Explanation of geographical distribution of hemp plantations by different neighbourhood characteristics in Enschede

by

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Thesis

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Abstract

Background The municipality of Enschede is confronted with a relative high amount of domestic (home-based) hemp plantations. The hemp plantations cause hazardous situations and despite of the risks of flooding and fire, neighbourhoods are still confronted with hemp cultivation at home-based locations. Enschede is responsible for half of the discovered (!) hemp plantations in Twente in the period between 2015 and 2017.
Objectives The foremost aim of this research is to provide insight in the distribution of hemp plantations in the neighbourhoods of Enschede. In the past, no research was carried out for this societal problem.
Methods The unit of analysis are the neighbourhoods of Enschede. The characteristics of the individuals are aggregated and the different neighbourhood characteristics are analysed. The neighbourhood characteristics were derived from the Central Office for Statistics (CBS) and a principal component analysis was carried out to provide insight in the neighbourhoods of Enschede with respect to the relationship with discovered hemp plantations.
Results Analysis over the period 2015-2017 shows a positive correlation between the quantitative presence of hemp plantations on the one hand and lower Socioeconomic Status (SES) and less social control among residents on the other.

Keywords: hemp plantations; social disorganization theory; principal component analysis; cultivation; neighbourhood characteristics; socioeconomic status; residential mobility; ethnical heterogeneity

Preface

In 2018, the opportunity for conducting research on hemp plantations in Enschede was set out by the police. My enthusiasm and curiosity got triggered and I applied for the research. I carried out my research for the police stationed in Enschede and this has resulted in this thesis which provides an insight in the distribution hemp plantations in Enschede.

The whole endeavour has foremost been a pleasant experience for me in which I got to work on an interesting subject of societal relevance. An additional benefit of this study which I appreciated highly, is that I got a more thorough understanding of the innerworkings of the police organization. During the course of this research the opportunity was facilitated to me to take part in a supporting role to certain operational police activities. This created on the one hand a way of getting more insight in the operational ins-and-outs of police activities and on the other an opportunity for me to apply to theoretical knowledge into practice.

I would like to thank my thesis supervisors, Ariana Need and René Torenvlied, for their constructive feedback on the thesis, their feedback is much appreciated for its value to keeping the process going on the right track. I would also like to extent my gratitude to Erik Colmer and Mark Broekhuis for offering me a workplace at the police station and for giving feedback on my thesis.

Last but not least, I would like to thank my family and friends for their support and understanding during this period, but also their feedback helped me a lot.

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1. Introduction

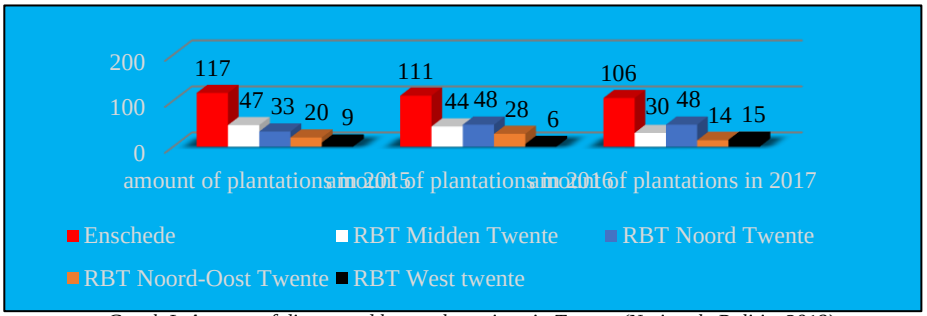
1.1 Domestic hemp plantations in the Netherlands

The Netherlands is often confronted with domestic (home-based) hemp plantations, due to the financial incentive to individuals to partake in hemp cultivation, born out of to the rising mostly foreign demand of Dutch hemp ('Nederwiet') (WODC, 2014). About 6.000 illegal hemp plantations are discovered every year in the Netherlands and in most cases the organised crime is closely involved (CCV, 2018). Due to the foreign demend for the "Nederwiet", large sums of money can be made by selling and exporting hemp. The "Nederwiet" is worldwide known for two aspects. On the one hand, the high percentage of tetrahydrocannabinol (THC) and on the other hand, the production method of cultivating the hemp at domestic locations (Potter, Bouchard & Decorte, 2013). The high quality of Dutch hemp is propable to enjoy a continouing relative large demand.

