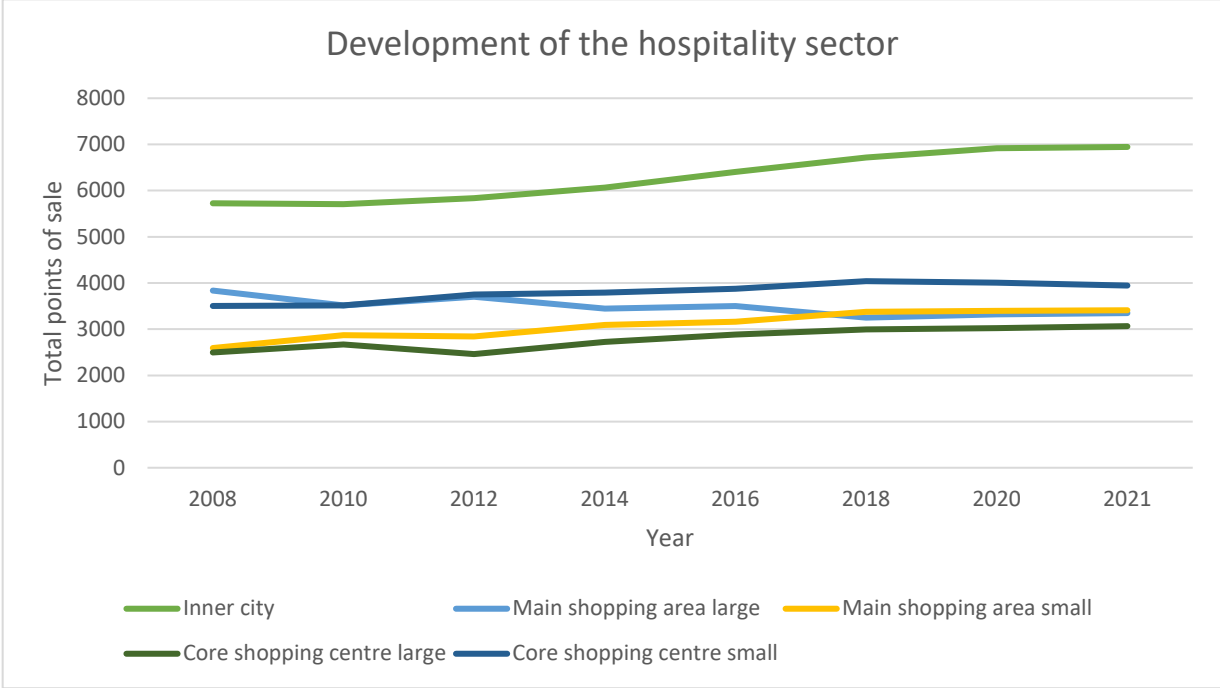


Figure 6, Development of the hospitality sector between 2008 and 2021 in various city centres. (Locatus, 2021).

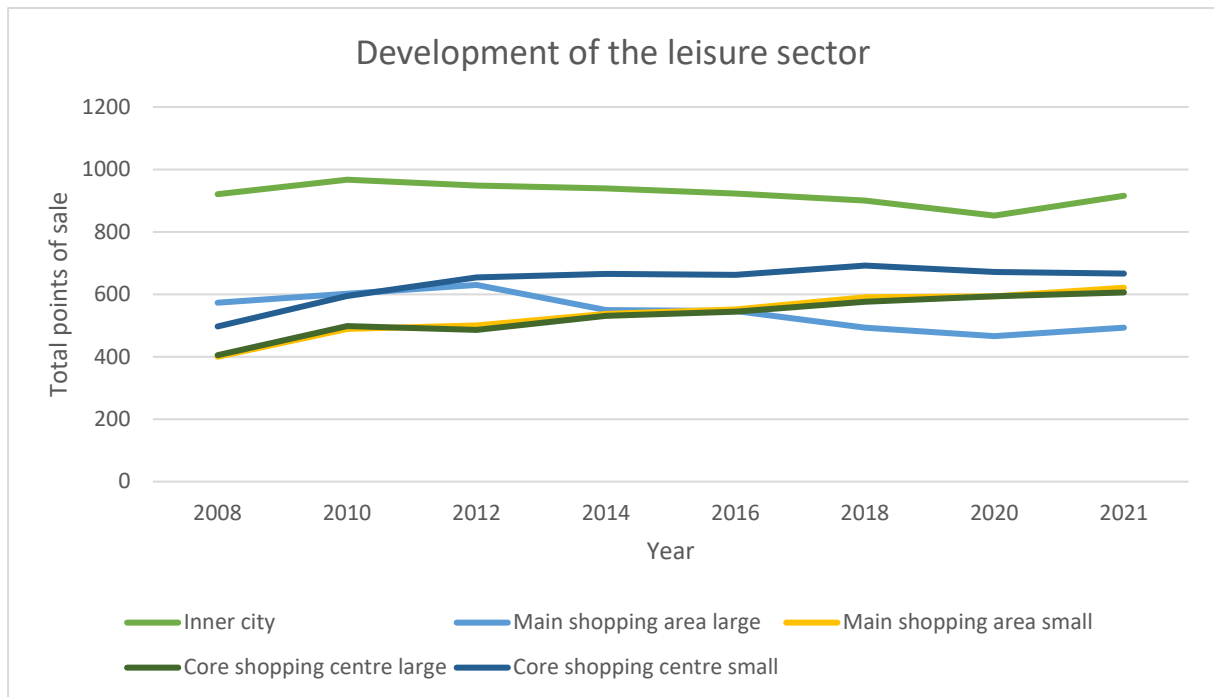


Figure 7, Development of the leisure sector between 2008 and 2021 in various city centres. (Locatus, 2021).

Mainly in inner-cities, the amount of hospitality has markedly increased. The number of businesses in the leisure sector is also (slightly) increasing for most inner-city areas, with some inner-city areas showing a slight decrease until 2020. The highest increase visible is in the small main shopping areas (see figure 7).

The increasing trend in the number of hospitality and, to a lesser extent, leisure businesses can be explained by the rising importance of improving the customer experience in inner-cities. This was already recognized in the publications 'De nieuwe binnenstad' and 'Winkelgebied van de toekomst' of Platform 31 in 2018 and 2014, respectively, and the research of Källström et al., in 2019. These publications state that the inner-city is going through a transition from mainly monofunctional, focused on retail, to a multifunctional and diverse inner-city focused on providing a complete experience for its visitors (Platform 31, 2018; 2014, Källström et al., 2019). This includes retailing for shopping, leisure for amusement, and hospitality for providing food and drinks. A good retailing environment can improve the number of (impulse) purchases by visitors (hedonistic behaviour of consumers) and the ambience of the city, and the presence of cafes, restaurants, and leisure can increase the duration of stay of visitors (Platform 31, 2014). This together makes the inner-city more attractive, which increases the willingness to go to the inner-city, thus increasing the service area of the inner-city.

#### 2.2.5.5 Offices

Offices can also contribute to the vibrancy of the inner-city because of the employment they bring to the inner-city. More employment means more people who have to come to the inner-city, thus increasing the amount of footfall in the inner-city (Swinney & Sivaev, 2013). The demand for office space in inner-cities is high in recent years because of the favourable economic conditions, the agglomeration effects (as discussed in the section inner-city) in inner-cities, and the central location of inner-cities (Van Zwet & Weck, 2019; Van der Heijde, 2021). This is also related to the changing role of offices due to the recent events evolving the Corona pandemic. Many employees have discovered working from home can be just as productive as working in the office. Therefore Van der Heijde (2021) and Verhaegh & Lokerse (2020) dispute whether the office will remain as a place to work or transform into a place to meet. While the demand for office space is high, the supply is very limited in recent

years because there is not much room for expansion in inner-cities for office space (Van Zwet & Weck, 2019).

#### 2.2.6 Other factors influencing revenue

Other factors that add to a higher customer experience and can therefore positively influence the revenue of retailers are, for instance, the opening hours of retailers (Parker et al., 2016; Platform 31, 2014; House of Commons, 2019). Because online shopping offers consumers the convenience of shopping at any given moment of the day, retail opening hours should try to match this and be adjusted to the shopping behaviour of customers (House of Commons, 2019). Increasingly more people shop on Sundays and between 18.00 and 22.00, so the opening hours of retail should be adjusted to these trends (Platform 31, 2014) to make sure that customers can go to stores at their desired time of day. Organising events in inner-cities can also positively influence the revenue of retailers because it can generate more footfall in the inner-cities (Platform 31, 2018; House of Commons, 2019). The same holds for (public) holidays such as Christmas- and easter (vacations), remembrance day (Chen & Zhou, 2020; Cools et al., 2009). However, it can also lead to nuisance for inhabitants or short-term accessibility hindrance for retailers (Platform 31, 2018). Therefore, they should be carefully organized. In-store events, such as physically engaging in sports exercises or special events to educate customers about products with, for example, fashion shows, are also suggested to improve retail sales (Sands et al., 2009).

A factor that cannot be influenced by retailers but can influence the amount of revenue is the weather. Weather is argued to have an impact on consumer behaviour because it can affect consumers' emotional states. More sunlight can lead to a better mood and a higher willingness to spend money. Their purchase method can differ, offline or online shopping because of sunny weather or heavy rain/snow, respectively. Lastly, it can affect product choice: Weather conditions can increase sales of weather- or seasonal-related products (WeatherAds, n.d.; Sandqvist & Siliverstovs, 2021). The findings of Sandqvist & Siliverstovs (2021) indicate that weather anomalies (monthly mean temperature, monthly mean rainfall, and monthly mean duration of sunshine) can cause substantial shifts in consumer expenditure, measured by monthly retail sales in Switzerland. The most important variable was found to be the monthly mean temperature in this research. Moreover, Franzoni & Pelizzari (2021) add that the weather can change the season length and quality for the tourism business and therefore affect the revenue in the hospitality industry. They state that: *"In particular, rainfall derivatives are designed to compensate for the lack of revenues caused by persistent rain, which causes customers to stay away from the affected tourist destinations, and has a negative impact on the business performances of hospitality firms in the medium/long-run"* (Franzoni & Pelizzari, 2021). Indicating that rainfall is also an important factor on the economic performance of retail and the hospitality sector.

#### 2.2.7 Turnover rental agreements

Insight into the revenue development of retailers and entrepreneurs and factors that influence the revenue can give rise to some interesting discussions, such as the usage of turnover rental agreements. This form of rental agreement can be both beneficial for retailers and entrepreneurs, as well as for property owners or investors.

In general, five types of rental agreements can be identified for retail properties: Flat rent, graduated rent, revaluated rent, indexed rent, and percentage rent. The most common type of rental agreement used in the Netherlands is the indexed rent. This contract usually consists of a rental period of five to ten years with a fixed base rental price that is indexed yearly to take inflation into account (Moerman, 2009). However, abroad, percentage rent, or turnover rent, has been around since the beginning of the previous century. The origin of turnover comes from America, where it initially was used in the mining industry, followed by kiosks along the railways. Mining operators had to pay a fixed percentage

(royalties) of the value of the mined raw materials to the landowners because there was uncertainty about the number of raw materials in the mine. This was also used in the initial phase of the railways, in which the property owners and investors of kiosks next to the railways used turnover rent to share in the profits if the revenues would increase due to a rising number of travellers (Buvelôt, 2007). Nowadays, turnover rent in The United States is the commonly used type of rental agreement (Horst, 2015). In England, the concept of turnover rent has been used before 1970 in kiosks and gas stations, but since 1970 project developers have introduced the turnover rent in the English rental market (Buvelôt, 2007). However, the number of turnover rental agreements in England is much lower than in The United States, as was evidenced by the study of Hendershott (2002). In this research, it is stated that in the United States, out of 5000 non-anchor store leases, 93% is based on 'overage clauses' or turnover rent, compared to 5% of United Kingdom leases. Moreover, turnover rent in high street locations outside of malls is non-existent (Hendershott, 2002). The same pattern can be seen in other European countries, where turnover rent is often applied to shopping centres, but it is not or only limited applied to (main) shopping streets in inner-cities (Horst, 2015).

Compared to the rest of Europe, the Netherlands is lagging behind in the use of turnover rent. Turnover rent is sometimes used in factory outlets, airports, train stations, and redeveloped or new shopping centres, but still on a very small scale, and in inner-cities, it is almost non-existent (Moerman, 2009; Horst, 2015). Turnover rental contracts can be divided into three types of agreements (HVAB Horeca Makelaardij, n.d.; Ashbolt, 2015; Horst, 2015):

1. Full turnover rent: A rent based solely on the revenue of a tenant. The rent is, therefore, very variable over the year.
2. Base rent with turnover component: The tenant pays a guaranteed base rent which is complemented with an additional rent based on a specific percentage of the company's revenue.
3. Full base rent / full turnover rent: A minimum base rent until an agreed-upon minimum percentage of the turnover. If the turnover does not exceed this amount, the tenant just pays the base rent without the turnover component.

These three kinds of rental agreements are the three general forms of turnover lease agreements. In practice, there are many variations on these contracts with different percentages for the base rent component and the minimum turnover. As mentioned earlier, the usage of turnover rental agreements is still scarce in the Netherlands for several reasons, the most important being legal obstructions and distrust between tenant and landlord. The distrust between tenant and landlord works two ways. Tenants do not like to share their revenue data because it is privacy-sensitive data that they have to entrust to their landlord. The landlord, on the other hand, has to trust that the information provided about the entrepreneur's revenue is correct. They often have the turnover data verified annually by an accountant, which is included in the rental agreement in advance (Buvelôt, 2007; Horst, 2015). Moreover, the rise of online shopping has further increased this obstacle. Growing online sales make it more difficult to define the exact revenue of a retailer because it can be unclear whether to include an online sale in the revenue of a bricks-and-mortar store. As Morrison states:

*"Without exception, a properly drafted definition of 'gross sales' will capture the conventional in-store sale as part of the calculation of gross sales. The problem occurs where the sale is an omnichannel transaction ordered from a retailer's dedicated e-commerce site but collected from the bricks-and-mortar store"* (Morrison, 2016).

In this article, it is argued which types of online retail sales should be included in the revenue of a company. It is advised that this is clearly defined in the lease to ensure that both parties are clear about



what is included and excluded from the revenue (Morrison, 2016). The distrust between landlord and tenant is much lower in countries such as Italy, France, and Sweden because there, the revenue data of tenants has to be shared periodically (monthly and quarterly) with their landlord, and this is incorporated in the turnover rental agreement, and tenants are therefore obligated to do so (Horst, 2015). Moreover, there are no legal obstructions for incorporating a turnover-based component in the lease agreement abroad, which is in contrast to the Netherlands. This other main obstacle for turnover rent in the Netherlands, legal obstructions, is mainly related to sections 7:303 and 7:304 of the Dutch Civil Code. As described by Jacobs & ter Meer, (2020):

*“If the tenant or landlord believes that the rent does not or no longer corresponds to the rent of comparable business premises on the premises, he may claim that the court should determine the rent in more detail. Depending on the circumstances, such a claim may lead to an increase or decrease in the rent. In short, a right that both parties can benefit from.”* (Jacobs & Ter Meer, 2020).

However, for turnover rental leases, this rent review can be problematic, as the court tends to convert the turnover lease into a fixed traditional lease (Horst, 2015). Therefore, landlords often decide to exclude the option for rent review in turnover leases at the subdistrict court which is also mentioned as an obstacle for the usage of turnover rent in the Netherlands (Horst, 2015).

### 2.3 Conclusion

The inner-city is the bustling heart of the city and plays an important part in the economic performance of the city because of the many job opportunities and businesses present. While inner-cities used to be *“places to buy”*, mainly focusing on retailing, they transformed into *“places to be”* where the inner-cities need to provide a diverse set of functions to provide a complete experience to consumers. More recently, inner-cities entered a new phase, *“place to live”*, where increasingly more people are living in inner-cities because of the transformation of vacant buildings into living space. Maintaining the vitality and liveability of the inner-city is of great importance to keep inner-cities attractive to visitors and thus maintaining or improving economic functioning of the centre. Inner-city management is one of the developments that address this by promoting public and private party collaboration in inner-cities with joint resources. Several factors influence the attractiveness and the economic functioning of inner-cities. The most important factors are tenant variety, mobility factors such as the short distances in the inner-city, and the atmospherics of the inner-city. Moreover, each city is unique and should therefore pursue its own unique identity and authenticity with its own approach because *“one size does not fit all”*.

The economic functioning in inner-cities is a complex and diverse system, with many stakeholders involved and influenced by various factors. Economic functioning can be measured by various indicators such as revenue, foot traffic, vacancy, employment, and labour- and floor space productivity. Revenue may be a straightforward option. However, measuring just revenue does not necessarily reflect the financial performance or stability of a company. To get more insight into this financial stability, the costs of the company should also be taken into account. A clear picture of a company's financial stability can contribute to more insight into the resilience of the company. Three sources of resilience can be distinguished from literature: Engineering resilience, ecological resilience, and adaptive resilience. Adaptive resilience, in particular, is the most important for retail resilience because of the constantly changing retail environment and the wishes and demands of the consumer. There are several threats, or 'slow burns' to the current retail system that have the potential to transform the entire system: The rise of online shopping, changing consumer behaviour, demographic changes, and increasing competition from large-scale retailers on the edge or out-of-town. Moreover, scattered ownership of properties in inner-cities can be difficult to create a coordinated response to challenges. While competition from large-scale retailers is not necessarily an issue in the Dutch retail

system, the other identified threats are clearly visible in the retail system and need to be addressed to control the impact they will have on the retail system.

