

# Willingness to use parcel lockers

A COMPARATIVE CASE STUDY OF  
GRONINGEN & TEN BOER



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## COLOPHON

**Title:** The willingness of parcel locker use: A comparative case study of Groningen and Ten Boer

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**Version:** Final

**Date:** 11<sup>th</sup> of June 2021

BSc Spatial Planning and Design

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Faculty of Spatial Sciences

Picture front page: Hovestad (2018)

Wordcount: 6588

## **ABSTRACT:**

With a continuous grow in e-commerce, the pressure of the last mile delivery on the city logistics network is rising. An increase in parcel delivery causes multiple negative environmental externalities, including traffic congestion and air and noise pollution. Parcel lockers are an innovative solution decreasing the number of driven kilometres and thereby potentially reducing CO<sub>2</sub> emissions. The success of parcel lockers depends on the flexibility of consumers to complete the last mile by themselves in a sustainable way. This study investigates the willingness of inhabitants of the municipality of Groningen to make use of parcel lockers and identifies preferable locations of these lockers at neighbourhood level. A literature review is combined with a conducted questionnaire in the urban inner city of Groningen and the rural area of Ten Boer. The results indicate both similarities and differences in user preferences between the two neighbourhoods, which influence the willingness to use parcel lockers. Determining factors are the delivery price and speed, together with location of the parcel locker. By including the indicated user preferences and location requirements in the planning process, the likelihood that parcel lockers will contribute to more sustainable city logistics is increased.

**Keywords:** Sustainable Urban Freight Transport, City Logistics, Parcel Lockers, User Preferences, Urban and rural comparison

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# INTRODUCTION

## 1.1 BACKGROUND

E-commerce has grown enormously, also in the Netherlands. A news article stated that since the first lockdown in the Netherlands in March 2020 the total online purchases had a growth of 100% compared to 2019 (Logistiek, 2020). Not only the Covid-19 pandemic has caused major growth in e-commerce, for several years this branch has been growing with a high number of home deliveries as result (CBS, 2020). These requested kilometres cause high pressure on the city logistic systems of every city, with a grow of +36% in delivery vans, +21% in traffic congestion and +32% in related emission as result (Ballantyne et al., 2013; WEF, 2020). Due to this increased pressure on the urban freight network, research has been conducted on different solutions which can lessen the increasing stress and improve the sustainability of urban freight (Kiba-Janiak, 2017).

To facilitate a good transport service for online orders without accepting an increase in pollution and traffic problems, local authorities seek sustainable urban freight transport solutions and implementation processes (Ballantyne et al., 2013). Studies have revealed that parcel lockers (figure 1) can have a positive impact on the reduction of travelled kilometres under specific circumstances (Prandtstetter et al., 2021). The location of the parcel lockers is very important to determine if acceptance and usage are the desired result (Van Duin et al., 2020). However, multiple studies show that selecting the potential locations and determining the number of locations is difficult because of the influence of different factors and the unique urban environments of every city (Lee et al., 2019; Prandtstetter et al., 2021; Van Duin et al., 2020).



Figure 1 Parcel Lockers of the Dutch postal agency PostNL (Post&Parcel, 2018)

The Netherlands counts 187 parcel lockers as of 2020, all distributed over the country. The installed parcel lockers are located in higher populated cities and can be found at diverse sites. For example, in or near shopping centres, in single stores, at train stations and in streets (Boogert, 2019; DvhN, 2021; PostNL, n.d.). In addition, in the province of Drenthe three parcel lockers machines are located at P+R locations, providing the consumers to pick up their parcel on route (RTV Drenthe, 2020). In spite of the differences in locations in the Netherlands, the total amount of service points which are reachable on foot cover only 16 to 52 percent of the Dutch households (van Paesschen, 2020). Furthermore, the location of parcel lockers can stipulate the number of users which can have positive or negative

economic consequences in the form of profit or investment loss (Lagorio & Pinto, 2020). The choice of a suitable location for parcel lockers is therefore a significant one.

## 1.2 ACADEMIC AND SOCIAL RELEVANCE

Adjunctive to the unique environments of every city, the consumer culture can differ per city. This results in citizens having other principles that will be valued higher than others, depending on their preferences (Vakulenko et al., 2018). Several studies indicate possible factors that influence the usage of parcel lockers as a delivery option, however the results do not correspond. With social and economic attributes playing a role in determining suitable locations for parcel lockers (Oliveira et al. 2019), differences in landscapes, e.g., rural, and urban, could influence the user preferences of using parcel lockers. The municipality of Groningen is a compact city with urban and rural districts closely located to each other and therefore offers a unique research area.

Furthermore, in the city logistics plan of the municipality of Groningen, presented in January 2021, the desire to improve the urban freight transport network in order to recover the open spaces in the inner city is represented. The minimalization of transportation traffic and the replacement of fossil fuel engines are the main priorities of the plan (Gemeente Groningen, 2021). A delivery option which requires less driven kilometres and fewer delivery vans, could reduce environmental impacts (Lagorio & Pinto, 2020). Therefore, a better understanding of the key locational factors and user preferences of parcel lockers is needed to support the ambition of creating a cleaner, greener, and better urban freight transport system within Groningen.

## 1.3 RESEARCH GOAL AND QUESTION

The aim of this research is to investigate inhabitants' preferences regarding the use and location of parcel lockers, of both urban citizens living in the Groningen inner city and inhabitants living in the rural area of Ten Boer. With this study the following research question will be answered to provide insight in the location and user preferences within the municipality of Groningen.

*How do user preferences influence suitable locations of parcel lockers, and to what extent do these conditions affect the willingness of inhabitants of the urban inner city of Groningen and the rural area of Ten Boer to use parcel lockers?*

The study is structured around five sub questions.

1. How can the sustainable urban freight transport be defined and how are user preferences understood as a driver in making urban freight transport more sustainable?
2. What are parcel lockers and what is their role in the sustainable urban freight transport?
3. Does the landscape, urban or rural, influence the method and user preferences of parcel collection of inhabitants?
4. What are conditions that had a positive or negative effect on the usage of parcel lockers in Groningen?
5. How can local authorities identify suitable locations for parcel lockers within their city?

## 1.4 THESIS STRUCTURE

After introducing the grow in parcel delivery and the need of sustainable methods to release this pressure on Groningen's city logistics, the role of parcel lockers in the sustainable urban freight transport will be described in chapter two. To investigate the influence of user preferences, a quantitative research including a questionnaire is designed to compare the differences between an urban and rural landscape and provided in chapter three. By analysing the results in chapter 4, recommendations for courier companies will be provided which concludes this study.

# A THEORETICAL PERSPECTIVE ON THE ROLE OF PARCEL LOCKERS

## 2.1 DEFINING SUSTAINABLE URBAN FREIGHT TRANSPORT

The concept of city logistics, also known as Urban Freight Transport (UFT), can be seen as the regulation of freight transport within urban areas and the consequences of UFT on the urban environment (Škultéty et al., 2021). Both Ballantyne et al. (2013) and, Behrends et al. (2008) define the urban freight transport as all transportation and delivery services of goods in, out, and through the city. With an increase in Last Mile (LM) transport<sup>1</sup>, the UFT network needs sustainable improvements in order to diminish the contribution to an unhealthy and unsafe environment (Behrends et al., 2008; Bruzzone et al., 2019; Škultéty et al., 2021).

In the article of Anderson et al. (2005), a sustainable freight transport strategy is described as meeting the “economic, environmental and social needs efficiently and equitably, while minimizing avoidable or unnecessary adverse impacts and their associated costs”. Additionally, He and Haasis (2020), refer to rectifying the environmental externalities (EE) (air and noise pollution, congestion) caused by the UFT, which can be placed within the three dimensions, environmental, economic, and social, of sustainability, as the crux of SUFT. Behrends et al. (2008) reifies on these thoughts by deriving the definition of SUFT from separate concept definitions creating four important factors:

1. accessibility for all freight transport categories;
2. reducing the negative impacts on the urban environment;
3. improving efficiency and cost-effectiveness; and
4. the rectification of the quality and attractiveness of the city’s environment.

Furthermore, the efficient planning between remoteness and LM transport and the routes made within urban areas is considered to be part of SUFT (Škultéty et al., 2021).

Derived from these definitions, an efficient UFT planning process should consider negative externalities on the social, economic, or environmental domain. Therefore, the definition of SUFT in this research is a sustainable city logistics system that is efficiently planned to minimize negative environmental externalities, such as increasing CO2 emissions. New inventions, such as parcel lockers, can contribute to the reduction of negative EE.

## 2.2 PARCEL LOCKERS

Parcel Lockers (PL) are invented to serve the LM delivery of parcels and can be an opportunity for the unsuccessful deliveries which are the results of recipients not being home (Prandtstetter, 2021). Furthermore, PL are based upon a self-service technology and provide more flexibility in time windows and suitable pick-up locations, from which recipients can collect their package (Schwerdfeger & Boysen, 2020). As can be seen in figure 2, the PL are self-contained and consist of various boxes to secure parcels before pickup, which can be done in combination with other activities.

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<sup>1</sup> The definition of Last Mile Transport is given by Gevaers et al. (2014) “the final leg in a Business-to-consumer delivery service whereby the consignment is delivered to the recipient, either at the recipient’s home or at a collection point.”



Figure 2 A parcel lockers located on a P+R in Gieten, Province of Drenthe (RTVDrenthe, 2021)

Economic advantages of PL are present for the delivery companies as well as for consumers. Instead of delivering single parcels at home addresses, couriers can deliver a bigger number of parcels at one location, saving the travelled kilometres (Oliveira et al., 2017; Vakulenko et al., 2018). Even though the consumers might have to spend more effort to collect their parcel, the implementation of PL can reduce the overall transportation costs (Orenstein et al., 2019).

PostNL is the biggest parcel delivery company in the Netherlands (Van Duin et al., 2020) and started a pilot series in 2016 with a “pakket- en briefautomaat” pilot (figure 1), a locker system for parcels and letters, resulting in 105 PL managed by PostNL (van Paesschen, 2020). Innovative forms of PL, such as self-driven or mobile PL, are currently in development in order to meet different location preferences (Schwerdfeger & Boysen, 2020).

### 2.3 WILLINGNESS TO USE A PARCEL LOCKER

Since the consumers have a big role as service receivers and as service creator, the view of consumers on PL is an important indicator on the positive operation (Vakulenko et al., 2018). Instead of delivering the ordered goods at home addresses, citizens could complete the LM of their delivery process using a sustainable mode of transportation, in order to decrease the CO2 emission in the LM (figure 3) (Russo et al., 2020).

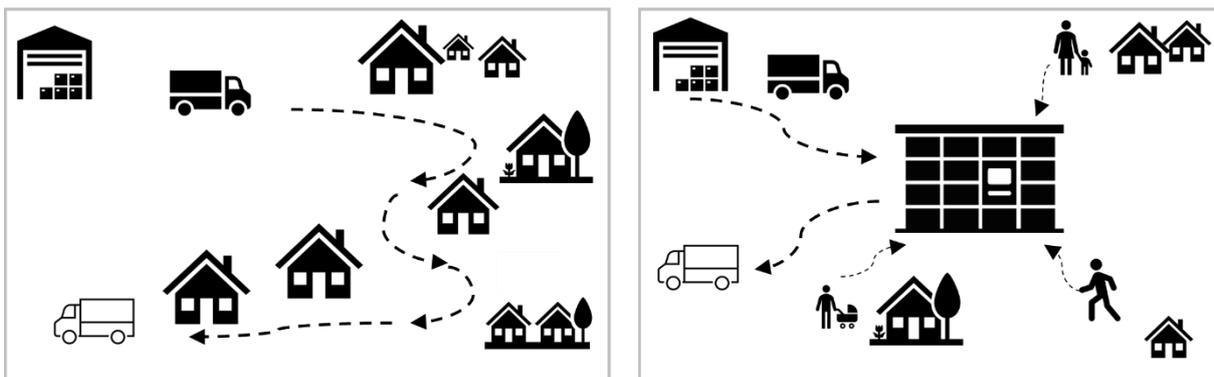


Figure 3 Parcel delivery route without (left) and with (right) PL.

### 2.3.1 User preferences as driver to reach SUFT

Thirty percent of the total of packages in the Netherlands gets collected from a service point nowadays. However, when these parcels are collected by car, the total CO2 emission is higher compared to home delivery (Van Wechem, 2020).

To create an environment in which the citizen will complete the LM in a sustainable manner, it is important to determine the factors influencing the willingness of inhabitants to collect the parcels from a service point (figure 4). In a literature review of Van Duin et al. (2020), the price of the delivery service, including the delivery speed, is named to be an important user preference in selecting a delivery option. Secondly, the opening hours of a service point are affecting the choice of delivery. Therefore, service points that operate with a 24/7 accessibility, have an advantage compared to service point with regulated opening hours (Vakulenko et al., 2018; Zenezini et al., 2018). Results from a stated preference survey, conducted by Oliveira et al. (2017), agree with the above standing factor but also state that the availability of tracing information and the service safety are highly ranked user preferences (Oliveira et al. 2017; Van Duin et al. 2020). Besides, the safety of PL is also declared as a factor that creates inconvenience compared to collection points within services, the unmanned service points might cause insecurity with the collection process due to absent assistance (Vakulenko et al. 2018).