The first aspect is the stronger composition of the Dutch weed compared to other cultivated hemp. Dutch cultivated hemp contains a higher percentage of THC, the narcotic substance that causes a hallucinating effect for the user (Paris & Tran, 1998; Potter, Bouchard & Decorte, 2013). Due to this stronger composition, the demand for Dutch hemp is rising. The Dutch Scientific Research and Documentation Centre (WODC) point out in their research report (The export of cannabis cultivation in the Netherlands, 2014) that the majority of cannabis that is cultivated in the Netherlands is intended for export. The WODC estimates that the hemp grown in the Netherlands is between 90 and 1,163 tonnes and represents between 48% and 97% of the total worldwide consumption (WODC, 2014). The Netherlands can be considered as one – if not the largest – producer and exporting country of hemp.

The second aspect for the popularity of Dutch hemp are the techniques applied in the cultivation that results in the aforementioned higher quality in comparison with other countries. Due to the high level of expertise in the Netherlands about techniques of manipulating agricultural crops, these techniques are deployed to domestic hemp cultivation. The high level of expertise results, next to an increased percentage of THC and an overall higher quality, also for faster growth of the hemp crops and therefore it takes less time to deliver the cultivated hemp to their buyers in the Netherlands or foreign countries (Bovenkerk, Hogewind & Milani, 2003). The continuous and stable request for Dutch hemp, the high yields of the harvest, and relative low sentences for cultivating hemp in the Netherlands results in the involvement of organized crime (Lam, van der Wal & Kop, 2018; Decorte, 2013). However, domestic cultivation causes problems for inhabitants and the environment in residential areas, such as fire risk, flooding, intense smell and damage to homes (CCV, 2018). The main reasons for the police to intervene in hemp cultivation are on the one hand to hinder the intrusion of criminal organizations into society and on the other hand preventing the harmful consequences to the public caused by the hazardous situations. To this end, the police in Enschede is in need of a scientific analysis into this phenomenon

In graph I, the amount of discovered hemp plantations are divided per Robust Local Teams (in Dutch: *Robuust Basis Team) (*hereafter: RBT).These teams are geopgraphically organized teams consisting of police officers. Remarkable is that half of the discovered hemp plantations in Twente are situated in Enschede. Consequently the choice is made, in respect to this study, to focus on the municipality of Enschede, in particular its neighbourhoods. It is assumed that the neighbourhood level will provide the most informative data, taken into account the balancing out between aggregate and specific level. With this in mind, the following research question has been formulated*: "How can it be explained that certain neighbourhoods in the municipality of Enschede have more discovered hemp plantations compared to other neighbourhoods in the period of 2015 to 2017"?*



Graph I: Amount of discovered hemp plantations in Twente (Nationale Politie, 2018)

1.2 Previous research

A literature review regarding hemp plantations shows that little research has been done about the geographical distribution of hemp plantations within neighbourhood level. However, there is a body of scientific literature.