Various developments or factors can contribute to controlling the impact of these threats. Online shopping can, for instance, also work to the advantage of retailers when used right. Other factors (positively) influencing the resilience of entrepreneurs are customer segmentation (knowing the customer and applying the right marketing techniques), integration of technology, retail opening hours, events & holidays, leisure & hospitality, and an uncontrollable factor, the weather. Moreover, the usage of turnover rental agreements has been discussed. In the Netherlands, these types of rental agreements are not commonly used in contrast to countries such as Italy, France, and Sweden, where these types of rental agreements are used more often. With these rental agreements, periodically sharing revenue data with landlords is included in the rental contracts, and therefore collecting revenue data is more common abroad. In the Netherlands, entrepreneurs are very reluctant with regard to sharing their revenue data, and landlords can be suspicious about the correctness of the data which creates distrust between the tenant and landlord. Distrust between tenant and landlord, combined with legal obstructions, are the main reasons that turnover rental agreements are scarcely used in the Netherlands. The literature review has been used to identify the most relevant factors that influence the revenue of retailers and entrepreneurs in the inner-city. They are shown in the conceptual framework presented in figure 8. With these factors known, more insight is given into the sub-question, *“What are relevant factors that have an influence on the revenue development of retailers and entrepreneurs in the inner-city?”* Moreover, the literature about retail resilience in inner-cities sheds light on the sub-question: *“What role do retailers and entrepreneurs play in the economic functioning of inner-cities?”* Because retailers and entrepreneurs in inner-cities form the backbone of the economic functioning in these areas, it is important to ensure their survivability by increasing their resilience.

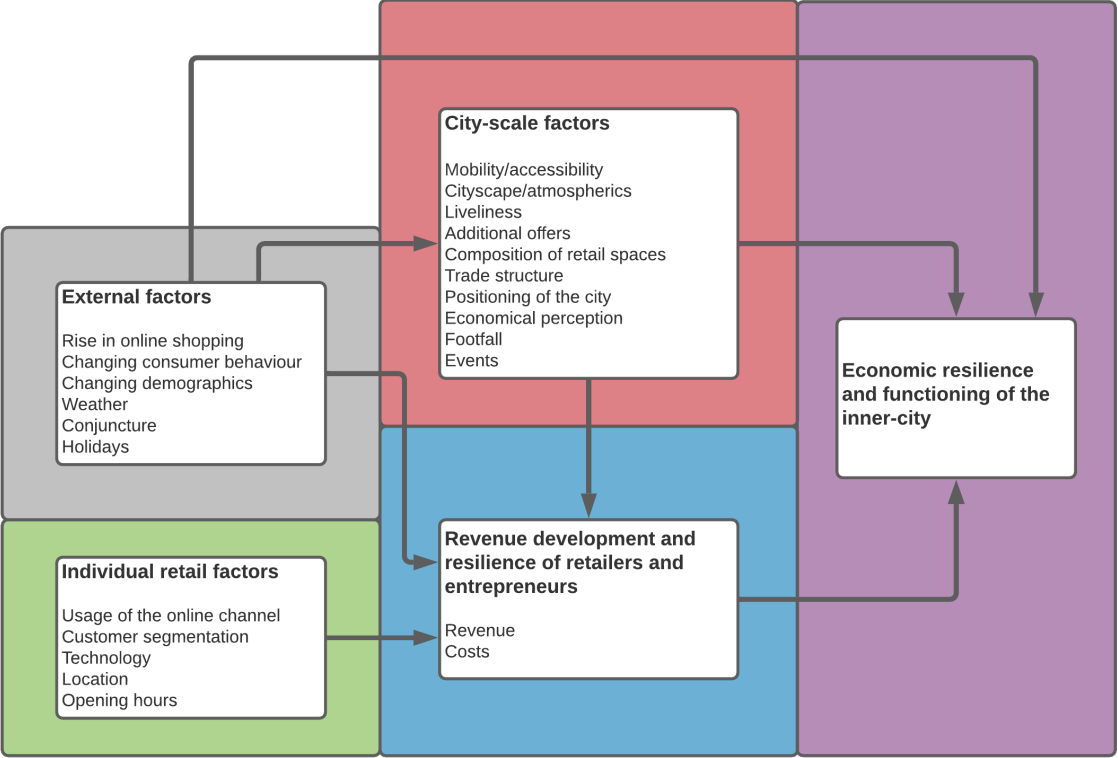


Figure 8, Detailed conceptual framework.

### 3. Research approach

In order to validate the factors that influence the revenue of retailers and entrepreneurs, as identified in the literature review, a pilot study will be conducted after the summer of 2021. This research forms the basis for this pilot study and has been part of the development phase (see table 4). The results gathered from the pilot study can be used by municipalities, retailers, and entrepreneurs to get insight into which factors influence their revenue development (for retailers and entrepreneurs, their individual revenue, for municipalities, the collective revenue development in the inner-city). This chapter will discuss the process of the development phase, and how this research project has contributed to this process. The following chapter, results, will elaborate on the factors included in the pilot study and the proposed models for analysing revenue data.

#### 3.1 Set-up

Three phases can be identified in the process of the pilot study, as can be seen in table 4. Currently, the first phase is in process. The second and third phases have not been started yet and are therefore highlighted in grey.

*Table 4, The three phases of the pilot study with the description and duration/starting date of each phase.*

Phase		Description	Duration / Start
1	Development phase	- Studying the most suitable data collection method - Online sessions to discuss the set-up of the pre-pilot and pilot study. - Survey about the importance of factors influencing revenue development.	April – August 2021
1a	Data collection method	Researching the most suitable data collection method	April 2021
1b	First session	Introduction with various parties involved and introduction of the proposed set-up for the pilot study	April 6 <sup>th</sup> , 2021
	Second session	Discussing the set-up of the pre-pilot and the compiled list of relevant factors influencing revenue	May 18 <sup>th</sup> , 2021
	Third session	Discussing the progress of recruiting entrepreneurs for the pre-pilot	June 15 <sup>th</sup> , 2021
	Fourth session	Discussing the progress of recruiting entrepreneurs for the pre-pilot	July 20 <sup>th</sup> , 2021
1c	Survey	A survey was composed to get more insight into the importance of factors influencing revenue development.	July – August 2021
2	Pre-pilot	Testing of the system with a small group of entrepreneurs	Start around August/September 2021
3	Pilot study	Actual pilot study	Start after pre-pilot

The idea for this pilot study was initiated at Platform Binnenstadsmanagement and BRO, as an extension to the theme 'economy' within the 'Binnenstadsbarometer'. Therefore, several decisions regarding the set-up of the pilot study have been made prior to the start of this research project:

- *Revenue* will be used as an indicator to get insight into the economic functioning of retailers and entrepreneurs.

- The revenue development of retailers and entrepreneurs will be measured within the *inner-city* because of the connections with the Platform Binnenstadsmanagement and because many retailers and entrepreneurs are concentrated in the inner-city area.
- The revenue data will be collected via the online communication platform *Chainels*.

These decisions have mainly been made based on practical considerations. Several cities were already working with the online communication platform of Chainels and therefore this platform will be used during the pilot study. This research project is focusing on the first phase in the process of the pilot study. Within this phase three sub-phases can be identified: Phase 1a, the data collection method, phase 1b, the various (online) sessions to discuss the set-up of the pre-pilot and the pilot study, and phase 1c, the survey to get more insight into the importance of factors influencing revenue development. In this research, mainly a qualitative research method will be used to answer the research question: Which factors influence the revenue development of entrepreneurs and the economic functioning of inner-cities, and how can revenue development and relevant factors in Dutch inner-cities be measured? First, a literature review has been conducted to identify relevant factors that have an influence on the revenue development of retailers and entrepreneurs in inner-cities. Secondly, the process of the development phase of the pilot study that will be conducted after this research project has been followed. During this development phase, the revenue collection method has been studied and alternative methods will be discussed. Moreover, background information about the participating cities will be given and the process of the online sessions with all issues that have arisen has been documented. This is important because the pilot study with the method used for data collection from retailers and entrepreneurs is one of the first in the Netherlands, and it is therefore important to document the process and issues to support future research. During the last part of this development phase (sub-phase 1c), a survey will be sent to retailers and entrepreneurs in the participating inner-cities to get more insight into the importance of the established factors influencing revenue development (according to these entrepreneurs).

The goal of the pilot study is to explore the needs of retailers, entrepreneurs, and municipalities with regard to a number of topics:

- How can the financial resilience, or stability, of retailers and entrepreneurs be assessed?
- Which factors influence the revenue development of retailers and entrepreneurs?
- Which factors are of interest to retailers and entrepreneurs (and municipalities)?

To get insight into these topics, revenue data from retailers and entrepreneurs in five inner-cities will be collected. The five cities that are participating are Arnhem, Eindhoven, Gouda, Tilburg, and Utrecht. These cities have not been selected on specific characteristics. However, all participating cities should have a functioning Chainels network for the entire inner-city. The three phases of the pilot study, as identified in table 4, will run for approximately three quarters of a year until the end of 2021. The cities have to contact the retailers and entrepreneurs in the inner-city to participate in the research. In order to give the cities enough time, data collection from retailers and entrepreneurs will start after the summer of 2021, approximately from August onwards. The final pilot study will run until the end of 2021 to incorporate the effects of the (Christmas) holidays at the end of the year on revenue development. To test the set-up of the pilot study and to receive some early feedback from the participating retailers and entrepreneurs, a 'pre-pilot' will be conducted around August. This pre-pilot has the same structure as the pilot study. However, the data collection will be tested with a small group of retailers and entrepreneurs (around 10 per city) in the cities of Eindhoven, Tilburg, and Utrecht. The pre-pilot can be used to gather feedback from retailers and entrepreneurs of their first experiences with the system. This feedback can be processed and can be used to optimise the set-up of the pilot study after this research project. This research forms the theoretical foundation or background for the

pre-pilot and pilot study. The following section will discuss data collection methods that can be used for the data collection of the pre-pilot and pilot study.

### 3.2 Phase 1a, data collection methods for revenue data

There are a number of ways to collect revenue data from entrepreneurs. Three of them are identified and elaborated below:

1. Collecting the data directly from the retailer or entrepreneur him- or herself. This involves either questioning the entrepreneur about their revenue development by means of a survey or questionnaire, or (s)he has to fill in his revenue data himself.
2. Collecting the data via the cash registries. This gives factual information about the sales made in the physical, brick-and-mortar store. However, the privacy of the entrepreneurs must be guaranteed at all times.
3. Collecting the data by analysing the VAT data from registrations at the Tax and Customs Administration. This is done by the Central Bureau for Statistics (CBS), in which the revenue development of entrepreneurs is shown monthly or quarterly (CBS, n.d.).

Option three is not desirable as a collection method for the relevant data because the research from the CBS uses a randomly taken sample from businesses in the Netherlands. The data can therefore not be collected for a certain region and therefore is not usable for the pilot study. It can, however, because it gives insight into the revenue development of entrepreneurs in the whole country, serve as benchmarks for the collected data to compare with.

For option two, collecting data via the cash registries, the company CCV can be collaborated with. CCV is a company that develops PIN machines and performs (online) transaction processing for entrepreneurs. In addition, they help organisations to design webshops, and they make local shopping more attractive for (inner) cities by offering a gift and loyalty system (CCV, 2020). However, because CCV tracks PIN machines and online transactions, this option does not give insight into cash payments. This is therefore not useful for data collection because the effect of point-of-sale spending is also important for the local retailers' revenue development.

Because options two and three are not useful for the research, option one will be used. Option one gives the possibility to measure both cash payments and PIN payments of retailers, and because the data is collected directly from the entrepreneur, it can be applied to any desired area. Moreover, collecting the data directly from the retailers and entrepreneurs enables the possibility to collect more data than just revenue. As discussed in the literature review, revenue individually is not enough to get a complete overview of the financial stability or resilience of an entrepreneur. Therefore, option one is the best data collection method for the pilot study because it can register both cash and pin or online and offline payments, it can be applied locally, and it enables the possibility to collect more data than mere revenue streams of retailers and entrepreneurs. One limitation to this data collection method is related to the communication platform in which the data will be collected, developed by Chainels.

Chainels is a company located in Rotterdam that has developed an online environment, available via a website and an app, that connects all entrepreneurs and retailers in a specific shopping area. The online environment gives room to inform all participants about the latest news items, safety (concerns), and events. It is used by various parties such as inner-cities, BID's, entrepreneurs' associations, centre managers, municipalities, property owners, and street managers (Platform de Nieuwe Winkelstraat, n.d.). Currently, the online platform is used by more than 250 locations across Europe and South America, with over 40,000 tenants/retailers subscribed to the app (Chainels, 2020). For this pilot, study Chainels have produced a 'module revenue development': A section inside of the

already existing online environment of Chainels for each of the participating cities in the pilot study. In this section, the participating cities, retailers, and entrepreneurs can see all information regarding the pilot study and can report their revenue data. However, in order to participate in the pilot study, it is desirable that the respective city already has a functioning Chainels platform in the entire inner-city because the revenue data will be collected using this platform. It is therefore not possible to include cities in the pilot study that do not have a working Chainels network.

### 3.3 Participating cities

In this section, the main characteristics and a brief history of all participating cities (Arnhem, Eindhoven, Gouda, Tilburg, and Utrecht) will be discussed to get a better understanding of the history of each participating city and to get more insight into the function mix in the inner-city.

#### 3.3.1 Arnhem

Arnhem is a municipality located in the province of Gelderland. On the 1<sup>st</sup> of January 2020, the total number of inhabitants in the municipality of Arnhem was 161,348. The largest share of the population is between 20 and 30 years old. This is considerably higher than the national average, which could be explained by the presence of the HAN University of Applied Sciences, which attracts younger people (students) to the city. Arnhem is the thirteenth largest municipality in the Netherlands (CBS, 2020c). Arnhem is an old city with a rich historical background. The city received city rights in 1233. Arnhem is historically best known for the part it played in the second world war, known as the Battle for Arnhem. During this battle, large parts of the city were destroyed by bombardments, and the inhabitants of Arnhem had to leave the city by orders of the German authorities, during which the Germans plundered the city and caused further destruction (Visit Arnhem, 2021). During the reconstruction, not only the damage done by the war was tackled, a new street plan was designed for the inner-city, old neighbourhoods were cleaned up, and industry was relocated outside the city. This renewed Arnhem was a textbook example of modern urban planning (Stichting Citymarketing Arnhem, 2021). Today, Arnhem is quite a modern city with some old national and international attractions. Table 5 shows the number of retail, leisure, hospitality, and service locations in the municipality of Arnhem, as well as the number of businesses in the inner-city. The inner-city of Arnhem, as defined by Platform Binnenstadsmanagement, consists of the neighbourhoods Janssingel, Markt, Rijnstraat, Stationsplein, and Weverstraat. The total population living in the inner-city is 5,000. As can be seen in table 5, the largest shares of businesses in the inner-city are in the Fashion & Luxury retail and hospitality sectors (23.0% and 31.3%, respectively).

Table 5, Total number of retail, leisure, hospitality, and service locations in Arnhem. (Locatus, 2021).

<b>Arnhem – total points of sale</b>	<b>Municipality</b>	<b>Inner-city</b>	<b>Inner-city distribution</b>
Vacancy	160	95	11.3%
Daily retail	275	59	7.0%
Fashion & Luxury	316	194	23.0%
Leisure time	72	37	4.4%
In/around House	171	35	4.2%
Other retail	50	16	1.9%
Culture & Leisure	77	32	3.8%
Hospitality	494	264	31.3%
Crafts	270	81	9.6%
Services	107	30	3.6%

### 3.3.2 Eindhoven

The second municipality, Eindhoven, is the largest city in the province of Noord-Brabant. On the 1<sup>st</sup> of January 2020, the total number of inhabitants in the municipality of Eindhoven was 234,934. Out of this number, the highest share of the population is between 20 and 30 years old. This is because of the presence of the Eindhoven University of Technology and the Fontys and Design Academy, which attracts many students to the city. Eindhoven is the fifth-largest municipality in the Netherlands (CBS, 2020c). The city of Eindhoven is quite an old city, and it has received city rights as early as 1232. Since 1920, a number of surrounding municipalities, Woensel, Tongelre, Stratum, Gestel and Strijp have merged, together with Eindhoven, into one municipality (Gemeente Eindhoven, 2021a). After the second world war in 1945, many buildings in the city had been destroyed. Therefore, the municipality decided in that time to also demolish other pre-war buildings in and around the centre to transform the city of Eindhoven into a modern city. Partly because of the company Philips, Eindhoven has grown strongly in the past 100 years (Gemeente Eindhoven, 2021b). Today, Eindhoven is the centre of technology in the south of the Netherlands, with companies such as Philips, DAF and ASML, and the University of Technology and High tech Campus all located in its vicinity. The number of retail, leisure, hospitality, and service locations in the municipality of Eindhoven, as well as the number of businesses in the inner-city, is shown in table 6. The inner-city of Eindhoven, as defined by Platform Binnenstadsmanagement, consists of three neighbourhoods: Binnenstad, Bergen, and Witte Dame, with a total population of 8,600 in the inner-city. The largest shares of businesses are in the Fashion & Luxury retail sector and hospitality sector (24.0% and 37.6% respectively), shown in table 6. The share of hospitality businesses (37.6%) is the highest of all participating cities.

Table 6, Total number of retail, leisure, hospitality, and service locations in Eindhoven. (Locatus, 2021).

<b>Eindhoven – total points of sale</b>	<b>Municipality</b>	<b>Inner-city</b>	<b>Inner-city distribution</b>
<i>Vacancy</i>	261	78	9.1%
<i>Daily retail</i>	328	50	5.9%
<i>Fashion &amp; Luxury</i>	371	205	24.0%
<i>Leisure time</i>	82	25	2.9%
<i>In/around House</i>	260	28	3.3%
<i>Other retail</i>	83	12	1.4%
<i>Culture &amp; Leisure</i>	106	25	2.9%
<i>Hospitality</i>	756	321	37.6%
<i>Crafts</i>	311	67	7.9%
<i>Services</i>	167	42	4.9%

### 3.3.3 Gouda

Gouda is the only participating city in the pilot study located in the province of Zuid-Holland. The total number of inhabitants in the municipality of Gouda was 73,427 on the 1<sup>st</sup> of January 2020. Contrary to the other municipalities, the largest share of the population is between 50 and 60 years old. This is in line with the national average. In fact, the age structure of the inhabitants in Gouda is almost the same as the average age structure in the Netherlands. This could be explained because of the absence of larger educational institutions, which contrasts with other participating cities. These cities have a higher share of young inhabitants between 20 and 30 years old. Because of this absence, the age structure of Gouda follows the more general age structure visible in other cities in the Netherlands. Gouda has the least number of inhabitants out of the participating cities and is the forty-eighth largest

municipality in the Netherlands (CBS, 2020c). Gouda received city rights in 1272. Gouda is a quite historic city with many national monuments nowadays. During the Middle Ages, Gouda developed into an important trading and industrial centre. However, the economic climate worsened in the following centuries (Erfgoedhuis Zuid-Holland, 2021). It was not until the second half of the nineteenth century that Gouda started to benefit from an improved economic climate, and in the twentieth century, Gouda started to expand beyond the inner-city and its canals. Gouda is mainly known for the production of its Cheese, candles, and pipes (Gouda750, 2021). Because relatively little damage was done to the city during the second world war, it is a historic city with many protected monuments nowadays (Gemeente Gouda, 2021). The number of retail, leisure, hospitality, and service locations in the inner-city and the municipality of Gouda as a whole are shown in table 7. The inner-city of Gouda, as defined by Platform Binnenstadsmanagement, consists of the following neighbourhoods: De Baan en omgeving, Nieuwe Markt en omgeving, Raam en omgeving, and Turfmarkt en omgeving. The total number of inhabitants in the inner-city is 6,300. Table 7 shows the largest shares of businesses in the inner-city, which are in the Fashion & Luxury retail sector and hospitality sector (19.3% and 20.0%, respectively). The inner-city of Gouda also contains a relatively large share of businesses in the crafts sector compared to the other participating cities.