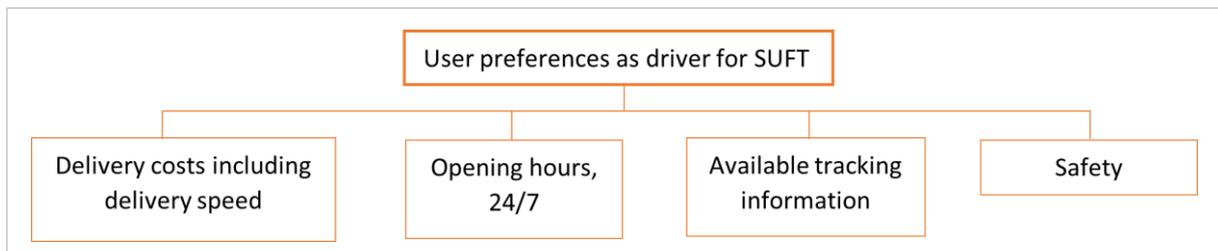


Figure 4 The four user preferences that form the drivers to reach SUFT.

### 2.3.2 Location of parcel lockers

From multiple studies performed all over the world, the location of the PL can be determined as the most important success factor (De Oliveira et al., 2019; Iwan et al., 2016; Oliveira et al., 2017; Van Duin et al., 2020; Vakulenko et al., 2018). In Poland, the use of PL increased when PL were relocated to a more suitable location, with the most effect achieved by relocation of the PL near a shopping centre (Iwan et al. 2016). An overall thought is that citizens will prefer to use the nearest placed service point, and that the willingness to collect a parcel from a service point decreases when the distance to a service point is increased (Deutsch & Golany, 2018). Furthermore, the favourable locations would be near inhabitants' home address or on the commuting route, suggesting that a car is used for parcel collection on the way to/from work and afoot for direct collection (Iwan et al., 2016).

The chosen location of PL can create the opportunity for inhabitants to combine their parcel collection trip with other activities, and it can influence the used mode of transport. If PL are stationed at a 5-minute walk range from a home address, then inhabitants are more willing to collect a parcel on foot (Van Duin et al., 2020). The workable distance could also be determined in metres, Lee et al. (2019) states a range of 200 to 300 walkable metres as workable service zone for PL.

Another requirement of a suitable location for PL is accessibility, the selected site of the PL should be accessible by couriers and consumers. Small streets, traffic congestion and traffic regulations such as time frames, are factors decreasing the accessibility and need to be considered when selecting a location (Rosenberg et al., 2021). Different landscapes can also influence the suitability of a location for PL. In Australia, most PL found in urban areas are accessible primarily with non-motorized vehicles,

although in suburban areas the PL are accessible by multiple modes of transport, and mostly located at post offices or small malls (Lachapelle et al., 2018).

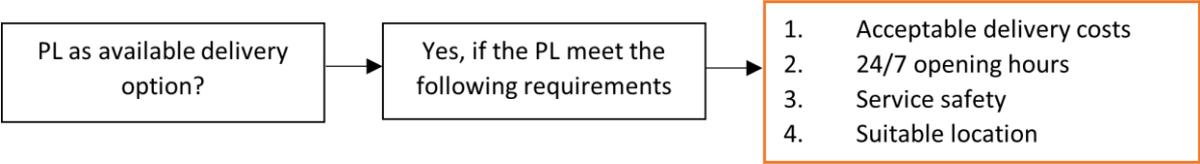


Figure 5 Concluding table of paragraph 2.3.3. PL are an available delivery option if PI satisfy the four user preferences.

**2.4 AN URBAN OR RURAL LANDSCAPE**

Distinguishments between urban and rural landscapes can be made based upon differences in the territorial, social and economic domain, leading to perimeters such as “resident population, existing infrastructure and public facilities” which define the landscape. The perimeters in turn influence the behaviour of the inhabitants which can be used by planners to create new or adapt their strategies (Amado et al., 2018). In the study of Schlüter et al. (2020) differences in transport mode use are discussed and car use scores frequently higher in the rural areas compared to urban clusters. Suburbanization and increasing car dominance, caused spatial planning strategies in the 1960’s to implement the car as main transport mode and adapt the infrastructure. However, the infrastructure plans of the Netherlands combined a new motorway network with the already existing cycle culture, providing room for both transport modes (Oosterhuis, 2015). This infrastructure planning led to a connectivity between rural and urban areas, creating opportunities to use both car and bicycle depending on the personal preference and activity (Gemeente Groningen, 2019; Oosterhuis, 2015).

**2.5 CONCEPTUAL MODEL**

The relations between the different concepts and theories, described in the theoretical framework, are indicated with arrows in the conceptual model below (figure 6). The willingness of residents (blue box) to use PL, influences the performance of PL within the SUFT network. If there is no use the PL or residents will only make use of the PL by emitting more environmental pollution, the influence of PL is deteriorating the sustainability of the UFT. With examining the user preferences and the suitable locations (orange boxes), the willingness to use PL which contributes to the sustainability can be determined.

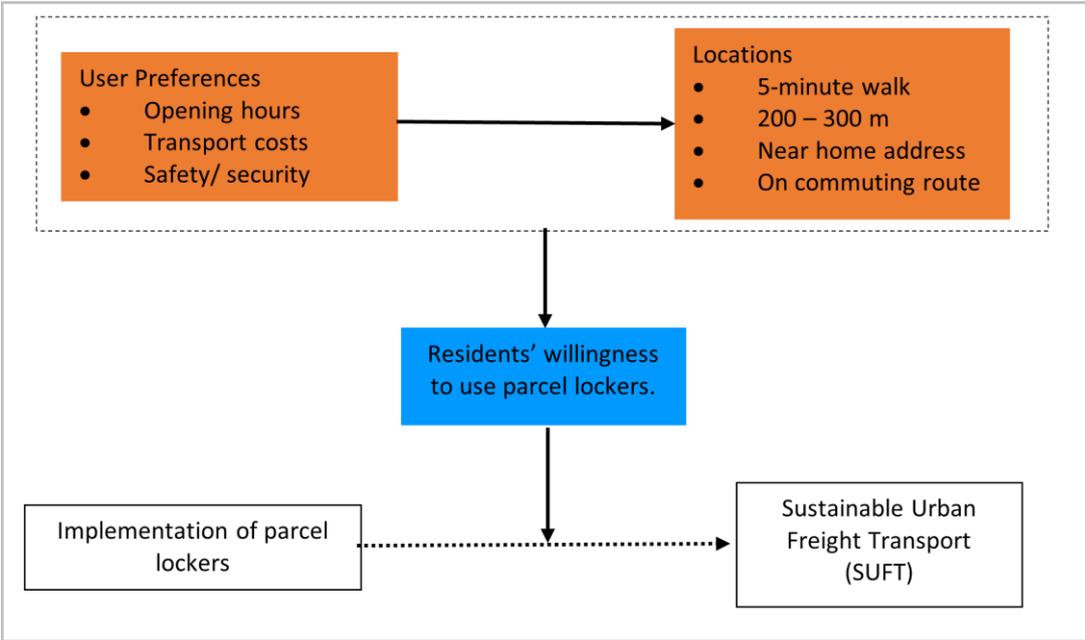


Figure 6 Conceptual model on how user preferences and location conditions influence the potential contributions of PLs on the SUFT.

## METHODOLOGY

This is a quantitative study comparing the willingness of residents to use PL in an urban and rural area in the municipality of Groningen. Specific attention is given to the locations of PL.

### 3.1 COMPARATIVE CASE STUDY

In the municipality of Groningen urban and rural areas are neighbouring districts, each with its own demographic characteristics (table 1). Therefore, the urban inner city of Groningen and the rural area of Ten Boer will be compared in this study to provide insight in the user preferences on PL use by the inhabitants of the municipality of Groningen, see figure 7.

Table 1 Overview of the demographic numbers per neighbourhood (numbers retrieved from AlleCijfers.nl, 2020)

	Population per Km <sup>2</sup>	Addresses per km <sup>2</sup>	Cars per Km <sup>2</sup>	Surface total	Residential function
Ten Boer	1994	561	951	228 hectare	1953
Groningen inner city	11694	6329,5	1897,5	98 hectare	4179

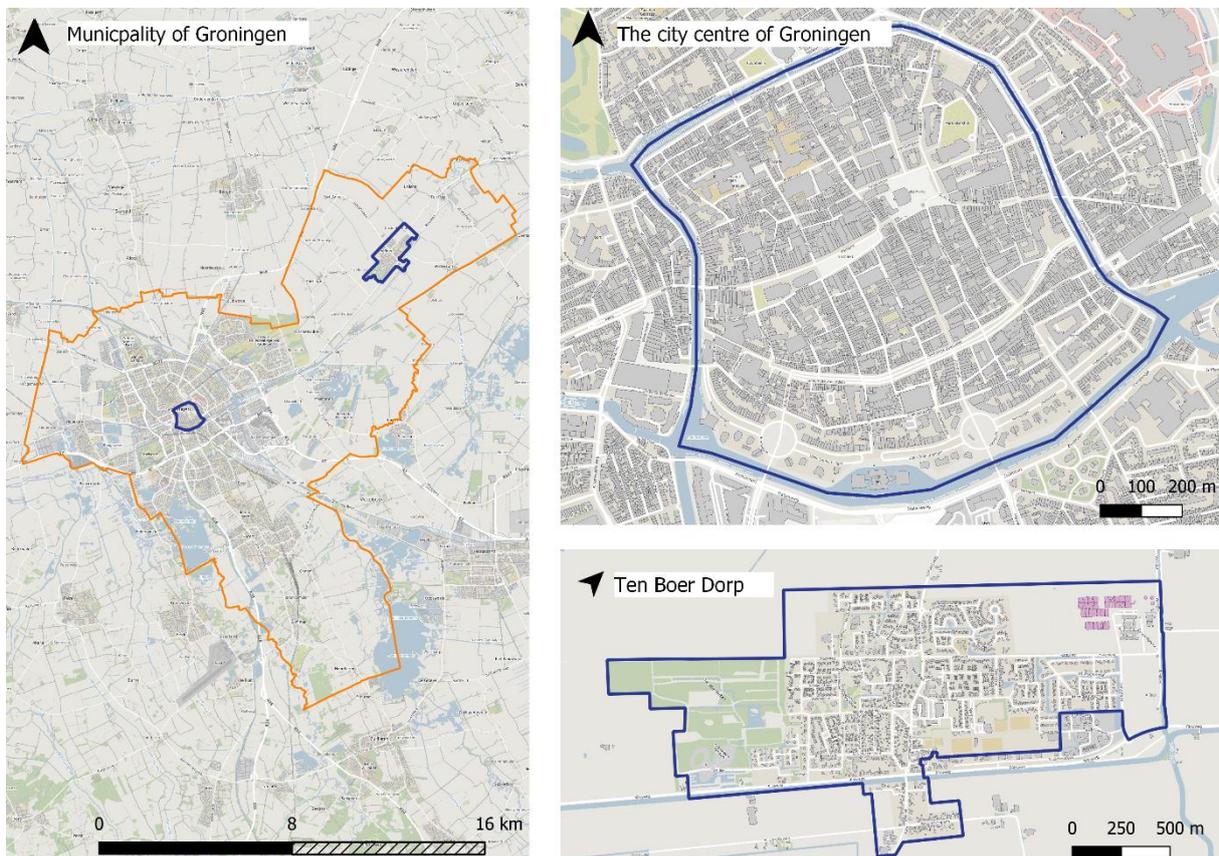


Figure 7 Location of the two neighbourhoods from the comparative study in the municipality of Groningen

Furthermore, within the municipality of Groningen multiple delivery options can be selected, however, only in the south of the municipality inhabitants can make use of four unmanned PL (DvhN, 2021). In the selected neighbourhoods, inhabitants can collect or retour their package at a manned service point. Due to more service point options, the inhabitants of Groningen can choose the nearest collection/retour locations in contrast to inhabitants of Ten Boer. In the rural area, two collection points are stationed in the area, one per post service (DHL, n.d.; PostNL, n.d.). Deriving from the studies

of Van Duin et al. (2020) and Lee et al. (2019), buffers of 200 to 400 metres around the service points in figure 8 show that the service point options that can be reached on foot differ per region.

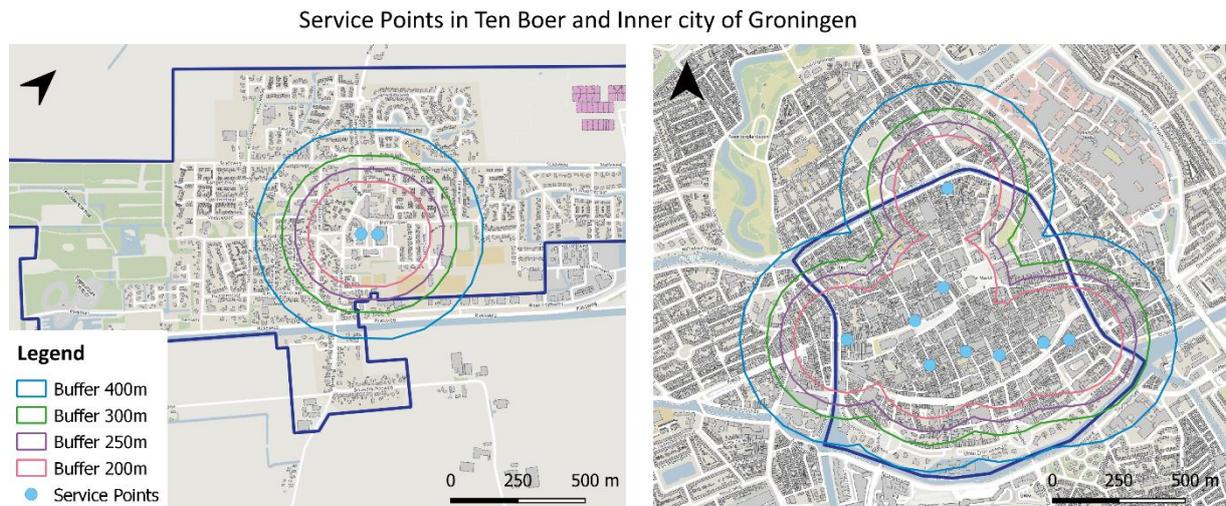


Figure 8 Map with the manned service point within Groningen inner city (left) Ten Boer (right) (PostNL, n.d.; DHL, n.d.)