The Netherlands can be considered as one of the largest hemp producers and exporter worldwide and several scientists endeavoured with different manners to find an explanation for the cultivation by analysing cities and the favourable climate and location of the Netherlands. The study by Bovenkerk Hogewind and Milani (2003), *Hennepteelt in Nederland*, generally focuses on hemp plantations in different cities. In doing so, they nationally analysed the municipalities throughout the Netherlands, the composition of the neighbourhoods and the size of the hemp plantations. In their study was no further attention paid to neighbourhood characteristics. Bovenkerk Hogewind and Milani (2003) endeavoured to explain the reasons for the popularity of the Netherlands as one of the largest hemp producers worldwide. Bovenkerk Hogewind and Milani (2003) describe hemp cultivation in the Netherlands, the establishment environment and the explanation why the Netherlands is a popular country for hemp due to a number of location factors. Bovenkerk Hogewind and Milani (2003) describe five locational factors in their research: (1) the favourable geographical location, (2) knowledge advantage in the field of agricultural and horticultural methods, (3) historical tradition in the Netherlands of adventurous entrepreneurship, (4) public opinion and lastly (5) government and its policy. The fifth aspect is divided into two sub-aspects, namely (a) policy of tolerance towards the use of hemp and (b) the lower criminal penalties for cultivating hemp in the Netherlands.

Research concerning hemp cultivation at domestic locations, the organizational changes of the hemp market were researched by several scientists. Decorte (2010) explains that nowadays small-scale or amateur home growers constitute a significant part of the hemp market. In the past, most of the hemp was imported from Southern American countries (Armenta, Jelsma, Metall, Blickman & Montanes, 2003). Decorte (2010) demonstrates two main reasons for the restructuring of the hemp market.

The first reason for restructuring the hemp market is that in the past the hemp was coming from Southern American countries that exported their hemp towards European countries. Nowadays, because of the improvement of new cultivation techniques and the cross breeding of new varieties that thrive well in the European climate, there is more (domestic) hemp cultivation in Europe. As better varieties could be grown in the European landscape, it resulted in less large quantities that needed to be imported from Southern American countries and more that could be grown domestically. As a result, the request for hemp from South America has decreased, while request for hemp cultivated on the European continent has increased (Potter, Bouchard & Decorte, 2013; Decorte, 2010; Bovenkerk, Hogewind & Milani, 2003; Jansen, 2002). The second reason for more domestic cultivation is the suggestion that law enforcement interventions may have contributed to the shift from the import-driven industry towards a production-driven industry. Decorte (2010) argues that more intensive law enforcement interventions have contributed from the shift from an import-driven market structure towards a production driven market structure (domestic hemp production). The enforcement agencies and their large-scale eradication programs have caused higher pressure for the importers of hemp, because of the increased risk of getting detected or arrested. In short, the earlier mentioned shift in hemp cultivation can be considered as an adaptive strategy caused by a higher increased risk of detection of illegal cannabis cultivation.

Research from Tilburg University and advice agency IVA, *geldbomen op zolder,* the cultivation of hemp in Brabant is researched more in depth (Siesling, Smeets & Spapens, 2011). The first finding is that most cultivators operate solistic. Caught cultivators declare in their interrogation that they own the plantation by themselves and are responsible for setting up the plantation. The second finding is that the majority of the caught domestic cultivators have a paid job and live in owner-occupied and rental properties. Nevertheless, these jobs are in the most cases low-paid and the rental and owner-occupied properties represent a low value. The third finding of this research is the organisation of hemp cultivators can best be described as a network with different tasks. The tasks that are distinguished in this research are, among others, purchaser, domestic cultivator and around the network all kind of supportive service providers (electricians, hemp cutters etc.) The fourth finding is the presence of violence in the hemp cultivation network. The violence commonly occurs in the higher ranks of the criminal network. It occurs in the most cases when large transactions fail and yields of the

hemp cultivation are being missed by the criminal organizations. The fifth finding of the research is to increase the financial risks for hemp cultivation and the investigation of the hemp cultivation should be aimed at the criminal organisation behind the domestic cultivator.

The existing literature describes the hemp cultivation phenomenon in various ways without providing any insight in its geographical dimension. Especially in the light of law enforcement by the police, it beholds additional value to acquire knowledge on this specific dimension. This study contributes to the body of existing scientific literature to remedy this knowledge.