Table 7, Total number of retail, leisure, hospitality, and service locations in Gouda. (Locatus, 2021).

<b>Gouda – total points of sale</b>	<b>Municipality</b>	<b>Inner-city</b>	<b>Inner-city distribution</b>
Vacancy	85	56	10.4%
Daily retail	133	64	11.9%
Fashion & Luxury	125	104	19.3%
Leisure time	34	24	4.5%
In/around House	102	43	8.0%
Other retail	32	17	3.2%
Culture & Leisure	54	23	4.3%
Hospitality	172	108	20.0%
Crafts	107	75	13.9%
Services	62	25	4.6%

### 3.3.4 Tilburg

Tilburg is the second-largest municipality located in the province of Noord-Brabant, with 219,789 inhabitants living in the municipality on the 1<sup>st</sup> of January 2020. Again, the largest share of the population is between 20 and 30 years old. This can be explained by the presence of the university and the Avans and Fontys university of applied sciences (HBO). Tilburg is the sixth-largest municipality in the Netherlands (CBS, 2020c). While the area of Tilburg has been inhabited for more than a thousand years, with the first mentioning of Tilburg in 709, the city received city rights relatively late compared to other cities in the Netherlands. The city did not receive city rights until 1809 (In your pocket, essential city guides, 2015). Because of the many meadows with sheep around the town centres that together formed Tilburg, the textile industry expanded in Tilburg, and in the following centuries, Tilburg developed into the most important textile centre of the Netherlands (In your pocket, essential city guides, 2015). The second world war was a relatively difficult period for the city of Tilburg. However, large-scale destruction because of bombings did not occur (Tilburg.com, 2019). While Tilburg does not have a medieval town centre, many monuments and townscapes have been preserved from the 20<sup>th</sup> century when the textile industry was thriving (In your pocket, essential city guides, 2015). Table 8 shows the number of retail, leisure, hospitality, and service locations in the municipality of Tilburg, as well as the number of businesses in the inner-city. The inner-city of Tilburg, as defined by



Platform Binnenstadsmanagement, consists of the neighbourhoods Binnenstad Oost and Binnenstad West. The total population living in the inner-city is 5,100. Table 8 shows that the majority of businesses in the inner-city belong to the fashion & luxury retail and hospitality sectors (25.3% and 25.7%, respectively). This share of Fashion & Luxury retailers (25.3%) is the highest of all participating cities.

Table 8, Total number of retail, leisure, hospitality, and service locations in Tilburg. (Locatus, 2021).

<b>Tilburg – total points of sale</b>	<b>Municipality</b>	<b>Inner-city</b>	<b>Inner-city distribution</b>
Vacancy	228	66	13.9%
Daily retail	303	40	8.4%
Fashion & Luxury	270	120	25.3%
Leisure time	82	25	5.3%
In/around House	242	22	4.6%
Other retail	69	7	1.5%
Culture & Leisure	84	14	3.0%
Hospitality	514	122	25.7%
Crafts	256	33	7.0%
Services	137	25	5.3%

### 3.3.5 Utrecht

Utrecht is a municipality located in the similarly named province of Utrecht. On the 1<sup>st</sup> of January 2020, the total number of inhabitants in the municipality of Utrecht was 357,597. The largest share of the population is between 20 and 30 years old. This can, again, be explained by the presence of Utrecht University and the other universities of applied sciences (HBO). Utrecht is the fourth-largest municipality in the Netherlands, which makes it the largest city participating in the pilot study (CBS, 2020c). It is one of the first cities in the Netherlands to receive city rights, namely in 1122 (Gemeente Utrecht, 2020), and has a very rich history. Because there was no large-scale destruction from bombings in the second world war in Utrecht, the historic inner-city is well preserved and contains many protected monuments nowadays (Canon van Nederland, n.d.). The number of retail, leisure, hospitality, and service locations in the municipality of Utrecht, as well as the number of businesses in the inner-city, are shown in table 9. The inner-city of Utrecht, as defined by Platform Binnenstadsmanagement, contains nine neighbourhoods: Breedstraat en Plomporengracht en omgeving; Domplein, Neude, Janskerkhof; Hoog-Catharijne NS en Jaarbeurs; Lange Elisabethstraat, Mariaplaats en omgeving; Lange Nieuwstraat en omgeving; Nieuwegracht-Oost; Nobelstraat en omgeving; Springweg en omgeving Geertebuurt, and Wijk C, with a total population of 16,600 inhabitants living in the inner-city. As shown in table 9, the largest shares of businesses in the inner-city are in the Fashion & Luxury retail and hospitality sectors (22.7% and 31.9%, respectively).

Table 9, Total number of retail, leisure, hospitality, and service locations in Utrecht. (Locatus, 2021).

<b>Utrecht – total points of sale</b>	<b>Municipality</b>	<b>Inner-city</b>	<b>Inner-city distribution</b>
Vacancy	268	123	8.8%
Daily retail	536	115	8.2%
Fashion & Luxury	526	318	22.7%
Leisure time	114	61	4.4%
In/around House	392	63	4.5%
Other retail	101	35	2.5%

<i>Culture &amp; Leisure</i>	207	57	4.1%
<i>Hospitality</i>	1045	447	31.9%
<i>Crafts</i>	455	131	9.4%
<i>Services</i>	256	50	3.6%

### 3.4 Phase 1b, online sessions

As elaborated earlier, five cities are participating in the pilot study. The process of the online sessions (subphase 1b) will be discussed in the following section. For each participating city, one or two representatives have been selected and are participating in the organisation of the pilot study. These representatives are all coordinators of the inner-city in their respective municipalities. Together with Platform Binnenstadsmanagement, BRO, and Chainels, the following procedure has been developed. Chainels has joined in as a communication supplier and is the intermediary between the entrepreneurs and the research. Monthly (online) sessions are held with the representatives of the cities to discuss the progress. To date, four online sessions have been held to discuss the set-up of the second and third phases, or the pre-pilot and pilot study. These sessions will be discussed below.

#### 3.4.1 First session

The first session was held on the 6<sup>th</sup> of April 2021. This session was used to get acquainted with the various parties involved and to introduce the design of the pilot study. Moreover, the representatives were asked two questions:

1. What is your reason for wanting to measure revenue?
2. What effects on the revenue development of retailers and entrepreneurs do you want to measure?

The answers given to these questions will be worked out in the brainstorming tool Kahoot and can be seen in figure 9 (as seen in section 3.4.6, preliminary results phase 1b, online sessions). The answers, together with information from the literature review, will be used to formalise a list of factors influencing revenue that will be used in the pilot study after this research project (shown in the next chapter). Moreover, discussing the set-up of the pilot study has raised a few questions from the representatives of the five cities concerning:

- *Feasibility*: Attention should be given to the workload for entrepreneurs, which should be as low as possible. Convincing entrepreneurs to participate in the pilot study will be a challenge, and asking them a large set of questions about their revenue (and possibly costs) will be too much and may therefore discourage entrepreneurs from participating in the research.
- *Online expenditures*: It is desired to include online expenditures in the pilot study. Especially during the effects of the Coronavirus, online expenditures have been essential for retailers and entrepreneurs because of the lockdown for physical businesses. Therefore, online expenditures will be incorporated in the pilot study.
- *Frequency of data collection*: To lighten the workload for entrepreneurs, data will be collected once per month and possibly a higher frequency (weekly/daily) around events and holidays.
- *Timing of the pilot study*: Some concerns have been expressed regarding the timing of the pilot study. Because of the lockdown during the Coronavirus, it is unsure what to expect after the lockdown. There could be an increase in expenditures in, for instance, the hospitality and retail sector because of an increase of footfall in cities, or people could stay at more home. This would not reflect a 'normal' situation. This will be closely monitored during the pilot study.
- *Pre-pilot*: One of the suggestions is to start earlier with the pilot study in the form of a 'pre-pilot'. As discussed in section 3.1, the pre-pilot will start with a small group (about 10) of

entrepreneurs, and revenue data will be collected to test the set-up of the pilot study and to receive feedback from the entrepreneurs about the set-up.

- *Other research:* Some research with revenue data collection is already being conducted by for example INretail who have developed revenue monitors (INretail, n.d.) for several branches (fashion, sports, shoes and living). These monitors also give information about the revenue development of entrepreneurs in specific branches. This data can possibly be included in the pilot study.

### 3.4.2 Second session

The following session, held on the 18<sup>th</sup> of May 2021, was mainly devoted to the set-up of the pre-pilot. The list of factors influencing revenue was discussed and will be used during the pilot study. The objective of the pre-pilot is to get insight into the willingness of entrepreneurs to participate and share their revenue data and to test the data collection system. Because of the very limited number of participating entrepreneurs in the pre-pilot, no statements can be made about relevant effects. The following questions will be used to gather the revenue of retailers and entrepreneurs:

1. What is your (offline) revenue from sales in the company (excluding VAT) in the most recent period?
2. What is your (online) revenue from sales in the webshop and click & collect (excluding VAT) in the most recent period?

These first two questions about the revenue achieved in the past period are followed by two short questions about the economic performance of the company and the possible effects that have influenced the revenue in the past period:

3. How would you rate your company's economic performance (based on the achieved revenue) in the past period on a scale of 1 to 10?
4. And why? Because of ...
  - a. Holidays
  - b. Events
  - c. Number of visitors
  - d. Weather conditions
  - e. Works in the inner-city
  - f. Others, namely: ...

Information about the offline and online revenue from entrepreneurs is gathered via the first two questions. Questions three and four are used to get a first impression of the retailer or entrepreneur as to why their revenue (if at all) varies from the usual or expected revenue.

To encourage retailers and entrepreneurs in the five inner-cities to participate in the pilot study, an information letter/flyer has been composed. This flyer shortly describes why the pilot study is relevant, what the goal is, who organizes the pilot, how the entrepreneur benefits from it, what entrepreneurs will receive in return, why it is important to participate, how data collection will be done and what will be measured, a privacy statement and what happens when the pilot study is finished (see appendix 3). This flyer can be adjusted to each city's own house style for more familiarity by the retailers and entrepreneurs. Lastly, some questions have been asked about the data collection with regard to privacy and access to the data, which will be discussed in more detail in the section privacy.

### 3.4.3 Third session

The third session, held on the 15<sup>th</sup> of June 2021, was a short session to discuss the progress of gathering entrepreneurs for the pre-pilot and discuss pitfalls in this process. During this session, the

representatives indicated that they had not yet found many entrepreneurs willing to participate in the pre-pilot. This can partly be explained by the current time, with the constant reductions in regulations of the coronavirus, which is already rather hectic for the entrepreneurs in the inner-city, and that therefore little time was left for inviting entrepreneurs to participate in the pre-pilot. The entrepreneurs that were willing to participate in the pre-pilot were from their own board and thus close to the representatives. An e-mail was sent to the other entrepreneurs in the inner-city with the flyer (in their own house style), but this resulted in very little response. The representatives expect that personally contacting entrepreneurs in the inner-city will result in more willingness to participate. Moreover, they expect that once some entrepreneurs are willing to participate, more will follow. The pre-pilot can therefore be an important first step towards recruiting enough entrepreneurs for the pilot study after this research project. As anticipated, most questions from entrepreneurs about participating were about the privacy aspect of the pre-pilot and pilot study.

#### 3.4.4 Fourth session

The fourth session took place on the 20<sup>th</sup> of July, 2021. This session was, just as the third session, used to discuss the progress of recruiting entrepreneurs for the pre-pilot and discuss pitfalls in this process. Only two cities participated in this session because of some absences due to holidays. The city of Utrecht has found 12 entrepreneurs willing to participate in the pre-pilot. There was still a lot of doubt by the entrepreneurs in the inner-city. However, the key to getting entrepreneurs willing to participate is to build trust with the entrepreneurs, to ensure that all information will be processed confidently, and to approach entrepreneurs personally and make use of these personal relationships, according to the representative of Utrecht. Moreover, it was questioned whether it is feasible to achieve the required sample size for the statistical representativeness of the pre-pilot and pilot study.

#### 3.4.5 Privacy

Privacy is a significant aspect of the pilot study. As is identified in the literature review, retailers and entrepreneurs in the Netherlands are very protective of their personal and company's confidential information, which translates into the apparent distrust between tenants and landlords when it comes to turnover rental agreements. Therefore, the privacy aspect and how to handle the entrepreneurs' confidential information during the pilot study need to be carefully taken into consideration. A few matters in relation to privacy have been discussed: Processing and viewing of the data, security of the data collection, and privacy and communication to the participating entrepreneurs.

Processing and viewing the data is one of the main concerns because not every party is allowed to review the confidential information of entrepreneurs. Chainels is, in the case of the pilot study, the data collector and therefore has a processing agreement with the cities connected to their network. This processing agreement implies that Chainels is allowed to collect and analyse personal data or data that can be traced back to individuals. Without this agreement, it is not allowed to process any personal data. The remaining organisations in the pilot study, Platform Binnenstadsmanagement, BRO, and students of TU Eindhoven, are therefore not allowed to process personal or traceable data without permission from the participating retailers and entrepreneurs. So, in order to analyse the data, the remaining organisations need to have either a processing agreement with the participating cities and entrepreneurs or need to obtain permission from the participating entrepreneurs to access and analyse the personal data for research purposes.

The second option will be used in the pilot study in which the participating entrepreneurs will be asked permission for the organisations to analyse their personal data for research purposes. Moreover, some questions have been asked to the representatives of the participating cities about which parties should have access to the data. The results indicate that the representatives think that the municipality and inner-city management should not have access to the personal data of retailers and entrepreneurs,

only the aggregated and anonymised data. The security of the data collection is the responsibility of Chainels. This is not discussed or influenced by the (development phase of the) pilot study. However, it has raised a lot of questions and concerns by participating entrepreneurs. The security of the data collection has been described in appendix 3, which meets the highest security standards.

For the final matter, privacy and the communication to the participating entrepreneurs, it is advised to be open and honest in the communication. This ensures that the retailers and entrepreneurs know what happens with their data and what they can expect from the pilot study to not create false hope for the results of the research. As expected, during the process of getting entrepreneurs willing to participate in the research, many questions and concerns have been raised about the privacy aspect. These cannot be fully resolved because revenue data will always be business-sensitive data that is not eagerly shared by entrepreneurs. However, informing the entrepreneurs as much as possible about the privacy aspect, what will happen to their data, and about the security standards of the data collection system could reduce these concerns and therefore persuade entrepreneurs to participate in the pre-pilot and pilot study.

3.4.6 Preliminary results phase 1b, online sessions

The factors influencing revenue development and resilience of retailers and entrepreneurs in inner-cities, as identified in the literature, have been divided into four categories: City-scale factors, revenue development and resilience of entrepreneurs, individual retail factors, and external factors. During the development phase, representatives of the five inner-cities have been asked which factors influencing retail would be most important for the inner-city, as well as the retailers and entrepreneurs in the inner-city. These can be seen in the word cloud in figure 9. The most important factors cities would like to get insight into are the effects of events and holidays, footfall, and the differences per branch (see appendix 4 for the original, Dutch, version of the word cloud). Moreover, some new factors have been proposed by the representatives of the five inner cities: the time of wage payment or holiday allowance, the visitors’ profiles, and employment (number of jobs) in the inner-city. These factors will be incorporated in the compiled conceptual framework following the literature review, as can be seen in figure 8.



Figure 9, Most important factors in relation to revenue development according to participants in the pilot study.

### 3.5 Phase 1c, survey to entrepreneurs in the inner-city

The survey composed to get more insight into which factors influencing the revenue development of entrepreneurs in the inner-city are the most influential, according to entrepreneurs, can be seen as an extension to the word cloud resulting from the online sessions with the representatives of the participating cities during the development phase (figure 9). This word cloud was used to gather the opinion of the representatives of the inner-cities on which factors are the most important to measure during the pilot study in relation to the revenue development of entrepreneurs. With this survey, the opinion of entrepreneurs will be added to this to get a better understanding of the most influential factors that have an influence on the revenue development of retailers and entrepreneurs in the inner-city.

The survey is sent to the Chainels network of each participating inner-city. This network is a private network for each city to which entrepreneurs in the inner-city are subscribed. By sending it to this network, the number of potential respondents is significantly larger than when sending the survey to the participating entrepreneurs. This is important because the response rate is expected to be very low, and therefore, a large population is needed to ensure enough response to the survey.