### 3.2 RESEARCH METHODS AND DATA COLLECTION

In interest of the research, finding relationships between different variables, the study will apply a quantitative research design. By researching the relationships between the independent variables (see table 2), it can be found how the different independent variables account for variance in the dependent variable and thereby influence the suitable location of PL in Groningen (Punch, 2014). Furthermore, with a two-sample research design, the populations of Groningen inner city and Ten Boer can be compared.

Table 2 Independent and dependent variables within this research

Variables	Independent or dependent	Possible relationships with
User preferences	Independent	Suitable locations, willingness of PL use
Suitable locations	Independent	Willingness of PL use
Willingness of PL use	Dependent	User preferences, suitable locations

#### 3.2.1 Survey questionnaire

To research the influencing factors on the willingness of PL use, inhabitants of both neighbourhoods in Groningen are asked to fulfil a digital questionnaire. This data collection method is a proper measure because of the multivariable possibility. Different variables, categorical, continuous, and spatial can be examined within the same questionnaire (Punch, 2014).

Maptionnaire was used to design of the questionnaire, which contains three themes, 1) a user profile, 2) previous experiences with collection/service points and 3) PL. At the end of the questionnaire three map questions are stated to collect spatial data on possible locations points and preferable walk and cycle distance (appendix 1). Due to the absence of PL in both neighbourhoods, it is chosen to use previous experiences with service points to determine user preferences and locations, because of an availability of a benchmark for the recipients. Due to 29,9% of the inhabitants in Groningen inner city and 8,4% of the inhabitants in Ten Boer being non-Dutch the questionnaire was provided both in Dutch and English (Allecijfers a, b & c, 2020).

With the help of a flyer consisting of information on the research and a QR code/ weblink which forwarded the recipient to the survey (appendix 4), the questionnaire was distributed by ranging the

doorbell of 250 addresses within both neighbourhoods. In GIS, a random selection was conducted to create the sample and recruit recipients based on BAG register data (figure 9), if there was no response at the selected address, the next house was addressed. The collected data was stored in a with password secured folder.

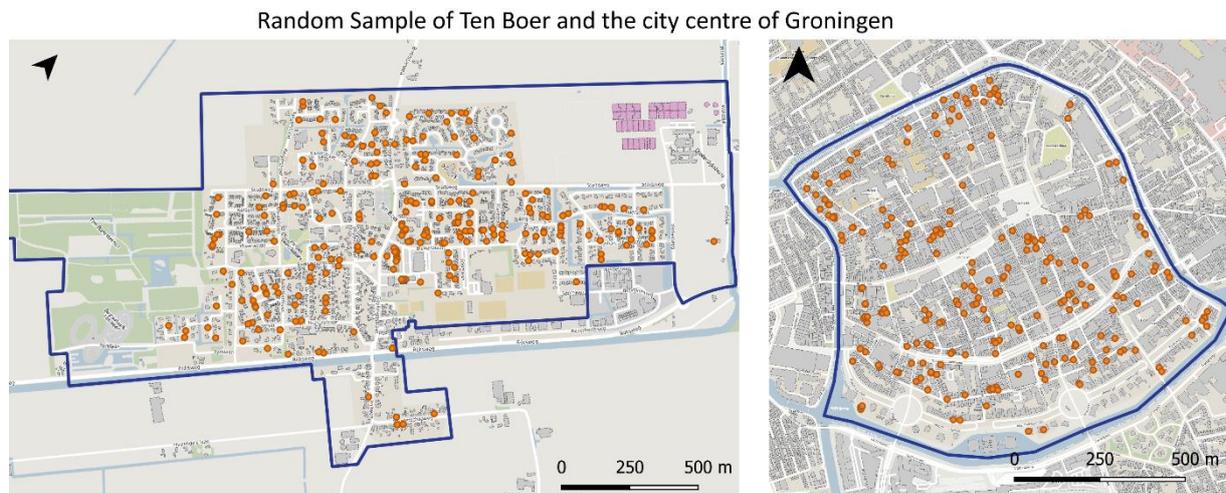


Figure 97 Random sample distribution within Groningen inner city (left) and Ten Boer (right).

### 3.3 DATA ANALYSIS

The analysis of the data is performed with the programs of SPSS for a statistical analysis and GIS for a spatial analysis. Within the statistical analysis, descriptive statistics are used to describe the collected data of the user profile.

Furthermore, the Mann-Whitney test was chosen to test equality of medians of both neighbourhoods. Time and transport mode related output can be researched on differences and similarities. The Chi-Square test was performed to determine the independence of two variables, in this study this was done with a variable and the neighbourhood(s). Both tests compare both cases, Groningen inner city and Ten Boer, and provide information on the differences between a rural and urban landscape.

A spatial analysis with GIS shows possible locations or suitable areas for the location of PL. The spatial data, from the questionnaire, was compared to location conditions of the conceptual model to define buffer zones in which PL should be located. Additionally, exact locations were analysed and visualized on a map (figure 16 and 17 on page 19 and 20).

### 3.4 ETHICAL CONSIDERATIONS

With regard to the ethical issues that may occur in all times of the ongoing research, the following measures are considered to maintain an acceptable and appropriate research environment. Before a recipient can fill in the questionnaire, they will be informed with their voluntary consent, meaning that the participant understands the consequences of their participation and that they can withdraw their co-operation at any stage of the research (Punch, 2014). The privacy and confidentiality will be guaranteed during the whole research process, by eliminating the link between the personal information and the disclosed information to make sure no non-public information can be shared with third parties or be traceable posted in the research report.

## WILLINGNESS TO USE PARCEL LOCKERS: AN URBAN - RURAL COMPARISON

### 4.1 SAMPLE DISTRIBUTION

The conducted survey in both neighbourhoods has resulted in a total of 71 respondents, with more student respondents in Groningen inner city in comparison to Ten Boer, which is in accordance with the total population distribution (Alle Cijfers a, b & c, 2021). The majority of the respondents orders at least once a month online products and with the home delivery option selected, these numbers are comparable with the growth of E-commerce and home deliveries (CBS, 2020). As can be seen in figure 10, delivery at the home address is frequently used as delivery option, with collection at a manned service point as second. A possible clarification can be the higher availability of service points in Groningen inner city and the higher number of millennials living in the inner city, due to their high skill of internet use (Moroz & Polkowski, 2016).

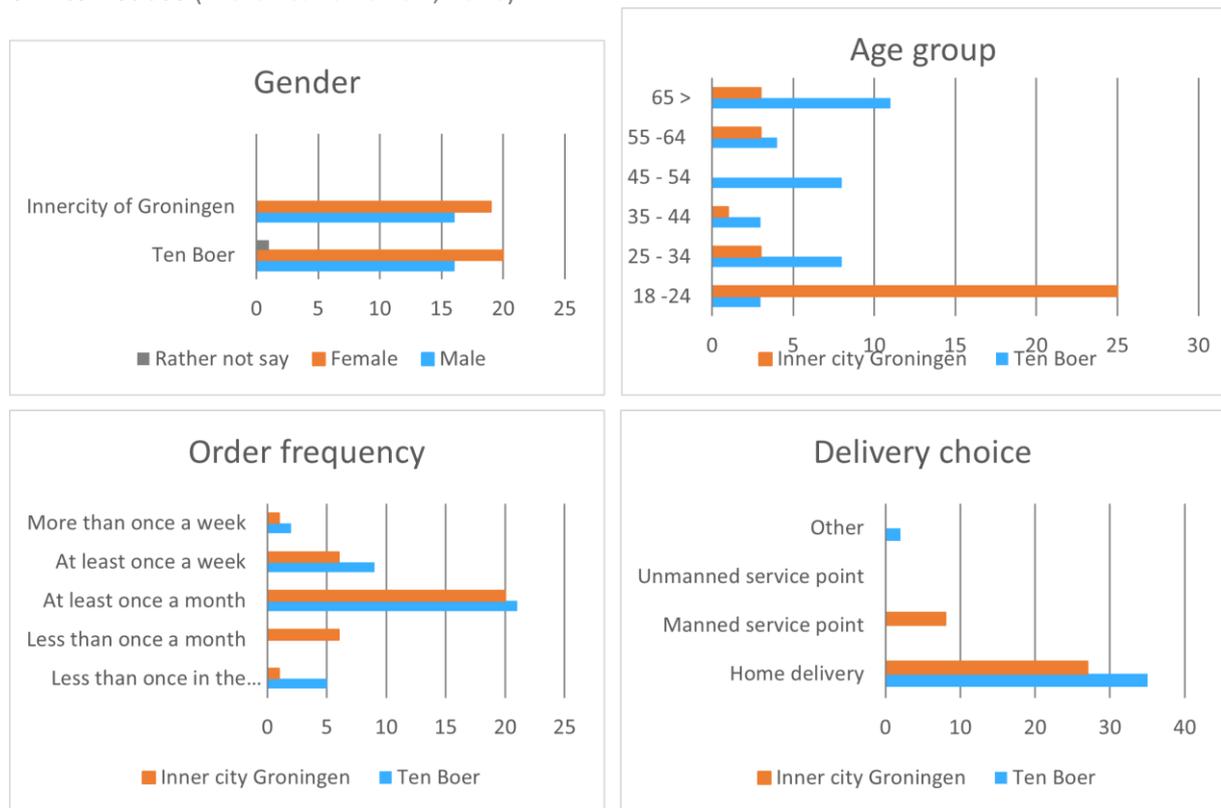


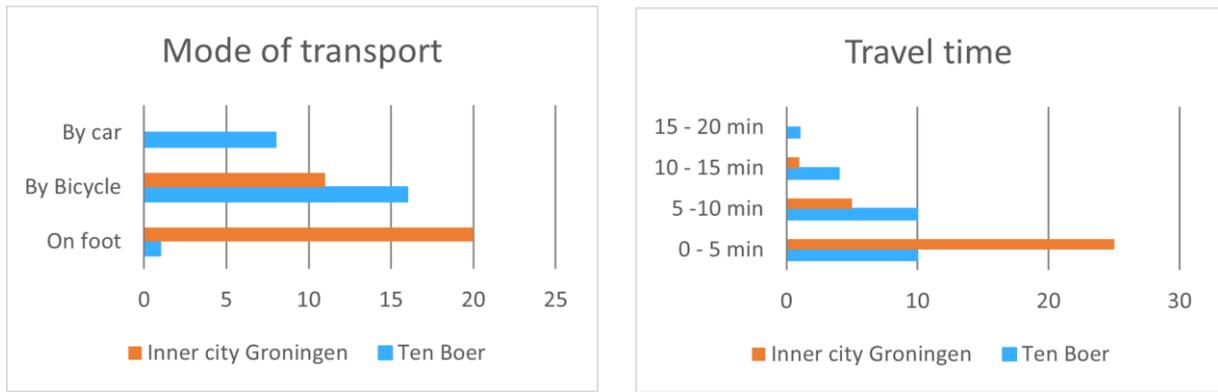
Figure 108 Sample distribution graphs with A) Gender of the respondents per neighbourhood, B) Age group distribution per neighbourhood, C) Order frequency per neighbourhood and D) Delivery choice per neighbourhood.

### 4.2 TRAVEL BEHAVIOUR OF PREVIOUS PARCEL COLLECTION

Due to the absence of PL in both neighbourhoods, the travel behaviour of respondents was tested on previous experiences with parcel collection at a manned service point.

#### 4.2.1 Collecting a parcel without combining the trip with other activities

The travel time and the transport mode, to collect a parcel without combining the trip with other activities, tested significant different ( $p=0.002$  &  $p=0.000$ ) with the Mann-Whitney test between the two neighbourhoods (appendix 3). The parcel collection was performed within zero to five minutes in the inner city on foot. Whereas the bicycle was frequently used in Ten Boer, to collect the parcel in five to ten minutes (figure 11).



**Figure 11** Distribution of the mode of transport used to collect a package without combining the trip (left) and distribution of travel time (right).

The results of the inner city agree with the theory of Van Duin et al. (2020). They stated that the PL should be in a 5-minute walking range, however, the inhabitants of Ten Boer exceed this travel time to reach the current available service points. With five to ten minutes cycling as consistent variable in Ten Boer, PL have to be located in a range of one kilometre to be reached in 5 minutes cycling (CSB, 2002). Figure 12 shows that the current service points are located within the acceptable range, which could be explained by partial coverage of households that can reach the service points on foot and the Dutch cycling culture (Oosterhuis, 2015).



**Figure 12** Buffers of 400 m (walking) and 1000 m (cycling) around current service points in Ten Boer.

#### 4.2.2 Collecting a parcel in combination with another activity

The mode of transport used to collect a parcel in combination with another activity, differs significantly per neighbourhood as indicated by the Mann-Whitney test in appendix 3 ( $p= 0.000$ ). Even though the activity with which the trip is combined is similar in both neighbourhoods, namely “groceries”,

inhabitants of Ten Boer make use of the car and citizens in Groningen go by foot (figure 13). This difference can be explained by the density of available facilities (appendix 2), and the difference in grocery shopping. “Number of groceries” and “Weekly groceries are always done by car” are given reasons care use by respondents from Ten Boer. With an extra travel time of 0 to 5 minutes, both neighbourhoods correspond with each other. However, the mode of transport should be considered when further utterances are being made.