1.3 Research question and sub questions

This study should provide insight into why some neighbourhoods have more hemp plantations than other neighbourhoods and which factors contribute to this. In this research neighbourhood characteristics and characteristics of the hemp plantations (e.g. real estate characteristics, size plantations) are analysed. This research is an explorative study about the hemp plantations in the neighbourhoods in the municipality of Enschede. The research question of this study is as follows: *"How can it be explained that certain neighbourhoods in the municipality of Enschede have more hemp plantations compared to other neighbourhoods in the period of 2015 to 2017?"* The research question is divided into two sub-questions and the first sub question is descriptive and the second sub question is analytical and describes the correlations.

(a) What distribution of hemp plantations can be observed in the municipality of Enschede?

(b) Which neighbourhood characteristics are related with the distribution and geographical location of the discovered hemp plantations per neighbourhood in the municipality of Enschede?

1.4 Societal relevance

Hemp is the most commonly used drug and, in addition, hemp consumption is historically rising according to several (inter)national researches. In some EU Member States, trends show that consumption is on the rise and signals suggest that this trend will continue in the coming years (WODC, 2014; Nationale Drug Monitor Trimbos Instituut, 2017; European Drug Report, 2018). There is concern about the problems created by the cannabis market and this is twofold. First, there is evidence that the strength of cannabis has increased over the last decade and this is a concern for public health issues (Arnone et al., 2008; Decorte, 2010; European Monitoring Centre for Drugs and Drug Addiction, 2018; Ministerie van Veiligheid en Justitie, LIEC & RIEC & CCV, 2016). Secondly, the illicit cannabis market affects safety in a community and can contribute to organised crime (Lam, van der Wal & Kop, 2018; European Drug Report, 2018; Bovenkerk, Hogewind and Milani, 2003; KLPD, 2008). In short, the cultivation of hemp has societal impact.

In literature different views regarding hemp cultivation are conducted. First, domestic cultivators and their personal motives to cultivate domestic hemp. (Decorte, 2010; Toonen, Ribot & Thissen, 2006). Second, using economic analyzes to gain insight in the locations where hemp is cultivated in urbanized cities (Wilkins & Casswell, 2003). A manner to provide more insight in the domestic cultivation was done by Decorte (2010) with executing interviews among domestic hemp cultivators. In two different studies the reasons for cultivating hemp were explained. First, the one of the outcomes of the study that was Decorte and Tuteleers (2007) was the relation between small-scale hemp cultivation and large-scale professional hemp cultivation. One of the outcomes is that small-scale hemp cultivators developed new techniques to create more powerful hemp with higher concentrated THC to strengthen the effect of the hemp when used. As a result, users of hemp pay more when the concentration of THC is higher due to the hallucinatory effect. The large-scale cultivators want to come in contact with the small-scale cultivators to implement these techniques for their own hemp cultivation. However, the intention of both type of cultivators to cultivate hemp is far apart from each other. The small-scale cultivators want higher quality of their own hemp to increase the effect of the hemp, by example when the hemp is used for medical purpose for themselves. The large-scale hemp cultivators implement these techniques for commercial intent to gain higher revenue and profits for their hemp business.

The large-scale and increasing request for hemp results in higher production of hemp (WODC, 2014; Trimbos Instituut, 2017; European Monitoring Centre for Drugs and Drug Addiction, 2018). Bovenkerk, Hogewind and Milani (2003) already described this societal problem in their research *'Hemp cultivation in the Netherlands*'. The people who are discovered with a hemp plantation are often not at the top of the criminal ladder, but are often smaller suppliers who are forced to take a hemp plantation (Bovenkerk, Hogewind and Milani, 2003). Despite at the risk of their own lives, hemp plantations are taken under pressure of criminal organizations.This delinquent behaviour is a serious, because it results in life-threatening situations for the cultivators themselves and the surrounding area. That is why it is important for the police to gain insight into the hemp plantations at neighbourhood level. In most cases, hemp plantations are searched for in a reactive manner. By gaining more insight into discovered hemp plantations, more proactively managed action can be taken in cooperation with the hereafter mentioned chain partners.