The survey consists of five questions. The first question, as can be seen in appendix 5, is used to determine in which sector the respondent (entrepreneur) operates. This enables to analyse the three sectors included in the pilot study (retail, hospitality, and services) separately. The following question, the main question of the survey, is used to measure the importance given to each factor by entrepreneurs. The factors that are included are distance (of your business) to parking facilities, distance (of your business) to the inner-city, distance (of your business) to anchor stores, construction works in the inner-city, opening hours, footfall (in the inner-city), public space around your business, pleasant sunny weather, high temperatures (32°C and above), rainfall, events, and holidays (see appendix 5). These factors are derived from the compiled list of factors influencing the revenue of entrepreneurs during the development phase of the pilot study (which will be elaborated in section 4.1 of the following chapter). Only factors that are relevant for individual entrepreneurs have been taken into account. Therefore, the factors time of wage payment/holiday allowance, visitors' profile, employment (number of jobs) in the inner-city, history of the inner-city, and branch/job type (franchising) have not been included in the survey. Weather has been divided into two variables for measurement in the pilot study, sun/heat (measured by the average weekly temperature) and rainfall (measured by the number of rainy days/week). Sun/heat is a variable that can be both positive as well as negative for individual entrepreneurs because pleasant sunny weather will encourage people to go to (inner) cities and can improve people's emotional state and thus willingness to spend money. However, above a certain temperature, the weather can become too hot which leads to the contrary, fewer people coming to inner-cities. The limit of this temperature (32°C and above) has been based on the heat index of the National Oceanic and Atmospheric Administration (NOAA), which states that above a temperature of 32°C, there is a chance of heat cramps and heat exhaustion and continuing activity could result in a heat stroke (NOAA, n.d.). In the question, entrepreneurs can score each factor with a range of -5 to +5, in which -5 is a strong negative influence, -1 is a weak negative influence, 0 is no opinion or neutral, +1 is a weak positive influence, and +5 is a strong positive influence. This way, the importance of the factors can be ascertained and how (negatively or positively) they influence revenue development. The next question is a follow-up question on the factor public space around your business, which only appears if the respondent scores this factor with a score of -3 and lower or +3 and higher. If this is the case, then the question: 'What do you consider the three most important aspects of the public space?' will appear to get more insight into which public space elements are considered the most important by entrepreneurs. The two last questions are used to give the entrepreneurs the possibility to add their own factors to the compiled list, by giving them three input

fields and thereafter the same scoring model as in the main table with factors (see appendix 5). The preliminary results of this survey will be discussed in chapter 4.

### 3.6 Conclusion

In this section, phase 1 of the pilot study (the development phase) and general background information about the inner-cities has been discussed. The development phase consists of three sub-phases: 1a data collection methods in which the most suitable data collection method will be researched, 1b online sessions which are used to discuss the set-up of the pre-pilot and pilot study, and 1c survey to get more insight into the importance of factors influencing revenue development. The data collection of the pilot study will start after the summer of 2021 to give the participating cities time to find entrepreneurs willing to participate in the research. In order to test the system and to receive some early feedback about the set-up of the system, a pre-pilot will be conducted around August 2021 with a small group of entrepreneurs. This research, in which mainly a qualitative research method has been used, forms the theoretical foundation for the pre-pilot and pilot study and discusses the preliminary results from the online sessions of phase 1b.

Data collection during the pilot study will be executed via surveys directed to the entrepreneurs in the participating (inner) cities. The surveys are sent via the online communication platform of Chainels, to which cities (and their retailers and entrepreneurs) can subscribe. With this method, both cash- and PIN payments can be collected from the entrepreneurs in any desired area, as well as some additional information, either via the survey or from already known information provided by the Chainels network of the five participating cities. Background information of these five cities has been given, which can be used in the analysis of the pilot study, mainly related to the history and the function mix or tenant variety of the inner-city.

As part of the development phase, four online sessions have been held to date, with representatives from the participating cities. During these sessions, information about the set-up of the pilot study has been discussed, and feedback from the representatives has been incorporated. The results from these sessions show that it is difficult to convince retailers and entrepreneurs to participate in the pilot study, largely because of concerns about the privacy aspect. Providing retailers and entrepreneurs with information about the set-up of the pilot study, its benefits, and the privacy aspect should encourage them to participate. Moreover, using personal relationships with entrepreneurs in the inner-city is more effective than collectively targeting the entrepreneurs in the inner-city because collective actions have not resulted in many entrepreneurs willing to participate.

To get more insight into which factors are the most influential for revenue development according to retailers and entrepreneurs in the inner city, a short survey has been composed. In this survey, five questions are presented to entrepreneurs in the inner city about various factors that have an influence on the revenue development of entrepreneurs.

During the development phase, the wishes and feedback from the representatives regarding which effects on revenue development of retailers and entrepreneurs will be measured during the pilot study have been combined with already known factors identified from the literature review into a new conceptual framework (see figure 10, highlighted in red). Most factors discussed during the development phase have already been identified in the literature review, such as the effect of events and holidays, footfall, and location in the inner-city. However, some additions have been made, such as the time of wage payment or holiday allowance, the visitors' profiles (which will be further operationalised from customer segmentation), and employment (number of jobs) in the inner-city, based on feedback during the development phase. The following chapter will use the information gathered from the literature review and the development phase to compile a list of factors influencing

the revenue development of retailers and entrepreneurs that will be used during the research of the pilot study.

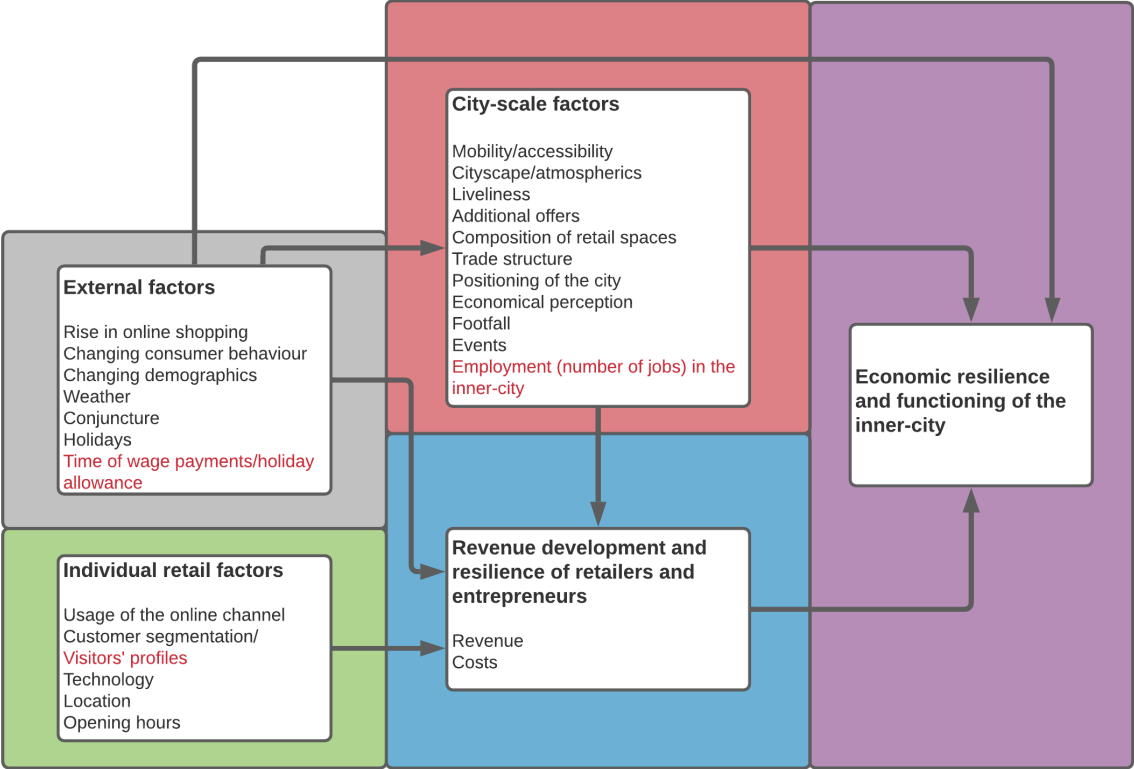


Figure 10, Detailed conceptual framework with additions from the development phase of the pilot study.



## 4. Results

This chapter will discuss the results following this project. First, it will combine information from the literature review and the development phase into a list of factors that influence the revenue development of retailers and entrepreneurs in inner-cities which will be used in the pilot study after this research project. Because the pilot study will start after the summer of 2021, and the data from the 'pre-pilot' is still not available, no analyses can be performed yet. However, the methodology to analyse the data (once it has been collected) will be discussed, including analysis methods and several examples and references.

### 4.1 Factors influencing revenue development

The most important factors, as perceived by the representatives from the five inner-cities during the development phase, combined with information from the literature study, have been combined into a list (table 10) with factors that will be analysed during the pilot study. The following sections will elaborate on how these factors can be measured and quantified.

*Table 10, Factors influencing revenue development included in the pilot study.*

Factor Impact of ... on revenue	Frequency of measurement	Measurement method	Data source
<b>Individual retail factors</b>			
Location in the inner-city	Quarterly - Once	<ul style="list-style-type: none"> <li>- Distance to parking garages</li> <li>- Distance to the centre of the inner-city</li> <li>- Distance to anchor stores</li> </ul>	Chainels
Opening hours	Quarterly	<ul style="list-style-type: none"> <li>- Opening hours per measurement period</li> </ul>	Chainels
Visitors' profiles	Monthly	<ul style="list-style-type: none"> <li>- Visitors' profiles</li> <li>- The service area of inner cities</li> </ul>	Whooz and Locatus
<b>City-scale factors</b>			
Footfall	Weekly – daily	<ul style="list-style-type: none"> <li>- Footfall in the inner-city</li> </ul>	Resono, CityTraffic, and Perfect Place
Events	Weekly	<ul style="list-style-type: none"> <li>- Monitoring the variation in revenue during the event</li> </ul>	Chainels
Atmospherics	Quarterly - Once	<ul style="list-style-type: none"> <li>- Public space (amount of greenery)</li> <li>- History (number of national monuments)</li> </ul>	Rijksdienst voor het Cultureel Erfgoed and Boomregister
Branch / Job type	Quarterly - Once	<ul style="list-style-type: none"> <li>- By branch (retail, hospitality, and services)</li> <li>- Tenant variety city (mix of retail, hospitality and services in the inner-city)</li> <li>- Franchising (relative number of franchisees in the inner-city)</li> <li>- Shopping area surface, total retail floor area</li> <li>- Number of outlets per branch</li> </ul>	Locatus

Works in public space/effect on accessibility	Weekly	- Monitoring the variation in revenue during the construction works	Chainels
Employment (number of jobs) in the inner-city	Quarterly	- Number of full-time job units per branch	LISA
<b>External factors</b>			
Weather conditions	Weekly	- Average weekly temperature - Number of weekly rainy days	KNMI and HetWeerActueel
Holidays	Weekly – daily	- Monitoring the variation in revenue during the holiday(s)	Chainels
Time of wage payment/holiday allowance	Weekly	- Monitoring the variation in revenue at the time of wage payment/holiday allowance	Business-dependent

#### 4.1.1 Individual retail factors

Three factors have been included in the pilot study that belong to the category of individual retail factors. Both location and opening hours have been discussed in the literature review, and visitors' profiles has been added because of the feedback from the participating cities in the pilot study. There is no general dataset for all factors, so information for each variable is dependent on various data sources. Therefore, for each factor, it will be explained, how they can be measured and how they can be quantified for the pilot study.

First, in the category of individual retail factors is the **location** of the business in the inner-city. All retailers and entrepreneurs that are subscribed to the online environment of Chainels have supplied their address data at registration. Therefore, for all retailers and entrepreneurs that take part in the pilot study, their location data is known. Multiple factors will be taken into consideration for the pilot study in relation to the location of a specific business: distance to parking garages, distance to the centre of the inner-city, and distance to anchor stores. With the location data from Chainels, the actual distance per desired mode choice (car/bike/foot) can be determined using geographic information systems (GIS). Because the location data cannot change (only if businesses move to another location), the data collection frequency is not as high as some other variables. A quarterly collection or even a one-time collection of revenue data from the retailers and entrepreneurs in the inner-city is for this factor sufficient.

**Opening hours** can also be reported in the online environment of Chainels and should be kept up-to-date by the retailers and entrepreneurs themselves. This factor could be quantified according to the number of hours opened per day. However, not only the number of open hours per day is important, the timing of the opening hours is important as well because the opening hours should adjust to the shopping behaviour of the consumers (House of Commons, 2019).

The final factor, **visitors' profiles**, has been included because it has been suggested by the participating cities. In the literature review, customer segmentation has been discussed with two types of customers, hedonic and utilitarian. Customer segmentation can be further operationalised with more specific types of customers or visitors and can be combined with the service areas of specific inner-cities to get information on visitors' profiles. Currently, information about visitors' profiles is not accurately available. However, there are several methods to get more insight into visitor's profiles. Municipalities could perform visitor surveys in their inner-cities to identify where visitors are coming

from. Such surveys could be performed physically, by asking visitors questions about their origin and characteristics, however, this can potentially be very time-consuming. Instead, new (online) methods such as short surveys via mobile apps could be used to get a better understanding of visitors' profiles. Until these methods are available, the alternative could be to look at the profiles of households in the service area surrounding the specific inner-city. This could be done by data sources such as the WhizeGuide developed by Whooz and Locatus. Whooz gives detailed information about household segmentation by grouping all households based on common socio-demographic characteristics, culture, preferences (lifestyle), and (purchasing) behaviour resulting in a classification of 11 segments divided into 59 sub-segments (Whooz, n.d.). Two examples of such household segments are shown in appendix 6. Moreover, Locatus can provide information about the service area of inner-cities with their Service areas Explorer in which the service area of inner-cities can be visualised based on the groups daily and non-daily retail (Locatus, n.d.). However, this will never be 100% accurate because not every household in the service area will visit the particular inner-city, and not all members of the household will always visit inner-cities at the same time.

#### 4.1.2 City-scale factors

The factors identified in the literature review as city-scale factors are not all included in the pilot study. The factors that are included in the research are the most important characteristics identified in the literature review; footfall, events, atmospherics, and works in public space (location could also be considered as city-scale factors, but this has already been discussed in the previous subsection), and factors that have been included because of suggestions from the participating cities (per branch/job type and employment). These factors will be discussed below.

**Footfall** is the first city-scale factor and is one of the most desired factors that the participating cities would like to get insight into. Footfall, as described in the literature review, is closely correlated to revenue development. Data about footfall in inner-cities can be collected via companies like Resono, CityTraffic, or Perfect Place (Resono, n.d.; CityTraffic, n.d.; Perfect Place, n.d.). These companies can collect data about footfall based on mobile data, scanners, or infrared sensors. It has been suggested to use footfall data during the pilot study to complement the revenue data. Oftentimes (inner)cities already have footfall data for their inner-cities available. In this instance, retailers and entrepreneurs can fill in the questionnaire about revenue on a monthly/quarterly basis (thus alleviating their workload), and daily or weekly numbers of (already known) information about footfall can be used to give an alternative indication of the economic functioning of the inner-city.

Data about **events** will be monitored in an event calendar in the online environment via Chainels. A requirement for this is that the event calendar should be up-to-date with all events incorporated in the calendar. Various types of events can be distinguished, such as events based on their scale level: large-scale (city-wide) events and small-scale (subareas) events, or based on the type of event, for instance, sports events or cultural events. This factor cannot be quantified by itself; however, the variation in revenue caused by the event can be monitored. A consequence of getting insight into the revenue development during events is that retailers and entrepreneurs need to provide their revenue data on a frequent basis, preferably weekly or even daily, for some types of events.

**Atmospherics** has been identified as one of the most important factors for the attractiveness of inner-cities and therefore for generating footfall and revenue. Atmospherics can be addressed at different scale levels: Atmospherics for the whole (inner) city or atmospherics at the individual level, i.e. atmospherics within businesses. In this pilot study, atmospherics will be addressed on a large scale level. For the large-scale level atmospherics, there are a few factors that will be taken into consideration: the history of the inner-city and the amount of green in the public space. The history of the inner-city can be measured by dividing the number of national monuments by the number of

hectares of the inner-city. Information about national monuments in the Netherlands is public information that can be downloaded from the website of the Dutch cultural heritage Agency (Rijksdienst voor het Cultureel Erfgoed, 2021). By using this information in GIS, the number of national monuments in inner-cities can be determined. The amount of green in the public space could be measured with a couple of methods; The number of trees per hectare in the inner-city, the share of green in the inner-city (the share measured in floor area), and the share of water in the inner-city (same as the share of green). Information on the amount of green is also public information and could be analysed using a number of sources. The 'Boomregister' has information of all trees in the Netherlands which could be used in GIS to determine the number of trees per hectare of inner-cities (Boomregister, n.d.). Because atmospheric, in the manner it is used in the pilot study, is quite static, a quarterly or one-time data collection of revenue is sufficient for getting insight into this factor.

The next factor, **branch/job type**, is one of the most requested factors that the participating cities would like to get insight into. Various variables can be distinguished for this factor. First, the revenue development per branch or sector can be measured. In the pilot study, three sectors will be distinguished in the inner-city: Retail, hospitality, and services. These sectors can be divided into sub-sectors. However, because with small populations (participating entrepreneurs) almost the entire population has to participate in a study to make statistically significant statements (which is not expected at the start of the pilot study), the main sectors are still used at the start of the pilot study. If enough entrepreneurs participate in the pilot study, these sectors could be divided into sub-sectors. Next, the function mix of the inner-city can be investigated with respect to revenue development. In the previous chapter, the function mix of each participating city has been identified. While all cities show a similar pattern in their function mix, some small differences can be identified between the five cities. These differences can be analysed in relation to revenue development. However, it should be noted that it is difficult to measure the individual effect of the function mix because of the many factors affecting revenue development. The function mix can be studied for the whole city but also for sub-areas within the inner-city. However, as discussed above, in order to make statistically significant statements, enough entrepreneurs should participate in the study in this scenario. Franchising can also be taken into consideration in the pilot study. Data about franchising is available for all participating cities utilizing Locatus. With this data, the degree of franchising can be calculated for each inner-city (or sub-area of the inner-city), and this can be measured in relation to the revenue development of retailers and entrepreneurs. Another important factor that should be included in the pilot study is the total shopping floor area for each participating city (centre) which can be measured using Locatus. A quarterly or one-time data collection should be sufficient for these factors because they are quite static and will not change frequently.

The fifth factor in the category of city-scale factors is **works in the public space/accessibility** in which the accessibility consequences of work in the public space in the inner-city will be measured. The factor location (see the previous section) is related to the accessibility of the individual business in relation to different points in the inner-city. This factor will focus more on the consequences of disturbances in the inner-city and the (negative) effect it has on revenue development. The works in the inner-city can be monitored in the calendar in the online environment of Chainels. If all works in the inner-city are included, and the calendar remains up-to-date, it should be possible to gain insight into the (negative) effect of works in the public space on the revenue development of retailers and entrepreneurs. Because works can be short-term, the data collection frequency for this factor should be weekly to measure the full effect of works in the public space.