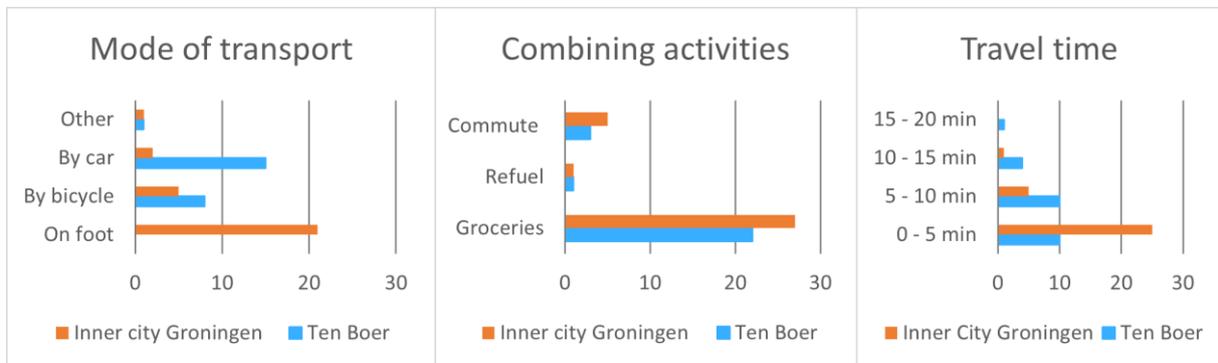


Figure 93 Distribution of mode of transport (left), Activities with which the trip is combined (middle), and Travel time (right) of both neighbourhoods when collecting a parcel in combination with another activity.

In contrast to Iwan et al. (2016), who stated that primarily the car was used when a parcel was collected in combination with commuting, respondents who combined the collection of a parcel with commuting were using the bicycle more frequent than the car (table 3). Locating PL near commuting cycle routes, allows consumers to combine their parcel collection, without contributing to negative EE.

Table 3 Overview of used transport mode when the parcel collection was combined with commuting.

Mode of transport	Percentage
Bicycle	56 %
On foot	22 %
Car	22 %

### 4.3 LOCATIONS

The residents of both neighbourhoods were asked to fill in the maximum number of minutes that they would prefer to walk or cycle in order to reach a PL (figure 14). By testing the data through a Mann-Whitney test, no significant difference ( $p=0.025$  &  $p=0.009$ ) is discovered between the two neighbourhoods.

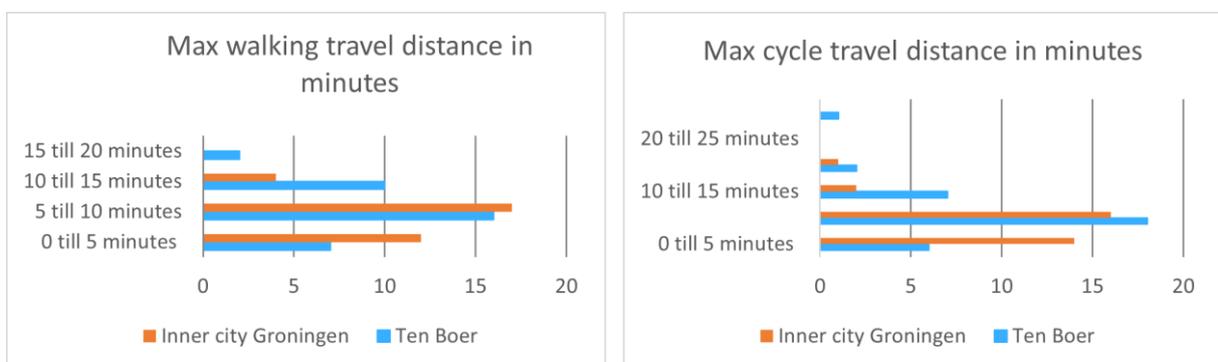


Figure 104 Distribution of maximum travel time when the trip is performed on foot (left) and by bicycle (right)

Figure 14 shows that the majority of the respondents in both neighbourhoods is willing to travel five to ten minutes, resulting in buffer zone of approximately 400 to 800 metres for walking and a buffer zone of approximately 1000 to 2000 metres for cycling. These results are in contrast with the theory of Lee et al. (2019), which argued that a range of 200 to 300 metres should be the maximum distance. Comparing the results to the theory of Van Duin et al. (2020) which stated that PL need to be located within a five-minute walking range, indicates that the willingness to use a sustainable mode of transport is bigger than expected.

The bufferzones in figure 15, are based around existing service points in Groningen inner city. As can be seen in the figure, every address in the inner city has a service point located within the 400m buffer zone. The service points in Ten Boer however, do not cover the complete neighbourhood, but are reachable by a five minute cycle trip (figure 12).



Figure 115 Buffers of 400 m (walking) and 1000 m (cycling) around the current service points within Groningen inner city.

In addition to the maximum travel time, respondents were asked to pinpoint suitable PL locations in their own neighbourhood (figure 16 & 17). Important is to point out that these locations occur in two categories, 1) location with an existing manned service point, and 2) new locations.

Conspicuous are the pinpoints at Groningen main train station placed by respondents of the inner city, since combining parcel collection with public transport use was not mentioned in the questionnaire. Other locations within Groningen inner city are near shops, public services such as the hospital and landmark sites within the city centre. Interesting is the difference in pinpointed locations, not only combination activities are suggested but also places that could form the mental map of the city of Groningen for the respondents. Except for some pinpoints placed in the shopping streets, most locations are accessible for the courier and consumer as Rosenberg et al. (2021) mentions. Obviously, when parcel delivery companies and local planners would select the exact locations, these should be considered in more detail to prevent traffic congestion.

The pinpoints placed in Ten Boer contain the locations of the current service points, but also at the public service such as the soccer club, the medical centre, or the primary school. Since it is considered that consumers will prefer the nearest service point and that the location of PL could influence the used mode of transport (Deutsch & Golany, 2018; Van Duin et al., 2020), an extra service point in the form of PL could lead to an increased area in which an PL or service point are reachable on foot.

There are no significant differences in location preferences between the two neighbourhoods. Public places reachable within five to ten minutes walking or cycling could increase the willingness to use PL positively.

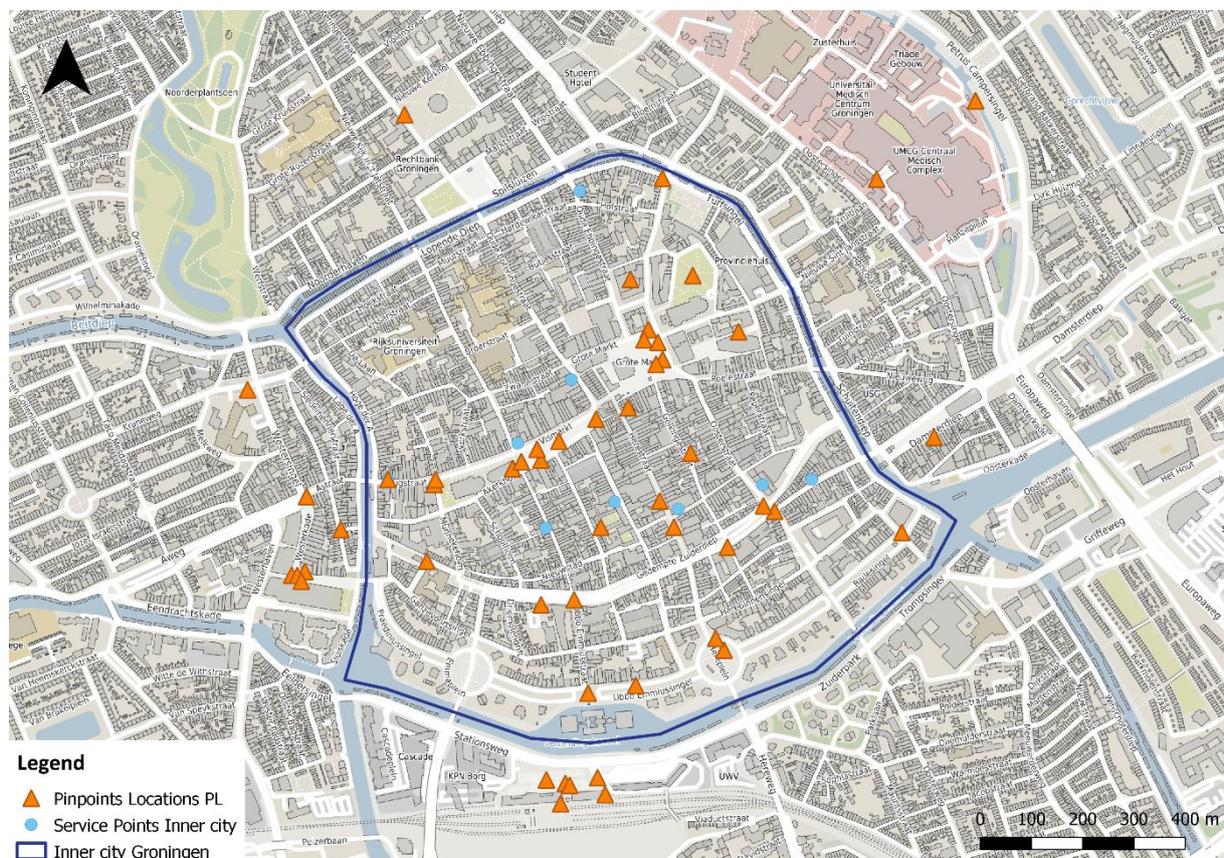


Figure 126 Chosen locations for PL in the Inner city by inhabitants.

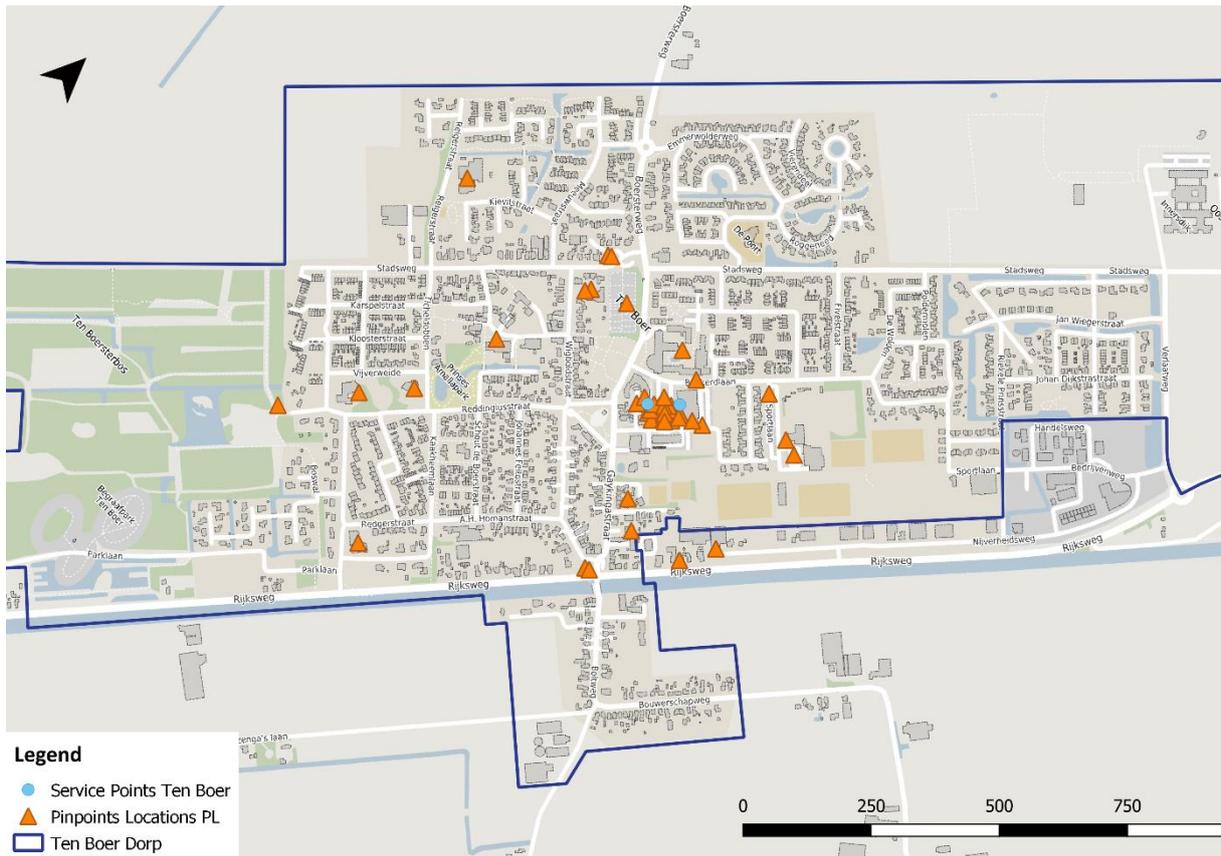


Figure 137 Chosen locations for PL in Ten Boer by inhabitants

#### 4.4 USER PREFERENCES

In the study of Van Duin et al (2020) and Oliveira et al. (2017), delivery costs and delivery time are two main factors influencing the choice of delivery. In Ten Boer and Groningen both factors play an important role when selecting a delivery option, however, there is no indication that the rural or urban character of the neighbourhood influences these user preferences (appendix 3). Even though the respondents of both areas indicate to walk or cycle, when collecting a package, they point out that the most sustainable choice is subordinate to delivery costs and time (figure 18). Furthermore, the value and weight of a package influence the choice of delivery heavily (figure 19). Respondents of both areas indicate to choose for home delivery when they ordered heavy or valuable goods. A recommendation for the implementation process of PL could be to inform users on the safety of their parcel, which might lead to more use of the PL.