This study is not only relevant for the police of Enschede, but also for the chain partners (municipality, fire brigade, energy companies, tax authorities, the Public Prosecutor's Office, housing corporations and real estate agents etc.) who have to deal with adverse (financial) consequences of hemp cultivation. By gaining more insight into hemp cultivation in Enschede, in cooperation with its partners, this insight can give a better indication of people and neighbourhoods where hemp cultivation occurs. It can help to offer the aforementioned partners the opportunity to recognise signals at the front end and to a certain extent can act to prevent any hemp cultivation. In this research, neighbourhood characteristics are processed in order to visualize hemp plantations in the municipality of Enschede.

1.5 Scientific relevance

The scientific relevance of this research contains applying the Concentric Zone model for the neighbourhoods in Enschede with discovered hemp plantations. Less study is conducted regarding geographical distribution of hemp plantations in neighbourhoods of municipalities in combination with neighbourhood characteristics.

Other scientific research regarding hemp cultivators was executed by Decorte (2010) and aimed at the ideological motivations of domestic cultivators. One of the conclusions was the motivatiom for small scale cultivators to cultivate hemp is the low financial investment in equipment for hemp cultivation and the prospective result of successful harvest. Decorate (2010) aimed his research at the idealistic hemp cultivator. Idealistic cultivation is by Decorte (2010) described as the situation when cultivators produce hemp on a small scale for own consumption. Another approach to explain domestic cultivation is by analyzing the quality of the hemp plantations. Toonen, Ribot & Thissen (2006) analysed the characteristics of the discovered hemp plants, the conditions and composition. Characteristics of hemp plants that are analysed are the developmental stage of the plants, plant density, wattage per growth, number of lamps (see Toonen, Ribot & Thissen, 2006). By analysing the hemp plantation in this manner, the quality of the hemp plantations could be determined.

Another view in literature that can be distinguished is the explanation of hemp cultivation by describing the structure of the hemp market with the use of different characteristics to be successful and gain a better position in the illicit hemp market. Wilkins and Casswell (2003) describe from an economical view the introduction of criminal organizations in the illegal hemp market. The theory is based on the traditional economical view where the size and scope of forms in a given industry are the costs of production or natural barriers to competition. This can be related to four characteristics of the criminalization of the hemp market: (1) cost advantages of larger-scale production, (2) the need for specialized skills, (3) capital equipment or large amount of start-up capital, and (4) visible targets for violence aimed at discouraging competition. They call these factors the causes for the large-scale cultivation of illegal hemp by organized crime and this makes it that the illegal hemp cultivation becomes more large-scale by pressure from the criminal environment. More money can be earned by the illegal hemp and there is a continuous search to different locations (domestic locations, business premises) to facilitate the illegal hemp cultivation.

What can be observed from the literature analysis is the absence of the linkage between neighbourhood characteristics and hemp cultivation. The gap in literature can be explained by the

accessibility of the information of discovered hemp plantations. Overall, the collected information is in most situations classified and not possible for scientists to research data about hemp plantations. The aim of this research is to provide insight in the discovered hemp plants on neighbourhood level to fill the gap in literature.

1.6 Outline

A further elaboration of the research question will be discussed in chapter 2 by applying theories to explain the presence of hemp plantations and constructed hypotheses based on the theories. In chapter 3 the methods and data are further explained, how the data-set is structured, and how the information from the police information systems has been coded. In chapter 4 the results of the data-analysis will be discussed, and the results of the sub questions are further explained. The last chapter (5) of this research contains a conclusion of the research question and sub questions and in the discussion the outcomes of the research will be discussed more in depth.