The final factor is **employment**. Employment in (inner) cities is measured by LISA. This is a data source with information of all establishments in the Netherlands with a spatial component (address data) and

a socio-economic component (employment and economic activity). However, this information is not available for the pilot study. Should the information be available, then the data from LISA can be used to measure the effect of employment (and what type of employment/jobs) in relation to the revenue development. Because this factor is, again, quite static, a quarterly data collection from retailers and entrepreneurs is sufficient.

#### 4.1.3 External factors

In the literature review, some external factors have been identified: the rise in online shopping, changes in consumer trends, demographic changes, weather, conjuncture (of the economy), and holidays. The changes in consumer trends, demographic changes, and conjuncture have already been discussed in the literature study and will not be included in the pilot study. The **rise of online shopping** has also been discussed in the literature review, but this factor will (to some degree) be included in the pilot study by dividing the data collection of revenue into two types of revenue: Offline and online revenue (see the following section). The effect of the **weather** will be included in the pilot study in two ways: The average (weekly) temperature and the amount of rainfall. Meteorologic data is publicly available via several internet pages (KNMI, 2021; HetWeerActueel, 2021). A weekly revenue data collection from retailers and entrepreneurs is necessary to get some insight into the effect of the weather in relation to the revenue development of retailers and entrepreneurs.

**Holidays** can, just like events, be monitored via a calendar in Chainels. Holidays are easy to keep up-to-date as they are always held on a fixed date in the year. The same principle regarding events holds for holidays because holidays can also not be quantified by themselves; however, the variation in revenue caused by the holidays can be monitored. Retailers and entrepreneurs need to provide their revenue data on a frequent basis, preferably weekly or even daily, for some types of holidays, to get insight into the variation in revenue caused by certain holidays.

The final factor, **time of wage payment/holiday allowance**, has been included because it has been suggested by the participating cities. However, for this factor, information for the timing of wage payments are necessary, and currently, this information is not available. Moreover, obtaining data on wage payment or holiday allowance is very difficult because it can be business-dependent, which makes it difficult to measure on a large scale.

#### 4.1.4 Revenue development and resilience of entrepreneurs

There are five dependent variables in the study; two types of revenue (offline and online revenue) and three types of costs (rent, cost of goods sold, and personnel costs), which give insight into the financial stability or resilience of retailers and entrepreneurs. In an ideal situation, all these variables should be known to get insight into the financial stability of retailers and entrepreneurs. However, in practice, collecting revenue data from retailers and entrepreneurs is already a difficult task, and therefore, (in consultation with the participating cities in the pilot study) **only revenue data** will be collected from retailers and entrepreneurs. Revenue data will be collected twofold: Offline revenue, gathered from sales in the company itself, and online revenue gathered from sales on the webshop and click & collect. All data about revenue is excluding VAT (as discussed in the literature review). In an ideal situation, information about costs of the company should be collected in three ways: rental costs of the business including gas, water, and electricity (which are the highest expenses within the fixed costs), cost of goods sold, and personnel costs (as the highest expenses within the variable costs of the business), all excluding VAT. Out of these three types of costs, rent is the most variable component because rent is location dependent. Personnel costs and the cost of goods sold are roughly the same for similar companies. Therefore, rent is the most important indicator of the costs of a company. Rental costs in the centre of large cities are substantially higher than in smaller cities or towns. As a result, entrepreneurs can make the trade-off between a low retail floor area in expensive locations with high

footfall/exposure or a higher retail floor area in cheaper locations (with probably less footfall/exposure) for the same rental price. Getting insight into the rental costs per square meter in combination with data about the retail floor area from for example Locatus can therefore be beneficial to get more insight into the costs of businesses and therefore shed more light on the economic functioning or stability of businesses. However as mentioned earlier, initially, data about costs will **not** be included in the pilot study. All financial data will be collected via the online environment of Chainels by means of a number of survey questions (see table 11). The intention is to measure the revenue on a monthly basis during the third phase (the pilot study). This is because the highest data collection frequency of all factors is monthly, and therefore the data collection of the revenue of retailers and entrepreneurs should also be monthly. This is also favourable for the entrepreneurs as it means they do not have a high workload from answering the questions relating to the revenue development of their businesses.

Table 11, Financial factors in the pilot study.

Dependent variable	Survey question	Pilot study
Offline revenue	What is your (offline) revenue from sales in the company (excluding VAT) in the past month?	Included in the pilot study
Online revenue	What is your (online) revenue from sales in the webshop and click & collect (excluding VAT) in the past month?	Included in the pilot study
Rent	What are your rental costs (including gas, water, and electricity) in the past month (excluding VAT)?	Not included in the pilot study
Cost of goods sold	What are your costs of sold goods (excluding VAT) in the past month?	Not included in the pilot study
Personnel costs	What are your personnel costs (excluding VAT) in the past month?	Not included in the pilot study

#### 4.2 Preliminary results survey

As discussed in chapter 3, data collection of the pre-pilot will begin in August, and the data collection of the pilot study will begin after the summer of 2021 and are therefore not available at the time of writing. Instead, at the end of the development phase during subphase 1c, a short survey was sent to entrepreneurs in the participating cities. As expected, the response rate of the entrepreneurs in the inner-cities was very low; only 19 entrepreneurs responded and fully completed the survey and 28 entrepreneurs have responded but did not complete the survey (see table 12). However, this does give an indication of which factors are the most influential in relation to revenue according to entrepreneurs in the inner-cities. There are several reasons why the response rate is so low. First, the survey could not be sent to all participating cities, and therefore the number of potential respondents was significantly lower than at first expected. One city has decided to quit the research, one city did not have a fully functioning Chainels network yet, and in one city, the representatives did not want to put too much workload on the entrepreneurs in the inner-city in this already busy time period. Secondly, the time in which the survey has been sent to the entrepreneurs in the inner city is not ideal because it is already a demanding time period for entrepreneurs because of the reduction in regulations of the coronavirus and the summer period. Moreover, around July/August is the holiday period, and therefore many people are away or not available. The number of incomplete responses shows that entrepreneurs do not always make time for surveys, not even for very short surveys.

Table 12, Number of responses for each sector of the survey.

Sector	Number of complete responses	Number of incomplete response	total
Retail	11	15	26
Hospitality	6	10	16
Services	1	1	2
Other	1	2	3
<b>Total</b>	<b>19</b>	<b>28</b>	<b>47</b>

Table 13 shows the results of the survey of all sectors combined. All answers of the respondents are added up to produce a score per factor. As can be seen, the most influential (positive) factor is believed to be holidays, followed by the distance of the business to the centre of the inner-city and footfall in the inner-city. The factors with the greatest negative influence are high temperatures (32°C and above), rainfall, and construction works in the inner-city. The scores of this survey give some insight into the difference between theory and practice. From a theoretical aspect, as discussed in the literature review, many factors are believed to have an effect on the revenue of retailers and entrepreneurs in inner-cities. However, as the results from the survey show, not all factors are believed to be of importance by the retailers and entrepreneurs themselves. This shows that in practice only a select number of factors are believed to be of high importance to the revenue development of retailers and entrepreneurs. Therefore, the focus should be on these influential factors during the pilot study.

Table 13, Most influential factors for revenue according to entrepreneurs in inner-cities, all sectors combined.

Factor	Influence (positive/negative)
Holidays	51
Distance (of your business) to the centre of the inner-city	47
Footfall (in the inner-city)	43
Pleasant sunny weather	39
Opening hours	38
Public space around your business	30
Distance (of your business) to anchor stores	29
High temperatures (32°C and above)	-27
Distance (of your business) to parking facilities	24
Events	22
Rainfall	-7
Construction works in the inner-city	-6

Tables 14 and 15 show the results of the sectors retail and hospitality. Because the sectors services and other each only have one response, no statements can be made about these sectors. The results for the sector retail (table 14) show that the most influential, positive factors are the distance of the business to the centre of the inner-city (39), the opening hours (30), and the public space around the business (29). These findings are in line with research from Parker et al. (2016), in which starting hours, or opening hours, and appearance/atmospherics have also been identified as influential factors for entrepreneurs. From the follow-up question regarding the three most important aspects of the public space (see appendix 5), cleanliness of the public space is the factor most often mentioned by the respondents. Safety, greenery, and accessibility are also mentioned as important aspects of the public space by the respondents. The factors with the greatest negative influence on the revenue development are the same as in the total results (high temperatures (32°C and above) and rainfall)

with the exception of construction works in the inner-city which has a very low positive influence. The results for the hospitality sector are slightly different (table 15). The most influential positive factors are holidays (21), footfall in the inner-city, and pleasant sunny weather (10). The factors with the greatest negative influence are high temperatures (32°C and above) (-13), construction works in the inner-city (-9), and distance of the business to parking facilities (-5). The results show that for retailing businesses the most influential factors are related to the location and the public space around the business, and for the hospitality sector, the most influential factors are related to the number of visitors. Therefore, these factors are the most interesting for these types of businesses and should therefore be given extra attention during the pilot study after this research project to raise entrepreneurs' interest and convince them to participate in the research.

*Table 14, Most influential factors for revenue according to entrepreneurs in inner-cities, retail sector.*

<b>Factor</b>	<b>Influence (positive/negative)</b>
Distance (of your business) to the centre of the inner-city	39
Opening hours	30
Public space around your business	29
Distance (of your business) to anchor stores	27
Footfall (in the inner city)	27
Distance (of your business) to parking facilities	26
Pleasant sunny weather	26
Holidays	26
High temperatures (32°C and above)	-14
Events	11
Rainfall	-7
Construction works in the inner-city	5

*Table 15, Most influential factors for revenue according to entrepreneurs in inner-cities, hospitality sector.*

<b>Factor</b>	<b>Influence (positive/negative)</b>
Holidays	21
High temperatures (32°C and above)	-13
Footfall (in the inner city)	12
Pleasant sunny weather	10
Construction works in the inner-city	-9
Events	7
Opening hours	5
Distance (of your business) to parking facilities	-5
Rainfall	-4
Distance (of your business) to the centre of the inner-city	3
Distance (of your business) to anchor stores	-3
Public space around your business	-1

#### 4.3 Analysis methods

Once enough data about the factors identified in section 4.1 has been collected, several analysis techniques can be used to get more insight into the revenue development of entrepreneurs in inner-cities. These will be discussed in the following sections.

A variety of studies have examined the financial performance of businesses. Khudir & Ali (2019) investigated the financial performance of two large Australian retailers (David Jones and Myers



Holdings) by using analyses techniques such as comparative horizontal analysis, vertical financial statement analysis, ratio analysis, and trend analysis. These techniques are also used by Andal et al. (2019) for analysing the financial performance of the company PUMA.

A multitude of different financial indicators has been used in financial research (de Mesquita & Martins, 2011; Hong et al., 2017; Pavithra et al., 2019; Ramansh et al., 2020). Nguyen et al., (2020) divide these financial indicators into six categories: *Valuation ratios, profitability ratios, growth rates, efficiency ratios, liquidity ratios, and leverage/solvency ratios*. Valuation ratios show investors how much they can earn from investments into the company and includes ratios such as earnings per share. The profitability ratio measures the company's ability to earn profits in relation to their expenses and includes ratios such as return on equity, return on asset and return on sales. Growth rates show the company's growth and includes the total asset growth rate, liabilities growth rate, and owner's equity growth rate. Efficiency ratios measure how well the company uses its assets and liabilities to generate revenue and profit and includes ratios such as inventory turnover payables turnover and equity turnover. The last two ratios, liquidity- and leverage ratios measure how well the company can service its debts and other obligations. These financial indicators, or combinations of them, are commonly used in research about the financial performance of businesses (Andal et al., 2019; Fenyves, 2020; Hong et al., 2017; Khudir & Ali, 2019).

#### 4.3.1 Horizontal, vertical, and ratio analysis

**Horizontal analysis** is a method to analyse financial statements by comparing financial information over a certain period of time. It compares the current year's values against a base year's values to measure trends or changes in a company's financial performance and financial position. **Vertical analysis** is an accounting tool in which proportional analysis of documents, such as financial statements, can be performed. Each item on a financial statement can be reflected as a percentage of another item or base figure from the financial statement. For income statements, every item is reflected in relation to the percentage of gross or net sales, and for balance sheets, every item is usually reflected in terms of a percentage of the total assets. These two analysis methods are quite similar. However, there is one main difference; The horizontal analysis uses values of financial statements to represent an item's per cent change on a quarterly or on a yearly basis to show the trend or change in the financial performance of an organisation in contrast to the vertical analysis which is focusing on the relationships between financial data in a single reporting period (one moment in time). The horizontal and vertical analyses are used to compare basic items on a financial statement, such as gross profit, expenses/cost of goods sold, and net income.

Table 16 below shows an example of a **horizontal analysis** from Tuovila (2021) in which a base period is compared to the current period. This shows that the horizontal analysis does not necessarily need to be analysed on a yearly basis but can be based on various periods, such as daily, weekly, or monthly.

Table 16, Horizontal analysis. (Tuovila, 2021).

	Period 1 (Base)	Period 2 (Current Period)	Change	% Change
Net Income	\$10 million	\$20 million	+ \$10 million	100%
Retained Earnings	\$50 million	\$52 million	+ \$2 million	4%

Company XYZ

Table 17 shows the **vertical analysis** from Grant (2020). Differences from the horizontal analysis described above are evident. The vertical analysis compares items on a financial statement to a base figure. In this case, financial items are reflected as a percentage of the total sales, while the horizontal analysis compares financial items based on different time periods.

Table 17, Vertical analysis. (Grant, 2020).

Sales	5,000,000	100%
Cost of goods sold	1,000,000	20%
Gross profit	4,000,000	80%
General and Administrative Expenses	2,000,000	40%
Operating Income	2,000,000	40%
Taxes (%25)	500,000	10%
Net income	1,500,000	30%

**Ratio analysis** is a method used to analyse various financial information in the financial statements of organisations. Financial indicators, such as profitability ratios, liquidity ratios, and leverage/solvency ratios, are commonly used to compare to past financial statements in order to determine the financial performance of a company and to identify trends and draw comparisons to other businesses. Ratio analysis can be used for three types of analysis (CFI, 2021):

- Comparisons: Comparing the financial performances of a company to similar companies to determine the company's position in the market.
- Determining trend lines: Certain ratios gathered from financial statements of companies can be plotted over time to determine a trend in the financial performance and determining operational efficiency.
- Determining operational efficiency: Using ratio analysis to assess if liabilities and assets are used efficiently within the organisation.

In the research of Khudir & Ali (2019), the horizontal and vertical analyses are used to determine the strength and weaknesses of a company, and ratio analysis is used for a more in-depth analysis of a company by comparing data of profitability, stability, and financial position. Ratio analysis is thus similar when compared to horizontal analysis but uses different input data. Horizontal and vertical

analysis can thus be used to compare basic items on financial statements such as revenue, profit, and total assets and liabilities. With ratio analysis, more complex items of financial statements are compared, such as the financial ratios described above. The ratio analysis is thus, in principle, the same as the horizontal analysis. However, instead of comparing basic items on financial statements, financial ratios are used as input for the analysis. An example of **ratio analysis** is given in figure 11, which shows the ratio analysis from the research of Khudir & Ali (2019), in which large retailing companies from Australia are compared to each other. Various ratios are used for the analysis, such as the current ratio and the asset turnover ratio. The current ratio is calculated by dividing a company's current assets by the current liabilities. The results for David Jones and Myers Holdings are shown in table 11.

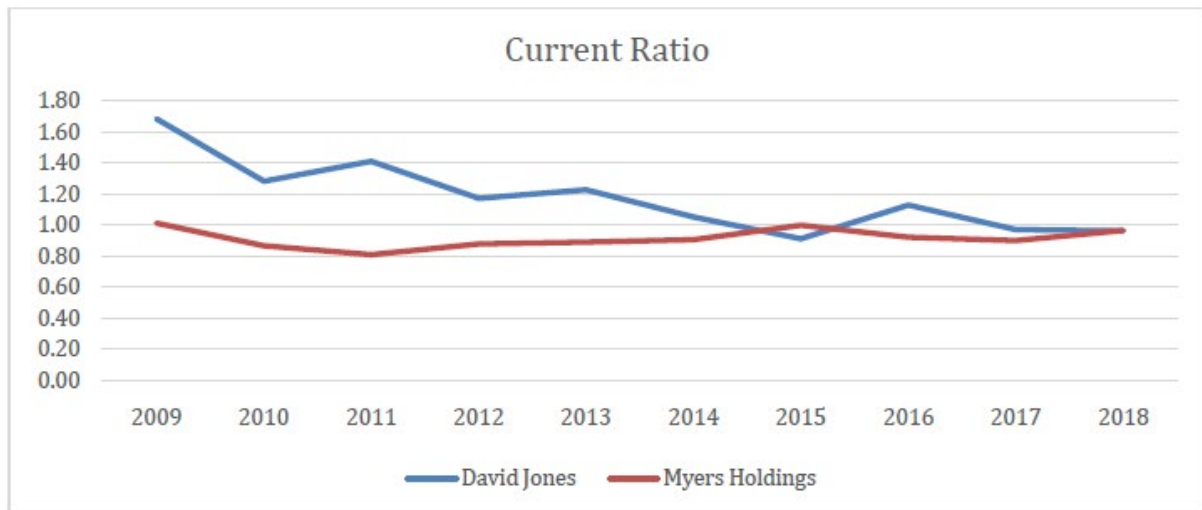


Figure 11, Ratio analysis. (Khudir & Ali, 2019).

The pilot study following this research project could make use of the horizontal and vertical analysis. These are the most suited techniques because the available financial indicator in the research is the periodical revenue of businesses. Financial ratios are more difficult to use in the pilot study because for financial ratios, more information about the financial performance of a company is needed than just the revenue development. However, an alternative ratio that could be used in a ratio analysis could be the average revenue per square meter retail floor area, which can be used to get insight into differences per branch or city over time.