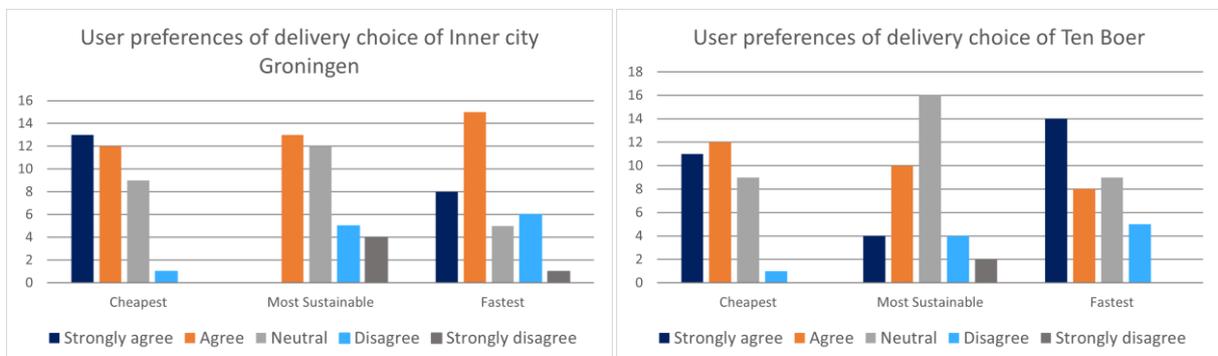


Figure 1814 Distribution of the user preferences of delivery choice. Both 'valuable' and 'heavy' relate to the statement: "I would rather have my valuable or heavy package home delivered".



Figure 19 User preferences in selecting home delivery for valuable or heavy ordered goods.

The availability of parking lots at the location of PL tested significantly different per neighbourhood with the Chi-Square test ( $p=0.001$ ), the combination with grocery shopping, primarily done by car in the neighbourhood of Ten Boer, could explain this preference. Other user preferences show no significant relationship with the neighbourhood and scored equally in range of preference (appendix 3). In contrast to the available parking lots, the PL could be located in a zero-emission zone in Groningen inner city (figure 20). In Ten Boer it would be possible but only if parking lots are closely located, since this is a user preference of its inhabitants.



Figure 20 Preference distribution indicating the location preferences of PL in Ten Boer and Groningen inner city.

There is a specific user preference when public locations and private locations are compared. The majority of the population of Ten Boer (54,3%) and Groningen inner city (78,8%), would prefer PL to be found in public spaces which hold social control, schools, libraries, and sport locations are mentioned as possible locations for PL.

A strong user preference are the operating hours of a PL (70,6%), the machines are 24/7 open for parcel pickup creating more freedom for the consumer. The results of the questionnaire agree with the studies of Vakulenko et al. (2018) and Zenezini et al. (2018), which suggested this advantage of PL. The current service points have regulated opening hours, with a wider time range available in Groningen inner city (DHL, n.d.; PostNL, n.d.). Both populations indicate that the 24/7 opening hours are a factor increasing the willingness of PL use.

## CONCLUSION

The differences found between rural and urban areas are limited to the preferred available parking lots at the location of PL in Ten Boer. To answer the first part of the research question, “How do user preferences influence suitable locations of parcel lockers”, being open 24/7, the presence of social control and a maximum of five to ten minutes travel time suggest that suitable locations of PL should be at accessible, public sites which are reachable within 400 to 800 metres walking or 1000 to 2000 metres cycling distance. If PL meet these requirements and become the cheapest or fastest delivery option, inhabitants of Groningen Inner city and Ten Boer are willing to use PL. Which answers the second part of the research question: “to what extent do these conditions affect the willingness of inhabitants of urban inner city of Groningen and the rural area of Ten Boer to use parcel lockers?”

The results of the user preferences influencing the location of PL and willingness to use PL, agree with the theoretical framework (Oliveira et al., 2017; Vakulenko et al., 2018; Zenezini et al., 2018). However, the distance inhabitants are willing to travel to collect their parcel is in contrast with the theories of Van Duin et al. (2020) and Lee et al. (2019), since five to ten minutes walking or cycling is longer than recommended by the two studies. Besides the frequent car use in the rural area of Ten Boer when parcel collection is combined with another activity, the majority of the inhabitants of both neighbourhoods uses walking or cycling as transport mode to collect a parcel. This reveals an equality in travel behaviour even though the contrary was indicated due to differences in the defining perimeters (Amado et al., 2019).

The cycling culture and infrastructure of the Netherlands, which connects urban and rural areas with each other in the Netherlands, could be an explanation for the absence of big difference between the urban and rural areas in this study. Furthermore, distances between urban clusters and surrounding areas are more limited compared to other countries, especially in the municipality of Groningen where both landscapes can be found as neighbouring districts.

Based on the results of this research, location recommendations for express delivery services incorporate public sites with social control which are reachable on foot or by cycling within five to ten minutes. Furthermore, delivery costs and time are significant factors influencing the choice of delivery. This fact could be used to increase the sustainability of the LM transport, if PL are the cheapest and/or fastest delivery option, the number of users could potentially grow. Focussing the implementation process on highlighting the safety of PL might increase the number of users, since valuable parcels were preferred to be home delivered. However, if PL consist of convincing security, more consumers might choose the PL as delivery option instead.

## DISCUSSION AND FUTURE RESEARCH RECOMMENDATIONS

Reflecting on the execution of this research, improvements and remarks can be made upon the questionnaire and the data collection process.

### *Questionnaire Improvements*

The conducted questionnaire consisted of multiple choice, open and “map” questions in which the respondents were asked to draw polygons on the map of their residential area. Due to the difficulty some respondents had with answering these questions, the results were not representative and question 26 and 27 were not included in the analysis.

Extra questions could be added to the questionnaire to make more specific conclusions. For example, results show a high preference of the 24/7 opening hours of PL in both neighbourhoods, however it is unclear if the current opening hours of manned service points are sufficient.

#### *Remark's data collection*

Due to low response rates, a second round of recruiting respondents had to be made. During this extra recruiting process, the random sampling strategy was followed less strictly due to the selection of neighbouring houses.

#### *Recommendations future research*

This research has focussed on the consumer perspective of possible user and location preferences for PL of two, one rural and one urban, neighbourhoods. As a spatial planner, multiple perspectives need to be researched to advise or lead a potential implementation process of PL. Therefore, more research is needed on the perspective of user and location preferences of express delivery services.

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## APPENDICES

### APPENDIX 1: QUESTIONNAIRE DESIGN

Question	Answer options	Measurement level	Related to (sub) question	Analysis method
<b>1 Wat is uw geslacht? What is your gender?</b>	Man (Man), Vrouw (Woman), Anders (other), Wil ik liever niet zeggen (rather not say).	Nominal	3	Statistics
<b>2 Tot welke leeftijdsgroep behoort u? What is your age?</b>	< 18, 18-24, 25-34, 35-44, 45-54, 55-64, 65+.	Ordinal	3	Statistics
<b>3 Op dit moment ben ik? At the moment my occupation is?</b>	Scholier (Pupil), Student (Student), Werkend (Employed), Werkloos (unemployed), Anders (other).	Nominal	3	Statistics
<b>4 Wat is uw postcode? What is your ZIP code?</b>	Open answer.		n/a	Statistics
<b>5 Heeft u wel eens online producten besteld? Have you ever ordered products online?</b>	Ja (Yes), Nee (No).	Nominal		Statistics
<b>6 Hoe vaak heeft u producten besteld in de afgelopen 3 maanden? How many times have you ordered products in the last three months?</b>	Minder dan 1 keer in drie maanden (Less than once in the three months), Minder dan 1 keer per maand (less than once a month), Tenminste 1 keer per maand (at least once a month), Tenminste 1 keer per week (at least once a week), Vaker dan 1 keer per week (More than once a week).	Nominal		Statistics
<b>7 Van welke leveringsoptie maakt u het vaakst gebruik? Which delivery option do you use most often?</b>	Levering aan huis (home delivery), Ophalen bij een bemand service point (Collect at	Nominal		Statistics

	manned service point), Ophalen bij een onbemand service point (Collect at unmanned service point), Anders (other)			
<b>8a Ik kies voor de goedkoopste leveringsoptie. I choose the cheapest delivery option.</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4	Statistics
<b>8b Ik kies voor de duurzaamste leveringsoptie. I choose the most sustainable delivery option.</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4	Statistics
<b>8c Ik kies voor de snelste leveringsoptie. I choose the fastest delivery option.</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4	Statistics
<b>8d Ik zou een waardevolle bestelling liever aan huis laten bezorgen dan op te halen bij een service point of pakketautomaat. I would rather have a valuable order delivered to your home than pick it up at a service point or parcel locker.</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4	Statistics

<p><b>8e Ik zou een zware bestelling liever aan huis laten bezorgen dan op te halen bij een service point of pakketautomaat. I would rather have a heavy order delivered to your home than pick it up at a service point or parcel locker.</b></p>	<p>Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).</p>	<p>Ordinal</p>	<p>4</p>	<p>Statistics</p>
<p><b>9 Heeft u wel eens uw pakketje opgehaald bij een service punt, zoals bij een supermarkt? Have you ever picked up your package at a service point, such as at a supermarket?</b></p>	<p>Ja (yes), Nee (no).</p>	<p>nominal</p>		<p>Statistics</p>
<p><b>10 Geef aan welke redenen voor u van toepassing zijn.</b></p>	<p>Ik ben altijd thuis om het pakketje in ontvangst te nemen (I am always at home to receive my package myself), Ik laat het pakketje door de burens in ontvangst nemen als ik niet thuis ben. (I have my package delivered by the neighbours when I am not at home), Anders (Other).</p>	<p>Nominal</p>		<p>Statistics</p>
<p><b>11 Heeft u wel eens uw pakketje opgehaald bij een service point <u>zonder de trip te combineren</u> met een andere activiteit? Have you ever picked up your package at a service point, without combining the trip with other activities (such as shopping)?</b></p>	<p>Ja (yes), Nee (no).</p>	<p>Nominal</p>	<p>3/4</p>	<p>Statistics</p>
<p><b>12 Hoe heeft u het pakketje toen opgehaald? How did</b></p>	<p>Te voet (on foot), Met de fiets (with the bicycle), Met</p>	<p>Nominal</p>	<p>4</p>	<p>Statistics</p>

<b>you pick up the package?</b>	de auto (with the car), Anders (other).			
<b>13 Hoe groot was de afstand tussen uw thuislocatie en de locatie van het service punt? How big was the distance between your home location and the location of the service point?</b>	0-5 minuten (minutes), 5-10 minuten (minutes), 10-15 minuten (minutes), 15-20 minuten (minutes), 20-25 minuten (minutes), 25-30 minuten (minutes).	Ordinal	4	Statistics
<b>14 Heeft u uw pakketje wel eens opgehaald bij een servicepoint (bijv. een winkel), in combinatie met een andere activiteit zoals boodschappen doen, tanken, reizen naar uw werk? Have you ever picked up your package from a service point (e.g., a shop), in combination with another activity such as shopping, refuelling, traveling to work?</b>	Ja (yes), Nee (No).		3/4	Statistics
<b>15 Met welke activiteit heeft u het ophalen van het pakketje toen gecombineerd? What activity did you combine the pick-up of the package with?</b>	Boodschappen (Groceries), Tanken (Refuel), Reizen richting werk (Commute), Anders (Other).	Nominal	4/5	Statistics
<b>16 Hoe heeft u het pakketje toen opgehaald? How did you pick up the package?</b>	Te voet (on foot), Met de fiets (with the bicycle), Met de auto (with the car), Anders (other).	Nominal	4/5	Statistics
<b>17 Wat was de extra reistijd om het ophalen van het pakketje te combineren met uw activiteit? What was the extra travel time to combine the pick-up of</b>	0-5 minuten (minutes), 5-10 minuten (minutes), 10-15 minuten (minutes), 15-20 minuten	Ordinal	4/5	Statistics

<b>the package with your activity?</b>	(minutes), 20-25 minuten (minutes), 25-30 minuten (minutes).			
<b>18</b> Waarom heeft u toen voor de aangegeven manier van mobiliteit gekozen? Why did you choose the indicated mode of mobility? (On foot, bicycle, car, otherwise)	Open answer.		3/4	Statistics
<b>19</b> Heeft u wel eens een pakketautomaat ergens zien staan? Bijv. op een station, in een winkel, los in een straat, etc. Have you ever seen a parcel locker somewhere? E.g., at a station, in a shop, loose in a street, etc.	Ja (Yes), Nee (No).	Nominal	3	Statistics
<b>20</b> Heeft u wel eens gebruik gemaakt van een pakketautomaat om een pakketje te ontvangen of te verzenden? Have you ever used a parcel locker to receive or send a package?	Ja (Yes), Nee (No).	Nominal	3	Statistics
<b>21a</b> Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als er autoparkeer-plaatsen aanwezig zijn op de locatie van de pakketautomaat? I would use the parcel locker as a delivery option for my orders as there are car parking spaces at the location of the parcel lockers?	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4/5	Statistics
<b>21b</b> Ik zou gebruik maken van het	Helemaal mee eens (strongly	Ordinal	4/5	Statistics

<b>pakketautomaat als bezorgoptie voor mijn bestellingen als deze 24/7 uur open is voor gebruik. I would use the parcel locker as a delivery option for my orders as it is open for use 24/7 hours.</b>	agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).			
<b>21c Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als deze bereikbaar is voor gemotoriseerde voertuigen. I would use the parcel locker as a delivery option for my orders as accessible for motorized vehicles.</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4/5	Statistics
<b>21d Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als deze zich in een publieke ruimte zoals een station of supermarkt bevindt. I would use the parcel locker as a delivery option for my orders as it is located in a public space such as a railway station or supermarket.</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4/5	Statistics
<b>21e Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als deze zich bij een particulier (thuis) bevindt. I would use the parcel locker as a delivery option for my orders as it is located at a private individual (at home).</b>	Helemaal mee eens (strongly agree), Mee eens (agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).	Ordinal	4/5	Statistics
<b>21f Ik zou gebruik maken van het pakketautomaat als</b>	Helemaal mee eens (strongly agree), Mee eens	Ordinal	4/5	Statistics