2. Theoretical framework

2.1 Introduction

Criminology is an interdisciplinary field within both the behavioural and social sciences and concentrates itself primarily on the individual and social (groups) level. The field of criminology focuses mostly on the personal characteristics of the individual, the characteristics of the perpetrator himself, how the criminal act was committed and how it potentially can be reduced or prevented in future situations. In the classical criminology there are roughly three aspects to be distinguished: (1) the study of crime, (2) the study of those committing crime and (3) the study of criminal justice and penal systems (Newburn, 2007). Thus, criminology can be approached in different ways.

Within criminology, this 'classical' approach to offences has evolved to the criminological domain, namely positivism. Within positivism, an additional distinction was made from the originated approach into different disciplines to explain and prevent offender behaviour. Within positivism roughly three new approaches emerged: (a) sociological, (b) psychological and (c) biological and are hereafter briefly explained. The sociological approach focuses on the causes of criminal behaviour, particularly in the social environment of the perpetrators. Within the psychological approach, crime is approached from a psychological perspective and is described by Newburn (2007) as follows: "*Theories that focus on the personality and psychological makeup and learning processes of individuals, and how these have been thought to relate crime to and anti-social behaviour"* (p.148). The biological approach tries to explain the criminal acts committed by means of biological characteristics. Within these new approaches, criminology has been further developed and the explanation of criminal behaviour has been further explored. Each approach has contributed to the process of making the field of criminology increasingly more sophisticated in terms of explanatory value of criminal behaviour. The sociological approach corresponds best with the purpose of finding insight into the geopgraphical distribution dimension of the hemp cultivation phenomenon, since we are not primarily interested in an individual cultivator or his/her traits, but the linkage between the phenomenon and geographical characteristics.

The first theory I would like to introduce in this light, is the social disorganization theory. The social disorganization theory can be categorized within the sociological approach and originated after the First World War and focuses mainly on a continuous-changing society. After the First World War, society became differently organized and due to the occurrence of different processes, society was changing at an unprecedented pace (Rubington & Weinberg, 2011). Processes that have been dealt with within the social disorganisation theory concern migration, urbanisation and industrialisation. In essence, it is assumed that these processes affect the social structure within neighbourhoods and are an important indicator to clarify the concentration of crime in neighbourhoods and the reason for an unequal distribution of crime among the different neighbourhoods.

Through the years, the social disorganization theory became more advanced by the contributions of a number of influential sociologists (Cooley, 1902; Thomas & Zaniecki, 1927; Ogburn, 1922). A new way of approaching the social disorganization theory, that was constructed by Chicago School sociologists, was developed in the 1920s within the sociological approach. First of all, Burgess (2012) created the concept of concentric zones within the city of Chicago and concluded that in the oldest and poorest zone of the city, called the zone of transition, was the zone where most crime occurred (further explanation of the zones see paragraph 2.3). Elaborating on the concentric zones of Burgess (2012), Shaw and McKay (1969) tested the theory of Burgess (2012), in which he stated that most crime occurred in the poorer neighbourhoods and called these zones the initial-areas (Akers, 2013). He also argued that these areas contained a high degree of social disorganization. The central idea is that crime is directly linked to the ecological characteristics of a neighbourhood, with ecological being described in research as the environment of the neighbourhoods. SES and social control mechanisms in neighbourhoods are described as important mechanisms to clarify social disorganization in neighbourhoods.

Another theory that came from the social disorganization theory is the social control theory (hereafter: SCT) and the focus is primarily at the deviant behaviour and what mechanisms can explain the cause of deviant behaviour. Hirschi (2017) focusses at social (control) mechanisms that are present within society (e.g. work status, voluntary work). Sampson (2013) elaborated further upon this by describing neighbourhood characteristics and individual characteristics as two different mechanisms

that are important for the explanation of criminality. Paragraph 2.2 will further elaborate on the explanation of criminality on neighbourhood level and which characteristics in literature are to be defined by this explanation.