#### 4.3.2 Trend analysis and time series analysis

**Trend analysis** revolves around analysing trends in financial statements to determine the financial performance of businesses and analysing past data of financial statements to predict the future movement of the financial performance. Trend analysis can therefore include very complex models (for predicting future movements) as well as less complex models to identify trends in financial statements. The horizontal analysis and ratio analysis are examples of less complex models in which trends of financial statements can be identified. Revenue predicting models are more complex. While revenue predicting using trend analysis mainly focuses on the stock market, there are several models that can be used for predicting the future movement of financial statements, such as time series models or neural networks. These will be discussed below.

Time series, a set of observations taken sequentially in time, are used in **time series analysis** which contains several methods and is used to analyse time-series data to derive “*relevant details and various knowledge traits*” (Ponniah et al., 2020). It can also be used to forecast future values based on previously observed values. Time series are commonly used for non-stationary statistics such as

economics, weather, stock price, and retail income. There are various time series analysis techniques such as ARMA, ARIMA, and ARIMAX (Kale & Joshi, 2015; Park et al., 2020; Ponniah et al., 2020).

**The Autoregressive Moving Average** model (ARMA) is one of the earliest time series analysis techniques. It consists of two parts, the autoregression part (AR) and the moving average part (MA) (Tang & Röllin, 2021). The moving average part is a process in which the value  $Y[n]$  depends linearly on the past error values ( $q$ ) of a random input process, a time-varying function in which outcomes of a random experiment are given to time values. The theory from Ibe (2014) describes these processes of ARMA models. In theory, a wide-sense stationary random input ( $W[n]$ ,  $n \geq 0$ ) is used, such as noise or message signals. Therefore, given a set of constants  $\beta_q$ , the moving average process of order  $q$  is defined by the following formula:

$$Y[n] = \beta_0 W[n] + \beta_1 W[n-1] + \beta_2 W[n-2] + \dots + \beta_q W[n-q]$$

$$= \sum_{k=0}^q \beta_k W[n-k] \quad n \geq 0$$

*Equation 1*

With:  $Y[n]$  = predicted value at time  $n$

$W[n]$  = random input

$\beta_q$  = coefficients of moving average

$q$  = the order of the moving average process

The autoregressive part also makes forecasts based on a linear combination of past values, but it does so on itself instead of past error values of a random input process, and therefore,  $Y[n]$  can be defined in a formula as a linear function of its own past  $p$  values:

$$Y[n] = \alpha_1 Y[n-1] + \alpha_2 Y[n-2] + \dots + \alpha_p Y[n-p] + \beta_0 W[n]$$

$$= \sum_{k=1}^p \alpha_k Y[n-k] + \beta_0 W[n] \quad n \geq 0$$

*Equation 2*

With  $Y[n]$  = predicted value at time  $n$

$Y[n-k]$  = past values of  $Y[n]$

$W[n]$  = random input

$\alpha_p$  = autoregression coefficients

$p$  = the order of the autoregressive process

These two processes combined together form the ARMA process, which can be defined as follows:

$$Y[n] = \sum_{k=1}^p \alpha_k Y[n-k] + \sum_{k=0}^q \beta_k W[n-k] \quad n \geq 0$$

*Equation 3*

The ARMA model can be used to make forecasts of future values based on past values of a certain time series (Ibe, 2014) and can therefore be used to predict future values of stationary time series such as noise (Zaw et al., 2020). The required input for an ARMA model is a stationary time series in which the

statistical processes of the time series do not change with time. While several analysis methods for time series use stationary data, many time series are not stationary and show some sort of annual or diurnal cycles. Some examples are temperature or in a financial context, revenue or retail income, and stock prices. Because these time series show this seasonality in their data, ARMA models are not applicable, and therefore the ARMA model should be extended to a model that can analyse non-stationary time series by differencing the data series (Anggraeni et al., 2015; Fabianová et al., 2016), such as the **autoregressive Integrated Moving Average** model (ARIMA). This model can thus deal with non-stationary time series such as economics, temperature or weather, stock price, and retail income or revenue because it incorporates differencing into the model. Differencing is transforming the non-stationary data to approximate stationarity by, for example, subtracting a periodic mean function from a given non-stationary time series, subject to an annual cycle, which will create a transformed data series with a constant mean (Wilks, 2019). The ARIMA model is defined as follows by (SAS Institute Inc., 2018):

$$\phi(B)(W_t - \mu) = \theta(B)a_t \quad \text{Equation 4}$$

With:  $W_t$  = the response series  $Y_t$  or a difference of the response series

$\mu$  = the mean term

$B$  = the backshift operator (used for differencing); given by  $BX_t = X_{t-1}$

$\phi(B)$  = the autoregressive operator

$\theta(B)$  = the moving-average operator

$a_t$  = the random error

**Autoregressive Integrated Moving Average with Explanatory Variable** model (ARIMAX) is an extension to the ARIMA model in which exogenous variables such as calendar variation or anomalies can be taken into account as well as the autoregressive, moving average, and differencing processes from ARMA and ARIMA models (Tadepalli et al., 2021). Moreover, the research of Tadepalli et al. (2021) shows that the ARIMAX model performs better than the ARIMA model to forecast kids' clothes demand. Other analysis methods that could be used for forecasting time series are **neural networks**: Series of algorithms that recognize relationships between data used in financial operations, business analytics, and product maintenance (Chen, 2020) and **machine learning**: A method of data analysis that automates analytical model building used in many industries such as financial services, retail, transportation and health care (SAS, n.d.).

**Time series analysis** using the **ARMA**, **ARIMA**, and **ARIMAX** models have similar input. All three models use a specific time series with either stationary data as input (such as noise or message signals) or non-stationary time series such as economics, weather, stock price, and revenue. Figure 12 shows a simulated time-series data set of sales from the SAS Institute Inc. (2018). Because this time series is a non-stationary time series, the ARMA model is not applicable, and ARIMA or ARIMAX models should be used for these analyses. There are many statistical software packages available for using ARMA, ARIMA, or ARIMAX models such as R, SPSS, and Python, but it can also be used in Microsoft excel with the right statistical add-ins installed.

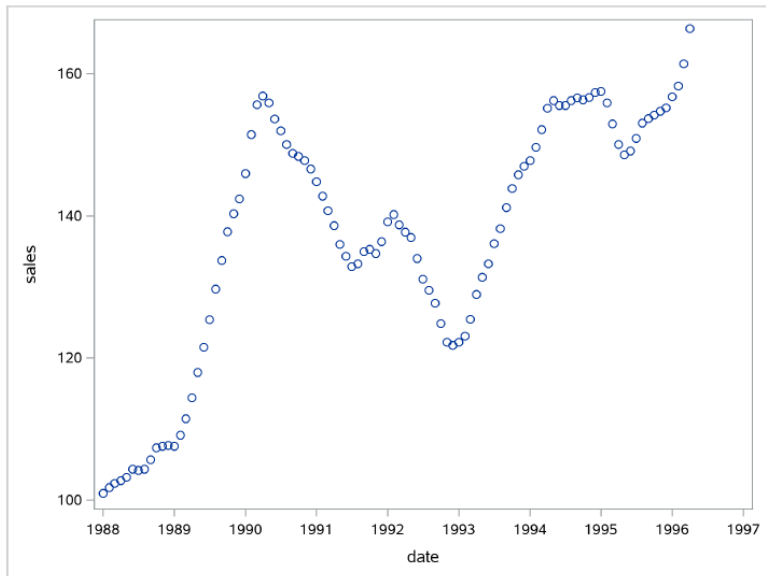


Figure 12, Time series. (SAS Institute Inc, 2018).

#### 4.3.3 Simulated example with an ARIMAX model

To illustrate how an ARIMAX model could be used to forecast future values of revenue, the following example is given based on the year-over-year growth rates from businesses in the retail sector (2015 to 2020), excluding petrol stations and pharmacies, as shown in table 18 (CBS, 2021). In this example, the base, monthly, revenue of this business is assumed to be €20,000,- and the fluctuations in revenue are based on the year-on-year growth rates from CBS (CBS, 2021). Table 19 shows data for the factor 'weather' with two variables: The monthly average temperature and the monthly accumulated rainfall based on public information from two online sources (KNMI, 2021; HetWeerActueel, 2021). The data for weather has been expanded to August 2021 because this data is needed to make forecasts for revenue for the first eight months of 2021. Because two independent variables are included in the analysis, an ARIMAX model will be used.

Table 18, Example of the monthly revenues of a business in the non-food retail sector. (CBS, 2021).

Date	Revenue (€)	Date	Revenue (€)
January 2015	20.280	January 2018	20.720
February 2015	20.480	February 2018	20.600
March 2015	20.280	March 2018	20.340
April 2015	21.280	April 2018	21.140
May 2015	20.280	May 2018	20.740
June 2015	20.800	June 2018	20.640
July 2015	20.580	July 2018	20.760
August 2015	20.200	August 2018	20.700
September 2015	21.000	September 2018	20.380
October 2015	20.480	October 2018	20.680
November 2015	20.220	November 2018	20.840
December 2015	20.560	December 2018	20.520
January 2016	20.300	January 2019	20.300
February 2016	20.440	February 2019	20.820
March 2016	20.300	March 2019	20.820
April 2016	20.160	April 2019	20.380
May 2016	20.700	May 2019	20.520
June 2016	20.280	June 2019	20.620
July 2016	20.560	July 2019	20.600
August 2016	20.420	August 2019	20.592
September 2016	20.080	September 2019	20.880
October 2016	21.040	October 2019	20.720
November 2016	21.000	November 2019	20.480
December 2016	20.460	December 2019	21.040
January 2017	21.000	January 2020	20.720
February 2017	20.580	February 2020	21.000
March 2017	20.920	March 2020	20.660
April 2017	20.860	April 2020	19.800
May 2017	20.760	May 2020	21.740
June 2017	20.900	June 2020	22.080
July 2017	20.900	July 2020	21.900
August 2017	20.900	August 2020	22.080
September 2017	21.160	September 2020	21.500
October 2017	20.300	October 2020	21.480
November 2017	21.080	November 2020	22.060
December 2017	20.740	December 2020	19.380

Table 19, Monthly meteorological data, average temperature and rainfall, in the past five years. (KNMI, 2021; HetWeerActueel, 2021).

Date	Average temperature (°C)	Rainfall (mm)	Date	Average temperature (°C)	Rainfall (mm)
January 2015	4.0	90.8	January 2018	5.6	84.2
February 2015	3.5	50.6	February 2018	0.7	27.6
March 2015	6.2	58.4	March 2018	4.7	65.2
April 2015	9.0	20.2	April 2018	12.2	44.6
May 2015	12.4	48.6	May 2018	16.4	36.5
June 2015	15.6	41.8	June 2018	17.5	74.7
July 2015	18.4	100.0	July 2018	20.7	81.9
August 2015	18.5	106.6	August 2018	18.5	79.7
September 2015	13.4	83.4	September 2018	14.7	74.9
October 2015	9.9	34.6	October 2018	11.9	57.6
November 2015	9.9	145.2	November 2018	6.8	86.6
December 2015	9.6	45.8	December 2018	6.1	77.5
January 2016	4.8	122.4	January 2019	3.5	82.6
February 2016	4.6	85.2	February 2019	6.1	94.6
March 2016	5.4	60.8	March 2019	8.0	56.7
April 2016	8.7	88.6	April 2019	10.9	38.0
May 2016	14.5	54.4	May 2019	11.7	36.5
June 2016	16.8	119.2	June 2019	18.1	74.7
July 2016	18.4	62.8	July 2019	18.8	81.9
August 2016	17.9	69.2	August 2019	18.4	79.7
September 2016	17.3	22.6	September 2019	14.5	74.9
October 2016	9.9	38.0	October 2019	11.6	57.6
November 2016	5.4	63.8	November 2019	6.4	102.0
December 2016	4.7	19.4	December 2019	5.8	81.2
January 2017	1.6	60.2	January 2020	6.2	56.8
February 2017	5.0	81.0	February 2020	7.2	161.6
March 2017	8.6	44.8	March 2020	6.8	62.6
April 2017	8.6	30.8	April 2020	11.1	12.2
May 2017	15.0	33.4	May 2020	13.1	9.4
June 2017	18.0	60.8	June 2020	17.5	77.0
July 2017	17.9	117.8	July 2020	17.0	46.8
August 2017	17.2	60.4	August 2020	20.4	82.6
September 2017	13.7	126.4	September 2020	15.2	67.0
October 2017	13.3	76.8	October 2020	11.3	80.8
November 2017	7.3	84.8	November 2020	8.9	52.6
December 2017	4.9	160.6	December 2020	5.5	84.2
			January 2021	3.4	80.0
			February 2021	4.3	44.6
			March 2021	6.4	34.6
			April 2021	6.7	45.6
			May 2021	11.2	100.4
			June 2021	18.2	49.4
			July 2021	18.0	91.6
			August 2021	16.9	91.8



SPSS is the statistical software package used for forecasting future values of this time series. First, because the time series used is non-stationary (see figure 13) with a varying mean and variance over time it has to be differenced to make the time series stationary and usable for analysis. This is done by subtracting the previous value to a current value of a given time series which will create a transformed data series with a constant mean (figure 14). Then, the autocorrelation function and partial autocorrelation function can be plotted, as seen in figures 15 and 16. These functions are used to determine which ARIMAX model has to be used. A negative autocorrelation at lag 1 means that a moving average model has to be used (Towards data science, 2018). Lag 1 in the autocorrelation function means the correlation between values are 1 time period apart. More generally, the lag  $k$  autocorrelation is the correlation between values that are  $k$  time periods apart. This negative autocorrelation, in combination with the decreasing trend in the partial autocorrelation, means that a lag 1 moving average model has to be used (Tabachnick & Fidell, 2013) in the ARIMAX model. Therefore, the correct ARIMAX model for this analysis is an ARIMAX(0,1,1) model which is derived from the standard notation for ARIMAX (and ARIMA) models, namely, ARIMAX( $p,d,q$ ) in which the  $p$  stands for the number of autoregressive lags, the  $d$  is the order of differencing and  $q$  is the number of moving average lags. This is done in SPSS by using the option 'forecasting' in the 'analyze' menu and then selecting the 'create traditional models' option. Revenue is then used as the dependent variable and average temperature and rainfall are used as independent variables.

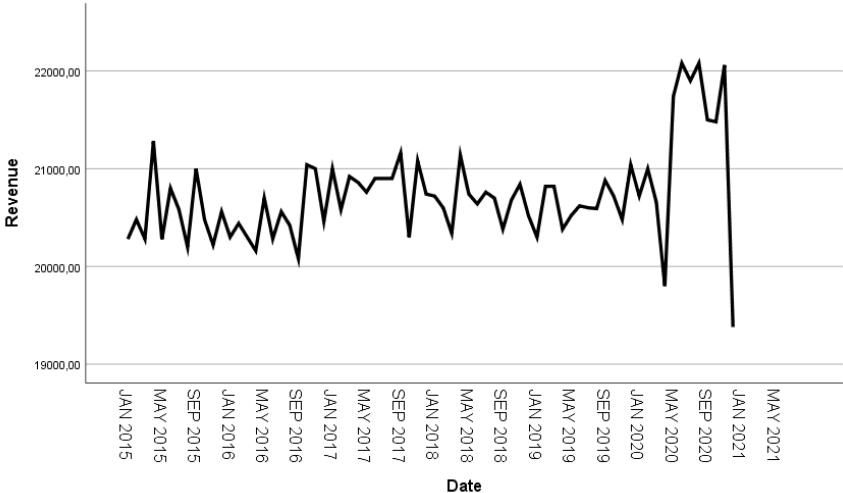


Figure 13, Sequence chart for the non-stationary simulated time series.

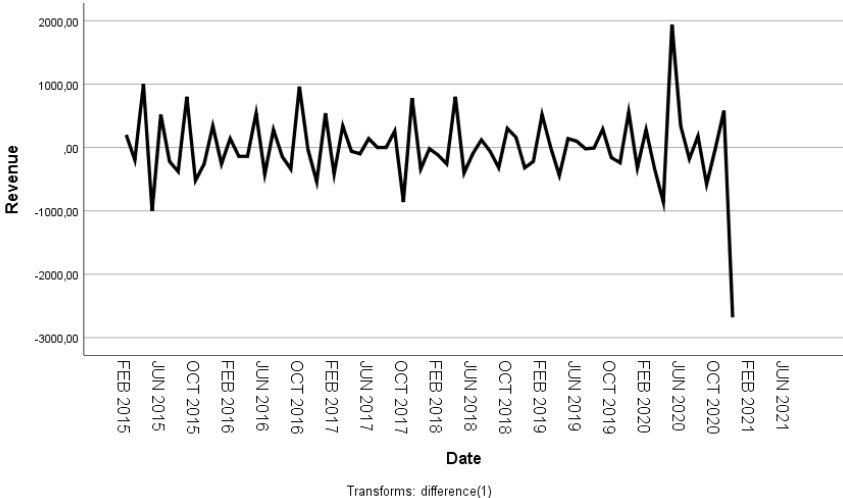


Figure 14, Sequence chart with first order differencing for the simulated time series.

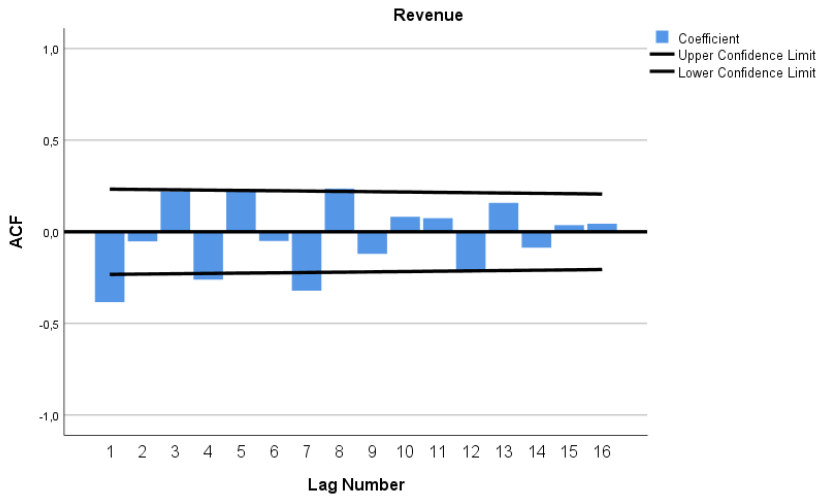


Figure 15, Autocorrelation function for the simulated time series.