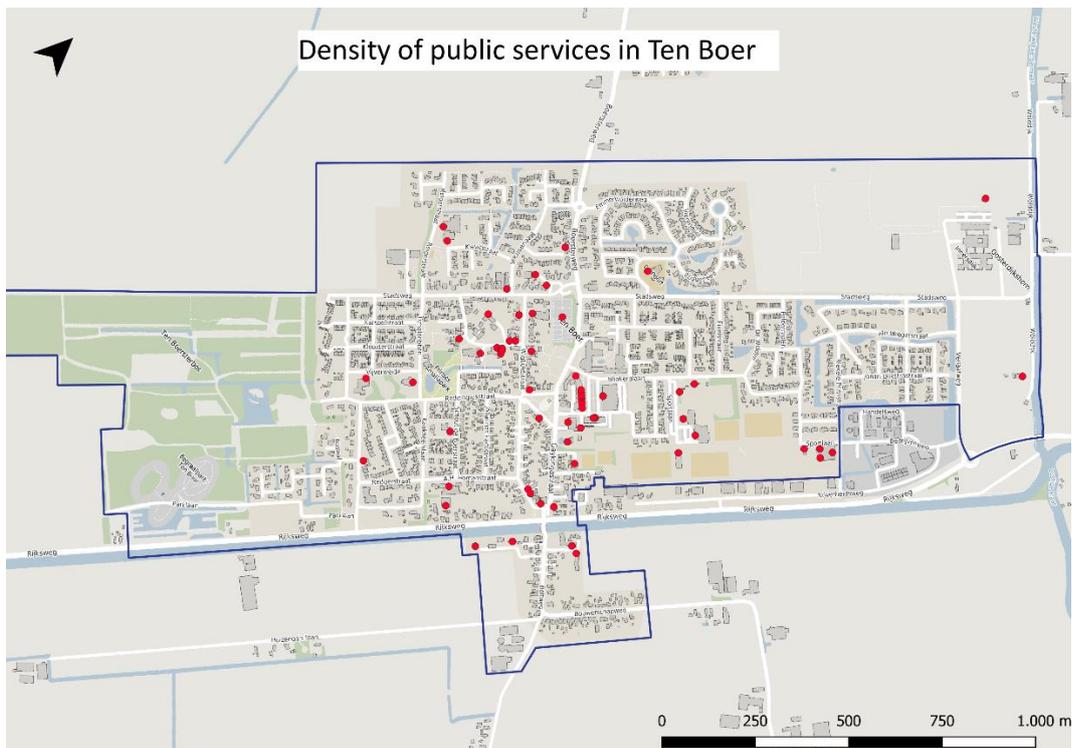
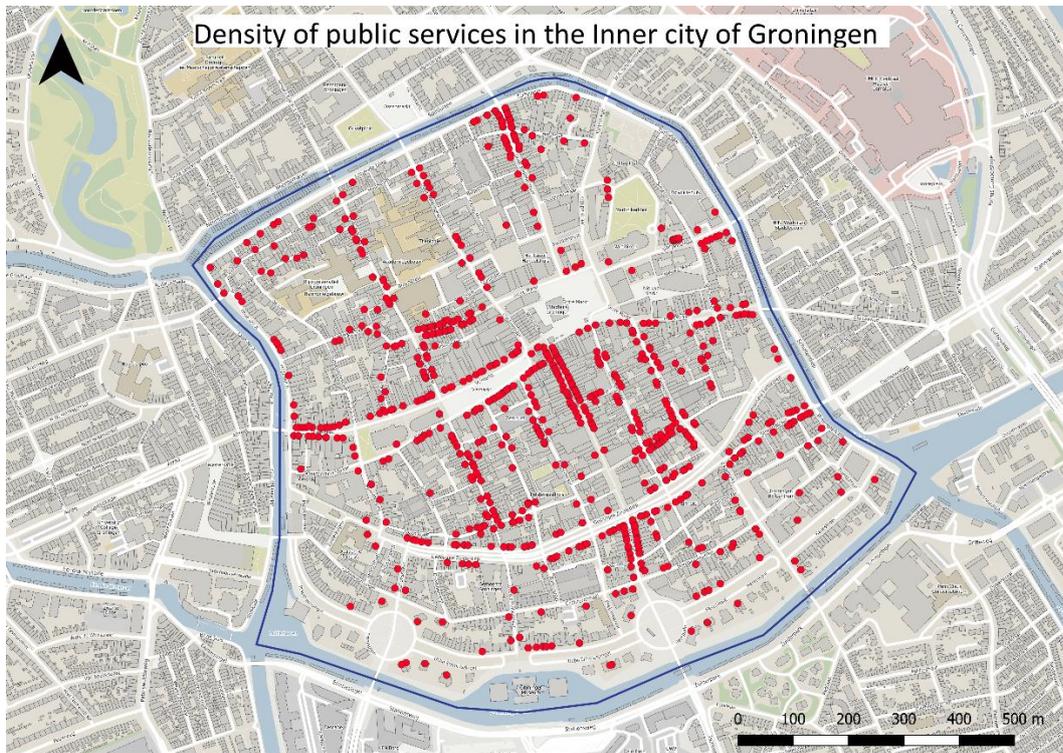
<b>bezorgoptie voor mijn bestellingen als er sociale controle heerst op deze locatie (bewoners/omstanders houden een oogje in het zeil). I would use the parcel locker as a delivery option for my orders as there is social control at this location (residents/bystanders keep an eye out).</b>	(agree), Neutraal (neither agree nor disagree), Oneens (disagree), Helemaal oneens (strongly disagree).			
<b>22 Als u het pakket lopend op zou halen bij een service punt, hoe ver mag het service punt van u gelegen zijn? If you were to pick up the package on foot at a service point, how far may the service point be located from you?</b>	0-5 minuten (minutes), 5-10 minuten (minutes), 10-15 minuten (minutes), 15-20 minuten (minutes), 20-25 minuten (minutes), 25-30 minuten (minutes).	Ordinal	5	Statistics
<b>23 Als u het pakket met de fiets op zou halen bij een service punt, hoe ver mag het service punt van u gelegen zijn? If you were to pick up the package by bike at a service point, how far may the service point be located from you?</b>	0-5 minuten (minutes), 5-10 minuten (minutes), 10-15 minuten (minutes), 15-20 minuten (minutes), 20-25 minuten (minutes), 25-30 minuten (minutes).	Ordinal	5	Statistics
<b>24a Ik zou het ophalen van een pakketje combineren met boodschappen doen. I would combine the collection of a parcel with grocery shopping.</b>	Eerste keus (first choice), tweede keus (second choice), derde keus (third choice).	Ordinal	4/5	Statistics
<b>24b Ik zou het ophalen van het pakketje combineren met het tanken van de auto. I would combine the collection of a parcel</b>	Eerste keus (first choice), tweede keus (second choice), derde keus (third choice).	Ordinal	4/5	Statistics

with refuelling of my car.				
<b>24c</b> Ik zou het ophalen van het pakketje combineren met de heen of terugreis van het werk/studie. I would combine the collection of a parcel with commuting.	Eerste keus (first choice), tweede keus (second choice), derde keus (third choice).	Ordinal	4/5	Statistics
<b>25</b> Zijn er nog andere activiteiten waarmee u het ophalen van het pakketje zou combineren? Vul deze hieronder in. Are there any other activities you would combine the pick-up of the package with? Fill it in below.	Open answer.	Nominal	4	Statistics
<b>26</b> In welk gebied zou de pakketautomaat zich moet bevinden, als u het pakketje lopend op zou ophalen? Teken het gebiedje op de kaart. In what area should the parcel machine be located, if you were to pick up the package on foot? Draw the area on the map.	Spatial.	GIS	5	GIS
<b>27</b> In welk gebied zou de pakket automaat zich moeten bevinden, als u het pakketjes met de fiets zou ophalen? Teken het gebied op de kaart. In which area should the package machine be located, if you were to pick up the packages by bike? Draw the area on the map.	Spatial.	GIS	5	GIS
<b>28</b> Wat zijn locaties waar u een pakketautomaat zou neerzetten? Geef deze punten aan op de kaart	Spatial.	GIS	5	GIS

<p><b>hieronder. 28 What are locations where you would put a parcel machine? Please indicate these points on the map below.</b></p>				
<p><b>29 Mocht u verder nog iets willen toevoegen of is er iets dat u niet bent tegen gekomen in de enquête, dan kunt u dat hier kwijt. If you would like to add anything else or is there something you have not encountered in the survey? Then please add your comment below.</b></p>	<p>Open Answer.</p>	<p>n/a</p>	<p>n/a</p>	

## APPENDIX 2 NEIGHBOURHOOD FACILITIES

As can be seen on the maps, there is a significant difference in the density of public services between the urban inner city of Groningen and the rural area of Ten Boer. The public services presented on these two maps are based upon data of the Bag register, which can be downloaded free of charge from the PDOK services. Within the 'verblijfsobjecten' layer, all users' functions were selected in the attribute table except 'woonfunctie' and 'overige gebruiksfunctie' to create a new geo package of all public services per neighbourhood.



## APPENDIX 3 STATISTICAL ANALYSIS

### Sample distribution

#### Question 1: What is your gender?

**Crosstab**

1 Wat is uw geslacht?

Postcode			1 Wat is uw geslacht?			Total
			Man	Vrouw	Wil ik liever niet zeggen	
Ten Boer	Count		16	20	1	37
	Expected Count		16,2	20,3	,5	37,0
	% within Postcode		43,2%	54,1%	2,7%	100,0%
Inner City Groningen	Count		15	19	0	34
	Expected Count		14,8	18,7	,5	34,0
	% within Postcode		44,1%	55,9%	0,0%	100,0%
Total	Count		31	39	1	71
	Expected Count		31,0	39,0	1,0	71,0
	% within Postcode		43,7%	54,9%	1,4%	100,0%

#### Question2: What is your age?

**Crosstab**

2 Tot welke leeftijdsgroep behoort u?

Postcode			2 Tot welke leeftijdsgroep behoort u?						Total
			18 tot 24 jaar	25 tot 34 jaar	35 tot 44 jaar	45 tot 54 jaar	55 tot 64 jaar	65 en ouder	
Ten Boer	Count		3	8	3	8	4	11	37
	Expected Count		14,6	5,7	1,6	4,2	3,6	7,3	37,0
	% within Postcode		8,1%	21,6%	8,1%	21,6%	10,8%	29,7%	100,0%
Inner City Groningen	Count		25	3	0	0	3	3	34
	Expected Count		13,4	5,3	1,4	3,8	3,4	6,7	34,0
	% within Postcode		73,5%	8,8%	0,0%	0,0%	8,8%	8,8%	100,0%
Total	Count		28	11	3	8	7	14	71
	Expected Count		28,0	11,0	3,0	8,0	7,0	14,0	71,0
	% within Postcode		39,4%	15,5%	4,2%	11,3%	9,9%	19,7%	100,0%

#### Question 4: What is your ZIP-code?

**Postcode**

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
		Ten Boer	37	52,1	52,1
	Binnenstad Groninge	34	47,9	47,9	100,0
	Total	71	100,0	100,0	

#### Question 6: How many times have you ordered products in the last three months?

**Crosstab**

6 Hoe vaak heeft u producten besteld in de afgelopen drie maanden?

Postcode			6 Hoe vaak heeft u producten besteld in de afgelopen drie maanden?					Total
			Minder dan 1 keer in de drie maanden	Minder dan 1 keer per maand	Tenminste 1 keer per maand	Tenminste 1 keer per week	Vaker dan 1 keer per week	
Ten Boer	Count		5	0	21	9	2	37
	Expected Count		3,1	3,1	21,4	7,3	2,1	37,0
	% within Postcode		13,5%	0,0%	56,8%	24,3%	5,4%	100,0%
Inner City Groningen	Count		1	6	20	5	2	34
	Expected Count		2,9	2,9	19,6	6,7	1,9	34,0
	% within Postcode		2,9%	17,6%	58,8%	14,7%	5,9%	100,0%
Total	Count		6	6	41	14	4	71
	Expected Count		6,0	6,0	41,0	14,0	4,0	71,0
	% within Postcode		8,5%	8,5%	57,7%	19,7%	5,6%	100,0%

#### Question 7: Which delivery option do you use most often?

### Crosstab

		7 Van welke bezorgoptie maakt u het vaakst gebruik?				
			Anders (vul hieronder uw antwoord in)	Levering aan huis	Ophalen bij een bemand service point	Total
Postcode	Ten Boer	Count	2	35	0	37
		Expected Count	1,0	31,8	4,2	37,0
		% within Postcode	5,4%	94,6%	0,0%	100,0%
	Inner City Groningen	Count	0	26	8	34
		Expected Count	1,0	29,2	3,8	34,0
		% within Postcode	0,0%	76,5%	23,5%	100,0%
Total		Count	2	61	8	71
		Expected Count	2,0	61,0	8,0	71,0
		% within Postcode	2,8%	85,9%	11,3%	100,0%

### Travel behaviour of previous parcel collection

#### Postcode \* WC\_transportmode

### Crosstab

		WC_transportmode				
			On foot	With the Bicycle	With the car	Total
Postcode	Ten Boer	Count	1	16	8	25
		Expected Count	9,5	11,8	3,6	25,0
		% within Postcode	4,0%	64,0%	32,0%	100,0%
	Inner City Groningen	Count	20	10	0	30
		Expected Count	11,5	14,2	4,4	30,0
		% within Postcode	66,7%	33,3%	0,0%	100,0%
Total		Count	21	26	8	55
		Expected Count	21,0	26,0	8,0	55,0
		% within Postcode	38,2%	47,3%	14,5%	100,0%