2.2 Crime in neighbourhoods

The literature is divided on the locations where criminality takes place. Bruinsma, Elffers and Keijser (2004) describe specific places where criminality takes place in the geographical locations and the different kinds of criminality that take place on those locations. Places can be described as the specific locations within the larger geographic units of communities and neighbourhoods. However, in other research scientists describe specifically established neighbourhoods where criminality occurs (Brantingham & Brantingham, 1996). The concept of neighbourhoods are described in different manners within the literature (Guerette & Bowers, 2009; Brantingham & Brantingham, 1995). For this research a neighbourhood is a place where the different neighbourhoods are demarcated and are part of a bigger picture. More in detail, defining neighbourhoods can include links, such as built environment features, population links, historical or social processes (Chaix, 2009). The neighbourhood characteristics within this research are the unit of analysis, which will be further elaborated upon and described in combination with the dependent variable (the amount of hemp plantations).

Over the years there have been done several different kinds of research related to the explanation of criminality in neighbourhoods. Social science is mostly focused on the individual and the choices that the individual makes in regard to the first step in criminality. The rational choice theory is mainly focused on the explanation of the choices of the individual (micro-level). The Chicago school however, is mainly focused on the neighbourhoods and tries to explain, with the help of neighbourhood characteristics, why criminality occurs in specific neighbourhoods only (macro-level).

What also stands out from the different views for criminality on neighbourhood level, is the way in which each research approaches it in different manners. For instance, Carr (2005) finds the collectivity of a neighbourhood important. Carr (2005) describes in his book, *Clean Streets*, that crime occurs relatively less in neighbourhoods with a strong social cohesion. Carr (2005) describes social cohesion as volunteering and contributing in neighbourhood activities. By contributing in activities, inhabitants are mutual dependent on each other. By example, participating in activities in the neighbourhood results in shared values among inhabitants of the neighbourhood and feeling more responsible for the status of the neighbourhoods. If inhabitants do not participate anymore in the activities, other inhabitants will notice the absence and undertake action. In short, social control and social cohesion are important foundations for preventing and controlling crime in neighbourhoods at micro-level.

The conceptual model (see figure I) is mainly focused on social cohesion and social control in a neighbourhood, whereas the total function, on micro and on macro level, are seen as even more important in other research (Sampson, 2013; Forrest & Kearns, 2001; Galster, 2012). Within science, crime can be explained with the help of neighbourhood links and this has been further developed by several scientists. For instance, Sampson (2013) describes in his book '*Great American City*', that crime in neighbourhoods is concentrated in areas where the socioeconomic circumstances are more weaker compared to other neighbourhoods with higher socioeconomic circumstances (Goudriaan, Wittebrood & Nieuwbeerta, 2005; Brantingham & Brantingham 1995; Telep et al., 2014). Moreover, to explain crime more in depth, the importance of micro level choices (individual) are equally important to the macro level choices (neighbourhoods). Due to the importance of both approaches, Sampson constructed a new model to explain this. This model was based upon the earlier work of Coleman (1986) and he explains in his research, *Foundations of Social Theory*, the movement of the level of individual actions and how those actions can be translated towards macrosocial functioning in society. Sampson (2013) applied this model to explain crime in neighbourhoods, however Sampson (2013) decided to construct a new model in order to explain crime in neighbourhoods. The main reason to change the model of Coleman (1986), was the rigidity of the model and the non integration of the two different dimensions into one cohesive whole.