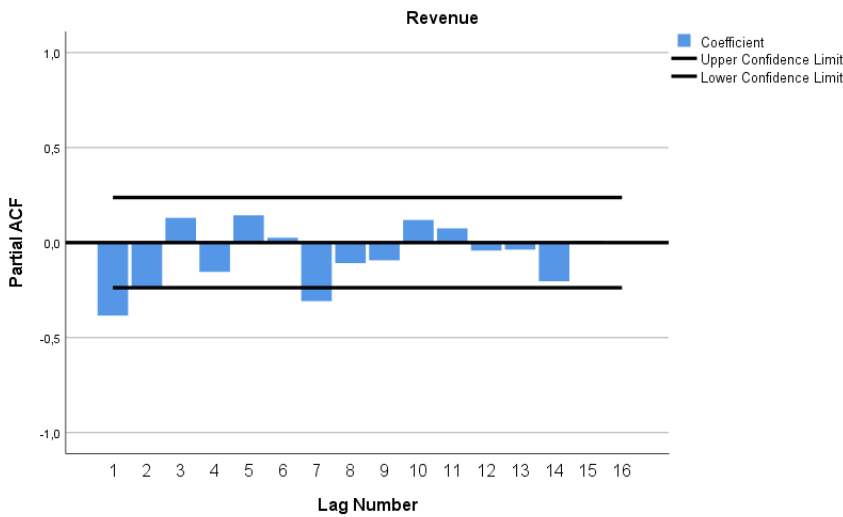


Figure 16, Partial autocorrelation function for the simulated time series.

SPSS does not define this as an ARIMAX model but defines it as an ARIMA model and includes the two variables as independent variables, but essentially it is the same as an ARIMAX model. As mentioned earlier, the revenue data has been given for the year 2015 till 2020. To forecast future values of revenue, based on previous values of revenue and independent variables (in this instance, average temperature and rainfall), the data for the independent variables should be known for the months in which the revenue will be forecasted. Therefore, the data about average temperature and rainfall is given from 2015 till August 2021. The values of revenue in the year 2021 are forecasted by the model in SPSS. Figure 17 and table 20 show the forecasted values of revenue, the upper control limit, and the lower control limit for the first eight months in 2021. The ARIMAX-model parameters are shown in table 21. The constant of the model is estimated to be 138.64 and estimates for the variables average temperature and rainfall are 4.34 and -2.54 respectively. Because the significance values for revenue and average temperature are over 0.05 (0.122 and 0.403 respectively), rainfall has the largest influence on the forecasted revenue in this model. The model statistics in table 22 show the performance indicators for the ARIMAX model. The  $R^2$  value is 0.403, the normalized Bayesian Information Criterion (BIC) is 12.465, and the model significance is 0.383. An  $R^2$  value above 0.7 is considered a high level of correlation and a measure below 0.4 is a low correlation in the field of finance (Fernando, 2021).

Therefore, the model fit is quite low. However, currently only two independent variables (average temperature and rainfall) have been used while there are many more variables of influence to the revenue, and therefore, the model fit could be considered as acceptable. Because this is a simulated example, the fact that the model is not significant is not very important for now. The example with the model is given to show how the revenue data can be analysed during the pilot study. Therefore, only two variables (average temperature and rainfall) have been included in the analysis currently. In a later stage, more independent variables can be included in the model.

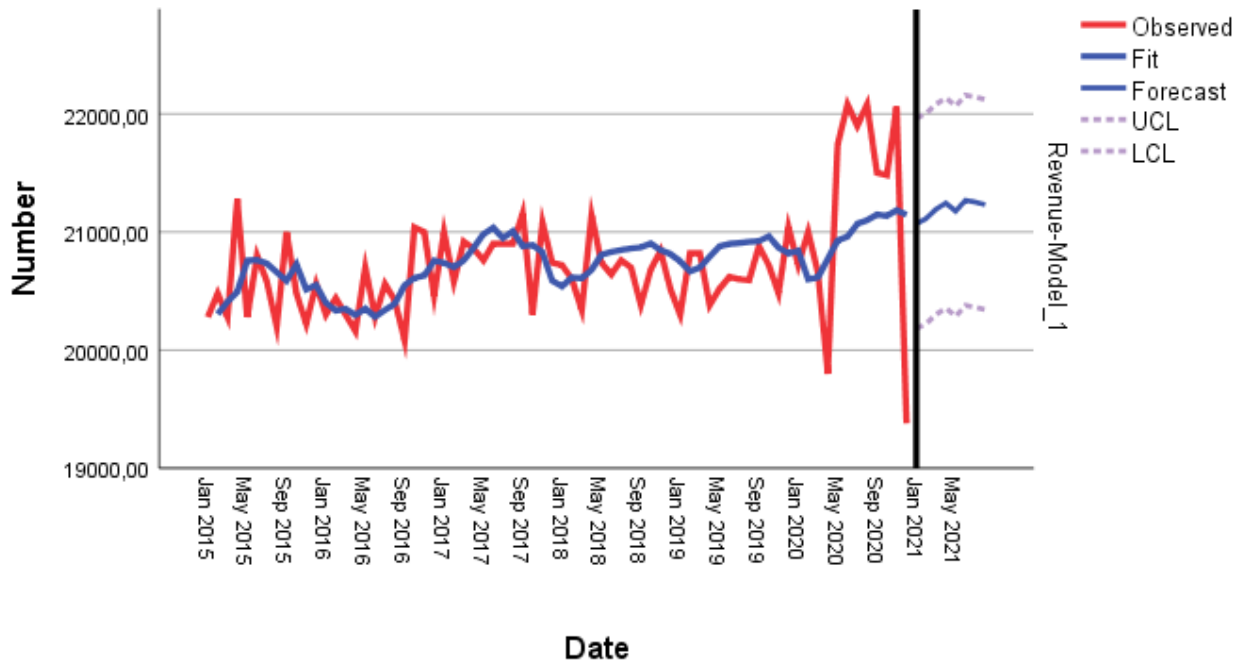


Figure 17, Observed and forecasted values of the simulated time series

Table 20, Forecasting values of the ARIMAX model of the simulated time series

	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021
Forecast	21070.48	21114.39	21192.85	21244.63	21176.63	21268.68	21252.56	21231.17
UCL	21960.48	22004.40	22082.84	22134.63	22066.62	22158.66	22142.54	22121.14
LCL	20180.48	20224.39	20302.85	20354.64	20286.64	20378.69	20362.59	20341.20

Table 21, Parameters of the ARIMAX model of the simulated time series

					Estimate	Sig.
Revenue-Model 1	Revenue	No Transformation	Constant		138.636	.122
			Difference		1	
			MA	Lag 1	.999	.281
	Average temperature	No Transformation	Numerator	Lag 0	4.341	.403
	Rainfall	No Transformation	Numerator	Lag 0	-2.542	.012

Table 22, Model statistics of the ARIMAX model of the simulated time series

<i>Model</i>	<b>Model Fit statistics</b>			<b>Ljung-Box Q(18)</b>
	Number of Predictors	Stationary R-squared	Normalized BIC	Sig.
<i>Revenue-Model 1</i>	2	.403	12.465	.383

#### 4.4 Conclusion

In this section, the results from this research and the development phase of the pilot study have been discussed. First, the information gathered from the literature review and the development phase have been combined into a list of factors influencing the revenue development of entrepreneurs in the inner-city. Twelve (independent) factors have been identified, divided into three categories: Individual retail factors, city-scale factors, and external factors. Five dependent factors have been included in the research; offline revenue, online revenue, rent, cost of goods sold, and personnel costs. However, as elaborated earlier, costs will not be included in the data collection because collecting revenue data alone already proves to be quite difficult.

A survey has been compiled to question entrepreneurs in the inner-cities about the importance of factors that have an influence on the revenue development of retailers and entrepreneurs. The results of the survey (only 19 respondents) show that holidays, the distance of the business to the centre of the inner-city, and footfall in the inner-city are the most influential, positive factors according to entrepreneurs in the inner-city. The factors that have the greatest negative influence are high temperatures (32°C and above), rainfall, and construction works in the inner-city. When data about these factors is available, they can be used to analyse their influence on revenue as has been discussed in section 4.3.3.

Various analysis methods have been identified that can be used to analyse the financial performance of businesses. The most straightforward analysis methods are the horizontal and vertical analysis: Comparing items on financial statements over time (horizontal) to identify trends or comparing items on financial statements as a percentage of a base figure (vertical). These analyses can be used to compare basic items on financial statements such as gross profit, expenses/cost of goods sold, or in the case of this research, revenue from retailers and entrepreneurs. Ratio analysis is used to analyse various financial indicators, such as profitability ratios, liquidity ratios, and leverage/solvency ratios, in the financial statement over time, which gives a more in-depth view of the company in relation to its profitability, stability, and financial position. During the pilot study after this research project, the ratio analysis could be used to analyse the average revenue per square meter retail floor area. More complex models, such as time series models can not only be used to examine trends in time series but also to forecast data based on previous values. Three forecasting models have been discussed which are the ARMA model; a forecasting model which can forecast values of stationary time series, the ARIMA model; a widely used forecasting model which can analyse non-stationary time series (such as weather, stock price, or revenue) by using differencing, and an extension to the ARIMA model, the ARIMAX model in which exogenous variables such as calendar variation can be taken into account as well as the standard processes from the ARMA and ARIMA models. Statistical software packages can be used to make forecasts using the discussed models. During the pilot study after this research project, the ARIMAX model could be used to forecast future values of revenue based on a set of independent variables. The simulated example given in this chapter shows how this ARIMAX could be used. Two independent variables have been included, average temperature and rainfall, and based on

these variables the revenue has been forecasted for the first eight months of 2021. The results from this simulated example show that rainfall has a higher influence on the forecasted revenue than average temperature. The model fit is quite low ( $R^2 = 0.403$ ) and not all variables are significant. However, because only two independent variable have been included the model, the model fit is considered to be acceptable.

## 5. Conclusion, discussion, and recommendations

This final chapter will discuss the conclusions of the research on the revenue development of retailers and entrepreneurs in inner-cities. The main research question and the sub-questions will be answered. Moreover, the limitations of the current study will be discussed, and recommendations for future research are given.

### 5.1 Conclusions

This research aimed to identify factors that influence the revenue development of retailers and entrepreneurs in inner-cities and to find a measurement method to verify the effect of these factors. In order to study these goals, the following main research question has been formulated:

*Which factors influence the revenue development of entrepreneurs and the economic functioning of inner-cities, and how can revenue development and relevant factors in Dutch inner-cities be measured?*

The research question has been answered throughout the research. To find the answers, first, a literature review has been conducted to identify relevant factors influencing revenue development. The inner-city is the bustling heart of a city and plays an important part in the economic performance of the city because of the many job opportunities in the inner-city. Inner-cities used to be a *'place to buy'* but have been transformed into a *'place to be'*, which underlines the importance of an inner-city with a diverse set of functions to provide a complete experience to consumers. More recently a new phase started for inner-cities in which many vacant buildings are transformed into living spaces, and therefore inner-cities are becoming a *'place to live'*. Maintaining the vitality and liveability of the inner-cities is therefore important to keep the inner-city attractive for the inhabitants but also its visitors because attracting more visitors gives the potential to increase the revenue of retailers and entrepreneurs in the inner-city and therefore increase the economic functioning of the inner-city. Several factors influencing the attractiveness, and thus the economic functioning of the inner-city have been identified in the literature review such as mobility/accessibility, cityscape/atmospherics, liveliness, additional offers, the composition of retail spaces, footfall, and events. These aspects can (partly) be influenced by the municipality and can therefore be used to improve the economic functioning of the inner-city. However, because these factors are on a city-wide scale, entrepreneurs cannot influence these factors individually.

Factors that entrepreneurs can (partly) influence are the usage of the online channel, customer segmentation, technology, and opening hours. These factors have been identified as opportunities for the retail system in the inner-city. However, these opportunities require some adaptation from retailers and entrepreneurs, but if used to their advantage, these developments can strengthen the economic functioning and resilience of entrepreneurs. The economic functioning can be analysed by several factors such as revenue, foot traffic/footfall, vacancy, employment, and labour- & floor space productivity. Data about these indicators can show how well a certain region is performing economically. In this research, revenue will be used as an indicator of the economic performance of entrepreneurs. Furthermore, threats and external factors that affect the revenue development and resilience of entrepreneurs have been discussed. Five threats have been identified: the rise of online shopping, changing consumer behaviour, changing demographics, competition from large-scale retailers, and scattered ownership. While the competition from large-scale retailers is not a large issue in the Netherlands, the other threats can have a large impact on the Dutch retail system. Retailers and entrepreneurs need to adapt to these changes to remain competitive and maintain their economic functioning and resilience. External factors to which retailers and entrepreneurs can adapt but cannot influence are the weather, the conjuncture of the economy, and holidays.

The factors discussed above are relevant factors for the revenue development of retailers and entrepreneurs in inner-cities and are shown in the conceptual framework developed for this research project. Moreover, if used to the advantage of the entrepreneurs, these factors can positively influence the resilience of entrepreneurs and therefore strengthen their economic functioning and stability. This is important because many entrepreneurs are located in the inner-city in various sectors and are therefore an important part of the economic functioning of the inner-city. Improving the resilience of retailers and entrepreneurs in the inner-city can therefore contribute to the economic functioning and resilience of the inner-city itself.

This research forms the theoretical foundation for the pilot study, which will take place in the near future. Beforehand, a pre-pilot will be conducted around August. During the pilot study, revenue data from entrepreneurs in the inner-city will be collected using surveys sent via the online communication platform Chainels. This data collection method is a suitable method for collectively measuring revenue because it can measure both cash and PIN payments, it can be applied to any desired area, and it can collect more data than mere revenue from entrepreneurs. As discussed in the literature review, in countries such as Sweden, Italy, or France, measuring revenue is often incorporated into turnover rental agreements in which retailers have to periodically (monthly or quarterly) share their revenue data with the landlord. Sharing revenue data is, therefore, obligated in these countries when using these types of rental agreements. In the Netherlands, these types of rental agreements are not common.

The results from the development phase of the pilot study show that it is very difficult for the representatives of the inner-cities to get entrepreneurs willing to participate in the research. The most important reason for this is the reluctance of Dutch entrepreneurs to share revenue data and concerns about the privacy aspect of the research. Because revenue data is business-sensitive data, these concerns cannot be fully taken away. However, by informing the entrepreneurs as much as possible about the use of business-sensitive data during the pre-pilot and pilot study and about the security standards of the data collection system, these concerns can be reduced, which might persuade entrepreneurs to participate. Once a first few entrepreneurs have been persuaded to participate in the pre-pilot and pilot study, it is expected that more entrepreneurs will follow. Furthermore, the workload on the entrepreneurs will be kept to a minimum during the pilot study; the questionnaires on revenue data will be short and clear and only need to be completed once a month. During events and holidays, this frequency may be increased to weekly or daily to get a better understanding of the effect of these events. By keeping the work pressure as low as possible, entrepreneurs will be more inclined to participate because they are not interested in long questionnaires that will take up a lot of time. Recruiting entrepreneurs willing to participate in the pre-pilot and pilot study has proven to be very difficult during the development phase, as evidenced by the city of Eindhoven. After many attempts to persuade entrepreneurs in the inner-city to participate, only two entrepreneurs were willing to participate and therefore, they have decided to stop with the pilot study.

To get more insight into which factors are the most influential to revenue development according to entrepreneurs in the inner-city, a short survey has been composed. The factors included in this survey are derived from the knowledge gathered in the literature study and the development phase of the pilot study. The results show that holidays, the distance of the business to the centre of the inner-city, and footfall in the inner-city are the most influential, positive, factors and high temperatures (32°C and above), rainfall, and construction works in the inner-city are the most influential, negative, factors. It is therefore essential to include these factors in the pilot study because information about these factors will be very important or intriguing to entrepreneurs in the inner-city. There are some differences between the sectors retail and hospitality. The most influential factors for hospitality can mainly be related to the number of customers (holidays, footfall, pleasant sunny weather, and events).

In contrast, the most influential factors for the retail sector are more related to the location and public space of the business (distance of the business to the centre of the inner-city, opening hours, public space around the business, and distance of the business to anchor stores).

Several analysis methods that could be used in the analysis of the revenue data gathered in the pilot study have been identified. Horizontal analysis and vertical analysis can be used to analyse basic financial items, for this instance, the revenue of entrepreneurs in the inner-city. Ratio analysis could be used to visualise the average revenue per square meter of retail floor area to get more insight into the differences between the revenue development in various branches and cities. Furthermore, time series analysis can be used to examine the existing revenue data and forecast future values based on the past revenue data. This can be interesting when using revenue data gathered during events and holidays, when more footfall is expected in the inner-city, to forecast future values of revenue during events and holidays. Three time series analysis methods have been discussed: ARMA, ARIMA, and ARIMAX. The ARIMAX model is expected to be the most relevant for the pilot study because this model can use non-stationary time series as input for analyses, which is the case for revenue data (because of the seasonality of revenue development) and it can include independent variables in the analysis. A simulated example has been discussed in this research project showing how an ARIMAX model can be used to forecast future values of revenue based on a set of independent variables (in this instance, average temperature and rainfall). The results from this example show, (albeit not a high model fit and not completely significant) that average temperature has a greater influence on revenue development than rainfall which is in line with findings discussed in the literature review. During the pilot study after this research project, the number of independent variables in the ARIMAX model can be expanded to get more insight into the influence of various factors on the revenue development of retailers and entrepreneurs in inner-cities. Because the pilot study will start with data collection at a later stage, this research can be seen as the theoretical foundation supporting the pilot study. Further research should focus on the actual data collection and analysis of the revenue data.