#### Postcode \* WC\_Distanceinminutes

### Crosstab

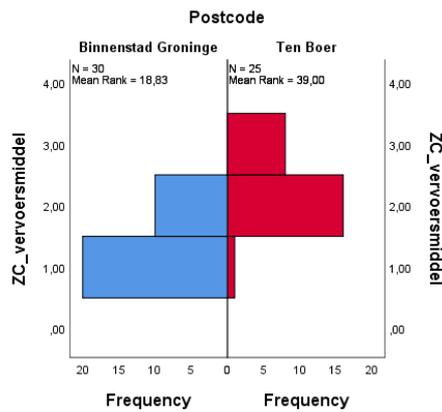
		WC_Distanceinminutes					
			0 to 5 minutes	5 to 10 minutes	10 to 15 minutes	15 to 20 minutes	Total
Postcode	Ten Boer	Count	10	10	4	1	25
		Expected Count	15,5	6,8	2,3	,5	25,0
		% within Postcode	40,0%	40,0%	16,0%	4,0%	100,0%
	Inner City Groningen	Count	24	5	1	0	30
		Expected Count	18,5	8,2	2,7	,5	30,0
		% within Postcode	80,0%	16,7%	3,3%	0,0%	100,0%
Total		Count	34	15	5	1	55
		Expected Count	34,0	15,0	5,0	1,0	55,0
		% within Postcode	61,8%	27,3%	9,1%	1,8%	100,0%

## ZC\_vervoersmiddel across Postcode

### Independent-Samples Mann-Whitney U Test Summary

Total N	55
Mann-Whitney U	100,000
Wilcoxon W	565,000
Test Statistic	100,000
Standard Error	54,089
Standardized Test Statistic	-5,084
Asymptotic Sig.(2-sided test)	,000

### Independent-Samples Mann-Whitney U Test

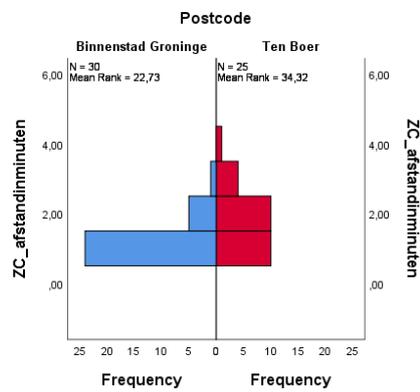


## ZC\_afstandinminuten across Postcode

### Independent-Samples Mann-Whitney U Test Summary

Total N	55
Mann-Whitney U	217,000
Wilcoxon W	682,000
Test Statistic	217,000
Standard Error	50,994
Standardized Test Statistic	-3,098
Asymptotic Sig.(2-sided test)	,002

### Independent-Samples Mann-Whitney U Test



## Postcode \* C\_transportmode

### Crosstab

Postcode	C_transportmode	C_transportmode				Total
		On foot	With the bicycle	With the car	With bicycle and car	
Ten Boer	Count	0	8	15	1	24
	Expected Count	9,7	6,0	7,4	,9	24,0
	% within Postcode	0,0%	33,3%	62,5%	4,2%	100,0%
Inner City Groningen	Count	21	5	1	1	28
	Expected Count	11,3	7,0	8,6	1,1	28,0
	% within Postcode	75,0%	17,9%	3,6%	3,6%	100,0%
Total	Count	21	13	16	2	52
	Expected Count	21,0	13,0	16,0	2,0	52,0
	% within Postcode	40,4%	25,0%	30,8%	3,8%	100,0%

**Postcode \* C\_distanceinminutes**

**Crosstab**

		C_distanceinminutes				Total	
		0 to 5 minutes	5 to 10 minutes	10 to 15 minutes	15 to 20 minutes		
Postcode	Ten Boer	Count	17	4	2	1	24
		Expected Count	17,5	4,2	1,4	,9	24,0
		% within Postcode	70,8%	16,7%	8,3%	4,2%	100,0%
	Inner City Groningen	Count	21	5	1	1	28
		Expected Count	20,5	4,8	1,6	1,1	28,0
		% within Postcode	75,0%	17,9%	3,6%	3,6%	100,0%
Total		Count	38	9	3	2	52
		Expected Count	38,0	9,0	3,0	2,0	52,0
		% within Postcode	73,1%	17,3%	5,8%	3,8%	100,0%

**Postcode \* C\_activity**

**Crosstab**

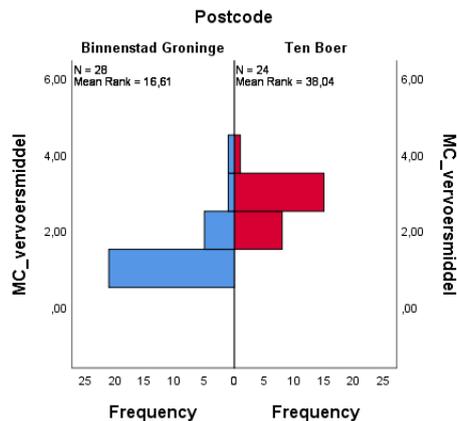
		C_activity					Total	
		Grocery shopping	Commuting	Grocery shopping and Commuting	Grocery shopping and Commuting	Grocery shopping, Refuel and Commuting		
Postcode	Ten Boer	Count	20	1	0	0	1	22
		Expected Count	18,5	,9	1,8	,4	,4	22,0
		% within Postcode	90,9%	4,5%	0,0%	0,0%	4,5%	100,0%
	Inner City Groningen	Count	22	1	4	1	0	28
		Expected Count	23,5	1,1	2,2	,6	,6	28,0
		% within Postcode	78,6%	3,6%	14,3%	3,6%	0,0%	100,0%
Total		Count	42	2	4	1	1	50
		Expected Count	42,0	2,0	4,0	1,0	1,0	50,0
		% within Postcode	84,0%	4,0%	8,0%	2,0%	2,0%	100,0%

**MC\_vervoersmiddel across Postcode**

**Independent-Samples Mann-Whitney U Test Summary**

Total N	52
Mann-Whitney U	59,000
Wilcoxon W	465,000
Test Statistic	59,000
Standard Error	51,386
Standardized Test Statistic	-5,391
Asymptotic Sig. (2-sided test)	,000

**Independent-Samples Mann-Whitney U Test**

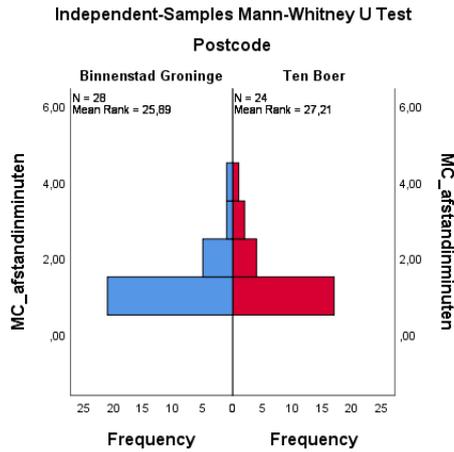


## Independent-Samples Mann-Whitney U Test

### MC\_afstandinminuten across Postcode

#### Independent-Samples Mann-Whitney U Test Summary

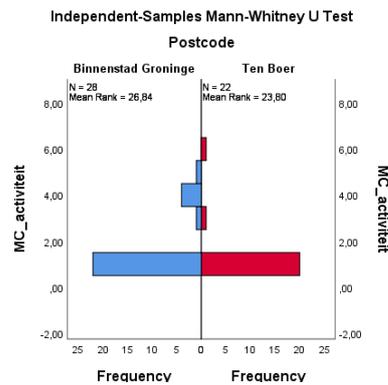
Total N	52
Mann-Whitney U	319,000
Wilcoxon W	725,000
Test Statistic	319,000
Standard Error	42,359
Standardized Test Statistic	-,401
Asymptotic Sig.(2-sided test)	,688



### MC\_activiteit across Postcode

#### Independent-Samples Mann-Whitney U Test Summary

Total N	50
Mann-Whitney U	345,500
Wilcoxon W	751,500
Test Statistic	345,500
Standard Error	32,637
Standardized Test Statistic	1,149
Asymptotic Sig.(2-sided test)	,251



### C\_transportmode \* C\_activity Crosstabulation

C_transportmode		C_activity					Total	
		Grocery shopping	Commuting	Grocery shopping and Commuting	Grocery shopping and Refuel	Grocery shopping, Refuel and Commuting		
On foot	Count	19	0	2	0	0	21	
	Expected Count	17,6	,8	1,7	,4	,4	21,0	
	% within C_transportmode	90,5%	0,0%	9,5%	0,0%	0,0%	100,0%	
	With the bicycle	Count	9	1	2	0	0	12
		Expected Count	10,1	,5	1,0	,2	,2	12,0
		% within C_transportmode	75,0%	8,3%	16,7%	0,0%	0,0%	100,0%
	With the car	Count	13	1	0	1	0	15
		Expected Count	12,6	,6	1,2	,3	,3	15,0
		% within C_transportmode	86,7%	6,7%	0,0%	6,7%	0,0%	100,0%
With bicycle and car	Count	1	0	0	0	1	2	
	Expected Count	1,7	,1	,2	,0	,0	2,0	
	% within C_transportmode	50,0%	0,0%	0,0%	0,0%	50,0%	100,0%	
Total	Count	42	2	4	1	1	50	
	Expected Count	42,0	2,0	4,0	1,0	1,0	50,0	
	% within C_transportmode	84,0%	4,0%	8,0%	2,0%	2,0%	100,0%	

**Postcode \* W\_DistancePL**

**Crosstab**

		W_DistancePL				Total	
		0 till 5 minutes	5 till 10 minutes	10 till 15 minutes	15 till 20 minutes		
Postcode	Ten Boer	Count	7	16	10	2	35
		Expected Count	9,8	17,0	7,2	1,0	35,0
		% within Postcode	20,0%	45,7%	28,6%	5,7%	100,0%
	Inner City Groningen	Count	12	17	4	0	33
		Expected Count	9,2	16,0	6,8	1,0	33,0
		% within Postcode	36,4%	51,5%	12,1%	0,0%	100,0%
Total		Count	19	33	14	2	68
		Expected Count	19,0	33,0	14,0	2,0	68,0
		% within Postcode	27,9%	48,5%	20,6%	2,9%	100,0%

**Postcode \* C\_DistancePL**

**Crosstab**

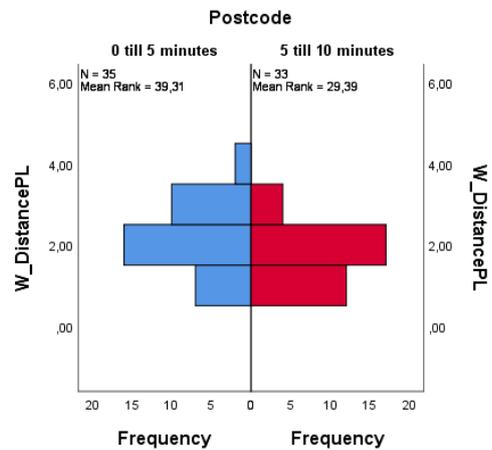
		C_DistancePL					Total	
		0 till 5 minutes	5 till 10 minutes	10 till 15 minutes	15 till 20 minutes	25 till 30 minutes		
Postcode	Ten Boer	Count	6	18	7	2	1	34
		Expected Count	10,1	17,3	4,6	1,5	,5	34,0
		% within Postcode	17,6%	52,9%	20,6%	5,9%	2,9%	100,0%
	Inner City Groningen	Count	14	16	2	1	0	33
		Expected Count	9,9	16,7	4,4	1,5	,5	33,0
		% within Postcode	42,4%	48,5%	6,1%	3,0%	0,0%	100,0%
Total		Count	20	34	9	3	1	67
		Expected Count	20,0	34,0	9,0	3,0	1,0	67,0
		% within Postcode	29,9%	50,7%	13,4%	4,5%	1,5%	100,0%

**W\_DistancePL across Postcode**

**Independent-Samples Mann-Whitney U Test Summary**

Total N	68
Mann-Whitney U	409,000
Wilcoxon W	970,000
Test Statistic	409,000
Standard Error	75,369
Standardized Test Statistic	-2,236
Asymptotic Sig.(2-sided test)	,025

**Independent-Samples Mann-Whitney U Test**

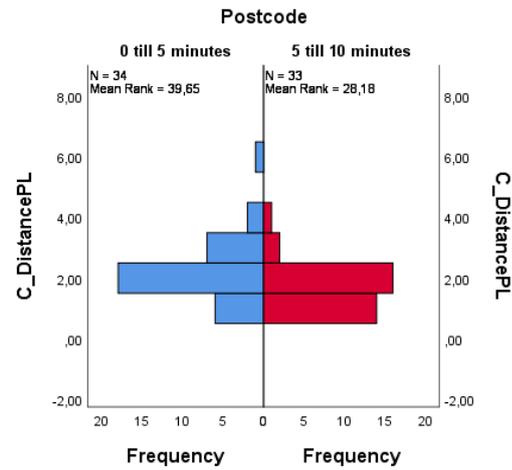


## C\_DistancePL across Postcode

### Independent-Samples Mann-Whitney U Test Summary

Total N	67
Mann-Whitney U	369,000
Wilcoxon W	930,000
Test Statistic	369,000
Standard Error	73,097
Standardized Test Statistic	-2,627
Asymptotic Sig.(2-sided test)	,009

### Independent-Samples Mann-Whitney U Test



## User Preferences

### Crosstab

8 Geef voor de onderstaande stellingen aan wat er op u betrekking heeft. - lk kies voor de goedkoopste leveringsoptie.

			2	3	4	5	Total
Postcode	Ten Boer	Count	2	8	15	11	36
		Expected Count	1,5	8,2	13,9	12,3	36,0
		% within Postcode	5,6%	22,2%	41,7%	30,6%	100,0%
Postcode	Inner City Groningen	Count	1	8	12	13	34
		Expected Count	1,5	7,8	13,1	11,7	34,0
		% within Postcode	2,9%	23,5%	35,3%	38,2%	100,0%
Total		Count	3	16	27	24	70
		Expected Count	3,0	16,0	27,0	24,0	70,0
		% within Postcode	4,3%	22,9%	38,6%	34,3%	100,0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	,777 <sup>a</sup>	3	,855
Likelihood Ratio	,784	3	,853
Linear-by-Linear Association	,313	1	,576
N of Valid Cases	70		

a. 2 cells (25,0%) have expected count less than 5. The minimum expected count is 1,46.

### Crosstab

8 Geef voor de onderstaande stellingen aan wat er op u betrekking heeft. - \_Ik kies voor de duurzaamste leveringsoptie.

			1	2	3	4	5	Total
Postcode	Ten Boer	Count	2	4	16	10	4	36
		Expected Count	2,6	4,7	14,6	12,0	2,1	36,0
		% within Postcode	5,6%	11,1%	44,4%	27,8%	11,1%	100,0%
	Inner City Groningen	Count	3	5	12	13	0	33
		Expected Count	2,4	4,3	13,4	11,0	1,9	33,0
		% within Postcode	9,1%	15,2%	36,4%	39,4%	0,0%	100,0%
Total	Count	5	9	28	23	4	69	
	Expected Count	5,0	9,0	28,0	23,0	4,0	69,0	
	% within Postcode	7,2%	13,0%	40,6%	33,3%	5,8%	100,0%	

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5,153 <sup>a</sup>	4	,272
Likelihood Ratio	6,693	4	,153
Linear-by-Linear Association	,838	1	,360
N of Valid Cases	69		

a. 6 cells (60,0%) have expected count less than 5. The minimum expected count is 1,91.

### Crosstab

8 Geef voor de onderstaande stellingen aan wat er op u betrekking heeft. - \_Ik kies voor de snelste leveringsoptie.

			1	2	3	4	5	Total
Postcode	Ten Boer	Count	0	5	9	8	14	36
		Expected Count	,5	5,7	7,2	11,3	11,3	36,0
		% within Postcode	0,0%	13,9%	25,0%	22,2%	38,9%	100,0%
	Inner City Groningen	Count	1	6	5	14	8	34
		Expected Count	,5	5,3	6,8	10,7	10,7	34,0
		% within Postcode	2,9%	17,6%	14,7%	41,2%	23,5%	100,0%
Total	Count	1	11	14	22	22	70	
	Expected Count	1,0	11,0	14,0	22,0	22,0	70,0	
	% within Postcode	1,4%	15,7%	20,0%	31,4%	31,4%	100,0%	

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5,454 <sup>a</sup>	4	,244
Likelihood Ratio	5,894	4	,207
Linear-by-Linear Association	,651	1	,420
N of Valid Cases	70		

a. 2 cells (20,0%) have expected count less than 5. The minimum expected count is ,49.

### Crosstab

8 Geef voor de onderstaande stellingen aan wat er op u betrekking heeft. - Ik zou een zware bestelling liever aan huis laten bezorgen dan op te halen bij een service point of pakketautomaat.

			1	2	3	4	5	Total
Postcode	Ten Boer	Count	1	0	1	12	23	37
		Expected Count	1,6	,5	1,6	10,4	22,9	37,0
		% within Postcode	2,7%	0,0%	2,7%	32,4%	62,2%	100,0%
	Inner City Groningen	Count	2	1	2	8	21	34
		Expected Count	1,4	,5	1,4	9,6	21,1	34,0
		% within Postcode	5,9%	2,9%	5,9%	23,5%	61,8%	100,0%
Total		Count	3	1	3	20	44	71
		Expected Count	3,0	1,0	3,0	20,0	44,0	71,0
		% within Postcode	4,2%	1,4%	4,2%	28,2%	62,0%	100,0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2,435 <sup>a</sup>	4	,656
Likelihood Ratio	2,835	4	,586
Linear-by-Linear Association	,685	1	,408
N of Valid Cases	71		

a. 6 cells (60,0%) have expected count less than 5. The minimum expected count is ,48.

### Crosstab

8 Geef voor de onderstaande stellingen aan wat er op u betrekking heeft. - Ik zou een waardevolle bestelling liever aan huis laten bezorgen dan op te halen bij een service point of pakketautomaat.

			1	2	3	4	5	Total
Postcode	Ten Boer	Count	1	3	6	6	20	36
		Expected Count	2,1	5,7	5,7	7,7	14,9	36,0
		% within Postcode	2,8%	8,3%	16,7%	16,7%	55,6%	100,0%
	Inner City Groningen	Count	3	8	5	9	9	34
		Expected Count	1,9	5,3	5,3	7,3	14,1	34,0
		% within Postcode	8,8%	23,5%	14,7%	26,5%	26,5%	100,0%
Total		Count	4	11	11	15	29	70
		Expected Count	4,0	11,0	11,0	15,0	29,0	70,0
		% within Postcode	5,7%	15,7%	15,7%	21,4%	41,4%	100,0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8,086 <sup>a</sup>	4	,088
Likelihood Ratio	8,321	4	,080
Linear-by-Linear Association	5,935	1	,015
N of Valid Cases	70		

a. 2 cells (20,0%) have expected count less than 5. The minimum expected count is 1,94.

## Location preferences

**Postcode \* 21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_- ... er autoparkeerplaatsen aanwezig zijn op de locatie van de pakketautomaat.**

### Crosstab

21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-... er autoparkeerplaatsen aanwezig zijn op de locatie van de pakketautomaat.

			Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Postcode	Ten Boer	Count	1	3	11	11	9	35
		Expected Count	4,6	3,6	14,4	7,2	5,1	35,0
		% within Postcode	2,9%	8,6%	31,4%	31,4%	25,7%	100,0%
	Inner City Groningen	Count	8	4	17	3	1	33
		Expected Count	4,4	3,4	13,6	6,8	4,9	33,0
		% within Postcode	24,2%	12,1%	51,5%	9,1%	3,0%	100,0%
Total		Count	9	7	28	14	10	68
		Expected Count	9,0	7,0	28,0	14,0	10,0	68,0
		% within Postcode	13,2%	10,3%	41,2%	20,6%	14,7%	100,0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17,801 <sup>a</sup>	4	,001
Likelihood Ratio	19,799	4	,001
Linear-by-Linear Association	15,444	1	,000
N of Valid Cases	68		

a. 5 cells (50,0%) have expected count less than 5. The minimum expected count is 3,40.

**Postcode \* 21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_- ... deze 24/7 uur open is voor gebruik.**

### Crosstab

21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-... deze 24/7 uur open is voor gebruik.

			Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Postcode	Ten Boer	Count	1	4	7	9	14	35
		Expected Count	1,0	4,1	5,1	8,8	16,0	35,0
		% within Postcode	2,9%	11,4%	20,0%	25,7%	40,0%	100,0%
	Inner City Groningen	Count	1	4	3	8	17	33
		Expected Count	1,0	3,9	4,9	8,3	15,0	33,0
		% within Postcode	3,0%	12,1%	9,1%	24,2%	51,5%	100,0%
Total		Count	2	8	10	17	31	68
		Expected Count	2,0	8,0	10,0	17,0	31,0	68,0
		% within Postcode	2,9%	11,8%	14,7%	25,0%	45,6%	100,0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1,892 <sup>a</sup>	4	,756
Likelihood Ratio	1,936	4	,747
Linear-by-Linear Association	,527	1	,468
N of Valid Cases	68		

a. 5 cells (50,0%) have expected count less than 5. The minimum expected count is ,97.

**Postcode \* 21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-  
... deze bereikbaar is voor gemotoriseerde voertuigen.**

**Crosstab**

21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-... deze bereikbaar is voor gemotoriseerde voertuigen.

			Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Postcode	Ten Boer	Count	1	2	12	10	9	34
		Expected Count	4,6	2,0	12,7	8,1	6,6	34,0
		% within Postcode	2,9%	5,9%	35,3%	29,4%	26,5%	100,0%
	Inner City Groningen	Count	8	2	13	6	4	33
		Expected Count	4,4	2,0	12,3	7,9	6,4	33,0
		% within Postcode	24,2%	6,1%	39,4%	18,2%	12,1%	100,0%
Total		Count	9	4	25	16	13	67
		Expected Count	9,0	4,0	25,0	16,0	13,0	67,0
		% within Postcode	13,4%	6,0%	37,3%	23,9%	19,4%	100,0%

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8,394 <sup>a</sup>	4	,078
Likelihood Ratio	9,207	4	,056
Linear-by-Linear Association	7,410	1	,006
N of Valid Cases	67		

a. 4 cells (40,0%) have expected count less than 5. The minimum expected count is 1,97.

**Postcode \* 21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-  
... deze zich in een publieke ruimte zoals een station of supermarkt bevind.**

**Crosstab**

21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-... deze zich in een publieke ruimte zoals een station of supermarkt bevind.

			Strongly disagree	Disagree	Neutral	Agree	Strongly disagree	Total
Postcode	Ten Boer	Count	1	4	11	11	8	35
		Expected Count	,5	2,6	8,8	11,3	11,8	35,0
		% within Postcode	2,9%	11,4%	31,4%	31,4%	22,9%	100,0%
	Inner City Groningen	Count	0	1	6	11	15	33
		Expected Count	,5	2,4	8,3	10,7	11,2	33,0
		% within Postcode	0,0%	3,0%	18,2%	33,3%	45,5%	100,0%
Total		Count	1	5	17	22	23	68
		Expected Count	1,0	5,0	17,0	22,0	23,0	68,0
		% within Postcode	1,5%	7,4%	25,0%	32,4%	33,8%	100,0%

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6,348 <sup>a</sup>	4	,175
Likelihood Ratio	6,912	4	,141
Linear-by-Linear Association	6,245	1	,012
N of Valid Cases	68		

a. 4 cells (40,0%) have expected count less than 5. The minimum expected count is ,49.

**Postcode \* 21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-  
... er sociale controle heerst op deze locatie (bewoners/omstanders houden een oogje in het zeil).**

**Crosstab**

21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-... er sociale controle heerst op deze locatie (bewoners/omstanders houden een oogje in het zeil).

			Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Postcode	Ten Boer	Count	1	2	6	14	12	35
		Expected Count	,5	2,1	8,8	13,9	9,8	35,0
		% within Postcode	2,9%	5,7%	17,1%	40,0%	34,3%	100,0%
	Inner City Groningen	Count	0	2	11	13	7	33
		Expected Count	,5	1,9	8,3	13,1	9,2	33,0
		% within Postcode	0,0%	6,1%	33,3%	39,4%	21,2%	100,0%
Total		Count	1	4	17	27	19	68
		Expected Count	1,0	4,0	17,0	27,0	19,0	68,0
		% within Postcode	1,5%	5,9%	25,0%	39,7%	27,9%	100,0%

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3,768 <sup>a</sup>	4	,438
Likelihood Ratio	4,188	4	,381
Linear-by-Linear Association	,870	1	,351
N of Valid Cases	68		

a. 4 cells (40,0%) have expected count less than 5. The minimum expected count is ,49.

**Postcode \* 21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-  
... deze zich bij een particulier (thuis) bevind.**

**Crosstab**

21 Ik zou gebruik maken van het pakketautomaat als bezorgoptie voor mijn bestellingen als ...-\_-... deze zich bij een particulier (thuis) bevind.

			Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Postcode	Ten Boer	Count	5	11	12	3	2	33
		Expected Count	4,5	14,0	10,0	2,5	2,0	33,0
		% within Postcode	15,2%	33,3%	36,4%	9,1%	6,1%	100,0%
	Inner City Groningen	Count	4	17	8	2	2	33
		Expected Count	4,5	14,0	10,0	2,5	2,0	33,0
		% within Postcode	12,1%	51,5%	24,2%	6,1%	6,1%	100,0%
Total		Count	9	28	20	5	4	66
		Expected Count	9,0	28,0	20,0	5,0	4,0	66,0
		% within Postcode	13,6%	42,4%	30,3%	7,6%	6,1%	100,0%

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2,397 <sup>a</sup>	4	,663
Likelihood Ratio	2,414	4	,660
Linear-by-Linear Association	,359	1	,549
N of Valid Cases	66		

a. 6 cells (60,0%) have expected count less than 5. The minimum expected count is 2,00.

## APPENDIX 4 SURVEY DISTRIBUTION FLYER

**GEZOCHT!**  
**Enquête**  
**RESPONDENTEN**

**PAKKETAUTOMATEN  
GRONINGEN**

**NIEUWSGIERIG NAAR  
EEN NIEUWE MANIER VAN  
PAKKET BEZORGING?  
VUL IN EN LEER MEER!**

**OVER MIJ**  
Mijn naam is Maaïke Buser en ik studeer aan de Rijksuniversiteit Groningen. Voor mijn afstudeer project van de Bachelor Spatial Planning and Design, doe ik onderzoek naar het gebruik van en mogelijke locaties voor pakketautomaten in de gemeente Groningen. Na een goede afronding van dit project, behaal ik mijn diploma. Helpt u mee?

**SCAN**  
Scan de QR code onderaan deze flyer of ga naar het volgende webadres:  
<https://app.maptionnaire.com/nl/9985/>

**01**

**VUL IN!**  
Het invullen van de enquête duurt maximaal 7 minuutjes en is het makkelijkst in te vullen via een computer

**02**

**Naar Enquete**

university of  
 groningen  
 faculty of spatial sciences

**Contact:**  
**M.A.BUSER@STUDENT.RUG.NL**