## 5.2 Limitations and recommendations for future research

This section discusses the limitations of this research. First of all, because the data collection will be performed via the Chainels network, the inner-cities that would like to participate in the pilot study should have a working Chainels network. Without this platform, data collection would be drastically more difficult because then each individual entrepreneur should be contacted to participate and fill in surveys about their revenue data. Moreover, with this system implemented in the online network of Chainels, the security standards are higher than when the data would be collected via surveys. However, the usage of the Chainels network can also be a limitation because several more cities were willing to participate in the pilot study such as Nijmegen, Leiden, 's Hertogenbosch, and Venray, but because these cities do not have a working Chainels system, they could not participate in the research. Future research should, therefore, focus on making the pilot study more accessible for all cities to participate. This does not necessarily need to be in combination with Chainels because there are other companies that provide online communication platforms such as HqO or Spaceflow, however, for this research Chainels was the most practical solution because several cities were already working with this system. With more cities participating, more information can be collected, which can make the results from the pilot study more representative for Dutch inner-cities. Currently, the information gathered is only based on five (reasonably large) inner-cities in the Netherlands, and it is therefore questionable if the results apply to all (sizes of) inner-cities in the Netherlands. Further research should therefore focus on increasing the representativity of the results of the pilot study

Secondly, getting insight into the established list with factors influencing revenue development would be an ideal situation. However, getting revenue data from retailers and entrepreneurs has already



proven to be difficult to achieve. Therefore, including costs of the company is not feasible and will therefore not be taken into account, while this would be desirable to get a better understanding of the economic functioning of a company because revenue data alone is not really sufficient. Moreover, analysis of all established factors is not possible because not enough information is available for some factors. For instance, to analyse the effect of the time of wage payment or holiday allowance, information is needed about when these payments are done. However, this data is currently not available and can therefore not be taken into account in the pilot study. Future research could focus on getting more insight into these aspects. While collecting data of costs via surveys will probably not be feasible, information on costs could be investigated by researching costs of businesses in general and translating this general information to individual businesses (or classes of businesses). For example, costs could be represented as a percentage of revenue.

The last limitation is related to the survey used to get more insight into which factors affecting revenue development are most influential according to retailers and entrepreneurs in the inner-city. Because during the development phase it became clear that the workload for entrepreneurs during the data collection should be as low as possible, the survey was kept very short and concise so that entrepreneurs could fill it out very quickly and it would not take up a lot of time. While this in itself is not a large problem, it does mean that there was not much room for follow-up questions. Ideally, entrepreneurs should be questioned about their given rating for each factor to understand their underlying reasoning, but because the survey had to be kept concise, this was not possible. Moreover, the sample size of the survey is essentially too small, with only 19 responses. Therefore, no factual statements can be made based on this survey. However, it does give an indication on which factors are believed to be the most influential to revenue development according to retailers and entrepreneurs in the inner-city. Attention to the sample size should also be given during the pre-pilot and pilot study. Because currently, not enough entrepreneurs have been found (yet) willing to participate in the pre-pilot, the required sample size has been left aside for now. However, during the pilot study, the sample size will have to be large enough to make representative statements about the results. Getting insight into sub-areas of the inner-city or for specific branches is difficult because the more specific the target group, the smaller the population will be. Future research should therefore give attention to the required sample size and motivate entrepreneurs to participate in the pilot study.

### 5.3 Practical implications and scientific relevance

The results of this research have multiple practical implications for different stakeholders. Firstly, the results of the literature review can be used by municipalities, retailers, and entrepreneurs in inner-cities as a set of factors that influence revenue development in inner-cities. Knowledge about these factors and how they can be manipulated can be used by municipalities and entrepreneurs to increase their revenue and thus increase their economic functioning and resilience. In addition, insight into the revenue data of entrepreneurs in inner-cities can shed light on the development of revenue over time and the effects of, for example, events and holidays. Retailers and entrepreneurs can use information about the revenue development in the inner-city as a benchmark to compare with their own individual revenue. The revenue development can be compared in respect to the whole inner-city, but also for sub-areas or for specific branches or sectors within the inner-city. Moreover, the benefit for individual businesses with respect to collective actions in the inner-city, such as events, can be assessed by benchmarking the individual revenue of a business to the aggregated revenue of a sector or inner-city area/neighbourhood. By benchmarking the individual revenue to the aggregated revenue, a rough indication can be given of whether the potential revenue in an area or sector has been achieved or not. However, this is still a rough indication because the revenue is not only dependent on the effect of a specific event but is also affected by various other factors such as location, weather, and atmospheric etc.

The pilot study is one of the first studies in the Netherlands to collectively measure revenue data of entrepreneurs in inner-cities. It is, therefore, an explorative process to understand the needs of retailers and entrepreneurs in the inner-city and municipalities. Documenting the issues during the development phase is therefore important so that future research in this field can learn from the procedures followed during the development phase. Recruiting enough entrepreneurs to participate in the research has been difficult but future research could learn from the results described in this research to gather support more easily. Personally contacting the entrepreneurs in the inner-city seems to be the most effective way of gathering support, according to the results from the development phase of the pilot study. Moreover, results from the pilot study may be used in the 'Binnenstadsbarometer' to give more insight into the theme 'economy' for inner-cities and thus give more insight into the economic functioning of inner-cities.

The extensive literature review on factors that have an influence on the revenue development of retailers and entrepreneurs in inner-cities has resulted in a conceptual framework that can be used as a foundation for future research in this field. Various factors, such as atmospheric, mobility/accessibility, and retail mix that influence the image and attractiveness of inner-cities, have been studied, however, not in relation to the revenue development of retailers and entrepreneurs. Therefore, this research has identified relevant factors that influence the revenue development of retailers and entrepreneurs in inner-cities by means of a literature review and complemented it with suggestions and feedback given during the development phase of the pilot study that will be conducted after this research project. By means of the discussed analysis methods, the influence of these factors can be analysed when the required data input is available.

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## Appendix

### Appendix 1. Classification of city centres, Locatus

<b>Central shopping area</b>	
<i>Inner-city</i>	>400 shops, top 17 shopping areas of the Netherlands, city centre larger cities
<i>Main shopping area large</i>	200-400 shops, city centre medium-sized cities
<i>Main shopping area small</i>	100-200 shops, city centre small cities
<i>Core shopping centre large</i>	50-100 shops, centre of large villages
<i>Core shopping centre small</i>	5-50 shops, centre small villages

<b><i>Inner-city</i></b>	<b><i>Main shopping area large</i></b>
Alkmaar	Almere
Amsterdam	Amersfoort
Arnhem	Apeldoorn
Breda	Assen
Dordrecht	Bergen Op Zoom
Eindhoven	Delft
Groningen	Deventer
Haarlem	Doetinchem
Hilversum	Emmen
Leeuwarden	Enschede
Leiden	Goes
Maastricht	Gouda
Nijmegen	Heerlen
Rotterdam	Hoorn
'S-Gravenhage	Middelburg
'S-Hertogenbosch	Oosterhout
Utrecht	Oss
	Purmerend
	Roermond
	Roosendaal
	Súdwest-Fryslân
	Sittard-Geleen
	Tilburg
	Veenendaal
	Venlo
	Weert
	Zaanstad
	Zeist
	Zutphen
	Zwolle

Appendix 2. Classification of sectors Locatus.

<b>Group</b>	<b>Main branch</b>
00-Vacancy	00.000-Vacancy
	00.100-Conversion
11-Daily retail	11.010-Food products
	11.020-Personal care
22-Fashion & Luxury	22.030-Warehouse
	22.040-Clothing & Fashion
	22.050-Shoes & leather goods
	22.060-Jewellery & Optics
	22.070-Household & luxury goods
	22.080-Art & antiques
35-Leisure time	35.100-Sports & Games
	35.110-Hobby activities
	35.120-Media
37-In/around House	37.130-Plant & Animal
	37.150-Brown & White Goods
	37.160-Car & Bicycle
	37.170-Do-It-Yourself
	37.180-Living
38-Other retail	38.200-Other retail
58-Culture & Leisure	58.100-Culture
	58.200-Recreation
	58.300-Gambling
	58.400-Sports
	58.500-Wellness
	58.600-Culture & Leisure Other
59-Hospitality	59.200-Drinks
	59.210-Food
	59.400-Fast food
	59.500- Coffee & Desserts
	59.700-Hotels
	59.900-Hospitality Other
65-Services	65.250-Rental
	65.260-Crafts
	65.280-Financial Institution
	65.290-Private Service provision

Appendix 3. flyer with information for entrepreneurs.

### **What do investments in the inner-city yield in your cash register?**

Every day, investments are made in the inner-city: from the organisation of an event to the redesign of the public space. Not only the municipality invests in the inner-city, but you, as an entrepreneur, also contribute to these investments. For example, by paying advertising tax or a contribution to the BIZ. But what is the return on these investments? To answer this question, it is important to monitor the returns on investments. The revenue of entrepreneurs is an ideal indicator: does the investment in an event in the inner-city, for example, also **generate more euros in the cash registers of entrepreneurs?**

### **What are we going to do?**

In the coming period (approximately six months), research will be started in five inner-cities into measuring revenue developments, focusing on the collection of revenue data. On the basis of this data, it will be examined how revenue develops in the inner-city and which factors influence the development of revenue, such as weather conditions.

### **Who is organising this pilot?**

The pilot is a collaboration between Platform Binnenstadsmanagement, Chainels, BRO, TU Eindhoven and four participating inner-cities (Arnhem, Gouda, Tilburg, and Utrecht). The Platform Binnenstadsmanagement, founded in 1995, is an independent, national knowledge and network organisation on collaboration in inner-cities. Chainels is specialised in facilitating the internal communication of shopping areas through its online platform. BRO is a consultancy company focused on tasks and projects in the areas of spatial development, urban planning, landscape, and economy.

### **Why should you share your revenue data periodically? What are the benefits for you?**

1. You can **compare** your revenue with the average revenue in your branch/sector in your inner-city and other inner-cities in the Netherlands. If enough entrepreneurs participate, we can also compare your performance to other inner-city subareas.
2. You gain insight into what **collective actions, such as events** in the inner-city, yield in your sector/sector and to what extent you benefit from this.
3. You will gain insight into how your branch/sector in the inner-city benefits from **online sales opportunities** and what the online potential is for your business.
4. You will gain insight into the **revenue development (index)** of the shops and restaurants in the inner-city per week and for larger events. This makes it clear which moments collectively generate the most revenue and where your company can also profit from.
5. From the collective cooperation, we can use the index figures of the revenue data to **convince the municipality** to (continue to) invest in the inner-city.
6. From the collective cooperation, we can use the index figures of the revenue data to **stimulate other entrepreneurs** to open their business at successful moments in order to create a more attractive visiting climate.
7. From the collective cooperation, we can use the index figures of the revenue data to **periodically monitor** how the economy of the inner-city is doing and to adjust where necessary to optimise the economic climate.
8. From the collective cooperation, we can **correlate** the index figures of the revenue data with visitor numbers, weather data, etc., to find connections with the aim of gaining insight into the factors that influence the revenue and how we can optimise this.

### What do you get in return?

The approach of this pilot is to explore, together with the entrepreneurs in the inner-city, what the periodic output should look like. In any case, our aim is to provide a **weekly overview** with aggregated information about your **branch/sector** in the inner-city (and the national average). You can compare this information with your own revenue figures. In addition, we would like to visualise information on **larger events** and possibly publish additional monthly or quarterly reports. What the result exactly looks like depends entirely on the **willingness of entrepreneurs** to participate. The more entrepreneurs periodically participate, the more (aggregated and indexed) information we can give.

*Example weekly output*

Sector	Revenue development inner-city	Revenue development inner-city
	Week 20 2021 vs 2020	Week 20 2021 vs 2020
Daily retail	+5,4%	+ 6,4%
Non-daily retail	+4,6%	+21,4%
Hospitality	+12,5%	+9,4%
Services	+14,6%	+7,3%

### Why is your participation important?

In order to be able to make reliable statements about the factors that influence revenue development in the inner-city, it is important that a sufficient number of entrepreneurs participate in this research. The success of this pilot, therefore, depends on the participation of you and your fellow inner-city entrepreneurs.

### How does it work?

To collect all revenue data of entrepreneurs, we use Chainels. Chainels is the communication platform that every entrepreneur in your inner-city is connected to or has the opportunity to join. Every month/week, you receive a notification via Chainels to pass on your revenue data via a short questionnaire. This questionnaire takes about 5 minutes to complete. The analysis is carried out on the basis of this data and the data already entered in Chainels, such as the events calendar or your company's sector. Your data is handled with care.

### What is measured?

The questionnaire asks you to supply the following data on a weekly basis:

- Offline revenue in the company (excluding VAT)
- Online revenue (excluding VAT)

In addition, we use data that you have already entered in Chainels, including your organisation's branch and the events calendar.

### Privacy statement

Revenue data provided by entrepreneurs is not shared with the municipality, inner-city management, or other parties. The individual revenue data is only visible to the entrepreneur himself and is only used by Chainels, TU Eindhoven, BRO, and the Platform Binnenstadsmanagement for this research. The data is aggregated and anonymised. The final results are shown in the form of indexes,

benchmarks, or general developments and can never be traced back to individual entrepreneurs. Individual revenue figures are not used for commercial purposes and are not shared with third parties. Guaranteeing the privacy of business-sensitive information, such as revenue, is our top priority!

As described, the data is collected by Chainels. The data remains the property of the individual entrepreneurs and the centre management organisation. The Chainels system has the **highest security standards**: secure connection (green lock), 24/7 monitoring, back-ups, and data storage is certified: Security management (ISO/IEC 27001), Quality management (ISO 9001). Furthermore, the system complies with the AVG and has been validated by various municipalities.

### **When the pilot ends?**

The pilot will end at the end of 2021. If the city continues to measure revenue, which is, of course, the intention, privacy will remain guaranteed. Our aim is to entice as many entrepreneurs as possible to participate because only then can we produce representative outputs. If the pilot stops, but the city does not continue, all historical data will be destroyed.

### **Manual**

This manual explains how you, as an entrepreneur, can easily report your revenue and costs for the benefit of the research into the revenue development in your inner-city.

### **Website & App**

You can report via the website or with the Chainels app.

- On the website, you can report your revenue. Go to [www.chainels.com](http://www.chainels.com) and log in with your email address and password.
- You can install the Chainels app for your iPhone (iOS), or you can install the app on your Android phone, for example, Samsung or Sony. The app is free to install. For iOS (iPhone/iPad), you can download the Chainels app in the App Store. For Android, download it from Google Play.

### **Reporting in 3 steps**

At the end of each period, you will be asked to submit your data. Below we explain how this works in a few steps.

#### **1. An email notification or push notification**

When the period is finished you will receive a notification through email, or you will receive a push notification on the Chainels app. Click on 'Report'.

#### **2. Fill in the questions**

When you open the report through the e-mail or the notification, you will usually first be asked to enter your Chainels password. Then the screen appears where you can fill in the details.

#### **3. Check your answers and submit**

You will receive an overview of all your answers. Check what you have entered and click on "Save". You have done everything correctly when you see the following message appear on your computer or telephone.



Appendix 4. Most important factors relevant to revenue  
Original, Dutch, version.

## Welke effecten t.a.v. van de omzetontwikkeling willen jullie meten?



Appendix 5. Questions of the survey

Question code	Question 1
Sector	To which sector does your enterprise belong?
Answer code	Answer
A1	Retail
A3	Hospitality
A2	Services
A4	Other

Question code	Question 2
VraagArray10P	To what extent do the following factors affect your revenue? (-5 to -1 = strong to weak negative influence, 1 to 5 = weak to strong positive influence)
Factor code	Factor
SQ001	Distance (of your business) to parking facilities
SQ0010	Distance (of your business) to the centre of the inner-city
SQ009	Distance (of your business) to anchor stores
SQ008	Construction works in the inner-city
SQ007	Opening hours
SQ006	Footfall (in the inner-city)
SQ005	Public space around your business
SQ004	Pleasant sunny weather
SQ003	High temperatures (32°C and above)
SQ002	Rainfall
SQ011	Events
SQ012	Holidays

Question code	Question 3
VervolgvraagOruimte	What do you consider the three most important aspects of the public space?
Answer code	Answer
<i>Open answer</i>	

Question code	Question 4
AnderefactorP	Other factor(s), namely ...
Answer code	Answer
SQ001	Factor 1
<i>Open answer</i>	
SQ003	Factor 2
<i>Open answer</i>	
SQ002	Factor 3
<i>Open answer</i>	










<b>Question code</b>	<b>Question 5</b>
AnderefactorArray	To what extent do the above factors affect your revenue? (If you did not specify any factors, please fill in 'No opinion')
<b>Answer code</b>	<b>Answer</b>
SQ001	Factor 1
SQ003	Factor 2
SQ002	Factor 3

## Appendix 6. Household segmentation based on Whooz data

### Segment A

## Dreaming and Getting By

#### CHARACTERISTICS

-  30 - 50
-  Singles or couples
-  Households with and without children
-  Student, unemployed or jobseeker, work-disabled, retired or early retirement
-  Vocational or secondary education
-  Below average
-  Rented apartment
-  Tram, bus
-  Watching TV  
Casino, cinema  
Theme park, zoo  
Visiting family abroad  
Online games  
FOX Sports  
SLAM!, FunX  
Gossip magazines (Privé, Story)  
Metro










They do not have much to spend, the people in the Dreaming and Getting By segment. In terms of personal wealth, they are on the lowest rung. They sometimes have trouble making ends meet and are not always able to pay their bills on time. However, they continue to dream of a better life, even though the chances of improving their destiny are slim for most.

“ I keep an eye out for all the special offers and fortunately I'm entitled to a number of allowances. That's how me and my daughter get by.

### Segment B

## Young and Hopeful

#### CHARACTERISTICS

-  Under 40
-  Single
-  No children
-  Student, unemployed or jobseeker, employed
-  Pre-university education, higher education
-  Below average or average
-  Rented apartment
-  Train, bus
-  Festivals  
Gaming  
Adventure holidays  
Theme park  
Snowboarding, martial arts  
MTV  
SLAM!, FunX  
Cosmopolitan, Glamour, Elle, Vogue  
nrc.next

They are usually single with no kids, and are still studying or starting out on a career, for example in the services sector. And they have one thing in common: the future is wide open for them. When you are Young and Hopeful, life can still branch of in all kinds of new directions! They are taking their first steps on the social ladder. One will start a family, while another sets out on a fast-track career path. Some even opt to do both at once.

“ I'm still very much at home in my current apartment: it's not too expensive and I enjoy having my own space. I plan to save for a while before I look around for something new.