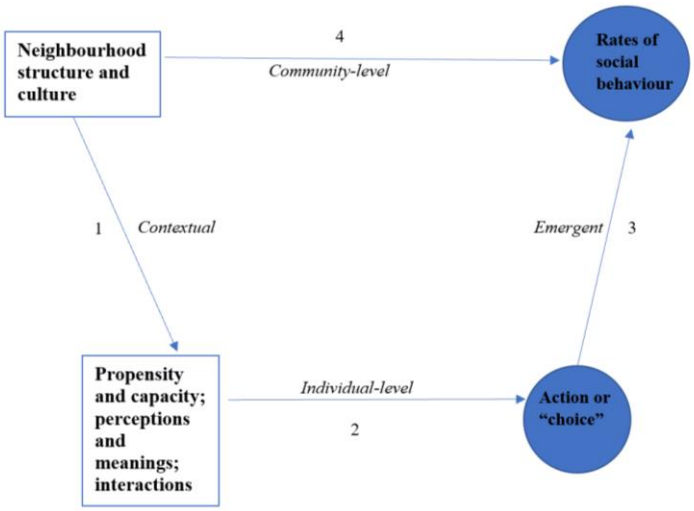


Figure I Conceptual model of neighbourhood micro-macro arrows (Sampson, 2013)

The model contains four links and are structured in macro and micro links. The first three links describe the individual interactions that influence the rates of social behaviour. The focus of link four is more at the macro level and aimed at the explanation of community structure and development. Sampson (2013) describes in his conceptual model that neighbourhood processes and choices are important to explain criminal acts within neighbourhoods. Sampson (2013) explains that neighbourhoods are continuously changing and the dynamic within neighbourhoods can contribute to the criminality within these neighbourhoods. The neighbourhood links and individual choices are, according to Sampson (2013), related to each other. The model is split up in two components, with the left side representing the neighbourhood links and the right side representing the individual links. Moreover, every arrow displays a number that can be interpreted as the connection between the different micro and macro links in neighbourhoods. The first arrow contains the contextual neighbourhood link with a top-down approach that can be assigned (e.g. criminal offences, concentration of poverty). The second arrow is focussed at the individual level and includes the propensities and capacities of each individual separately. This is influenced by the kind of social interactions that influence behaviour. The third arrow includes to what extent the social interactions influence the action or choice and in the end the rates of social behaviour is expressed. The fourth link describes, at macro-level, the structure and culture at community-level and explains to a certain extent the rates of social behaviour in neighbourhoods. Sampson (2013) tried to give a better insight with this model in the mechanisms that explain, on neighbourhood and individual level, criminality. Altogether, the micro and macro level factors were both seen as important indicators for explaining crime in neighbourhoods.

2.3 Concentric Zone Theory

The Concentric Zone Theory is meant to give an explanation with the help of the concentric zones for the urban development of a city. The Concentric Zone Theory is a theory which finds its origin in the Chicago School. Park and Burgess (2012), as scientists of the Chicago School, tried to explain the urban development from an ecological side in their work *The City*. Based on assumptions that included a uniform land surface, universal access to a single-centred city, free competition for space and the notion that development takes place outward from a central core, Burgess and Park (2012) concluded that the cities tend to form a series of concentric zones (Dear, 2002, p. 14). The ecological part of the explanation of the concentric zones, relate to the Darwinist ideology. They borrowed this ecological perspective from Darwin, who assumed that nature is formed by evolution. Park and Burgess (2012), state in their publication, *The City*, that the city is formed by the same forces as from a Darwinian perspective, namely competition. As a city forms, people and their (daily) activities cluster within certain zones. Population movements and changes in urbanized areas are caused in the sequence of

invasion, dominance and succession and are considered as three different stages within the concentric zones as explanation for the distribution of inhabitants throughout the city.

With help of the structures in figure II, the city is being divided in different concentric zones and every zone has its own characteristics in regards to the composition of the infrastructure and the inhabitants present in every zone. In other words, these zones are the outcome of ecological processes of urban growth, of population movements and economic development. The core idea of the concentric zone theory is the symbiotic process whereby land is considered as a resource which may be exploited and is allocated by competition. Each concentric zone contains different characteristics to one another. The core of the concentric zones contains the Central Business District (hereafter: CBD). Originally, the population of the city lived around the CBD and is based upon the *Bid Rent Curve*. This *Bid Rent Curve* has the ideology that the division of cities in concentric zones is caused by the amount of money an inhabitant is willing to pay for a piece of land. The understanding is that inhabitants want to invest in a piece of land when enough profit can be made.

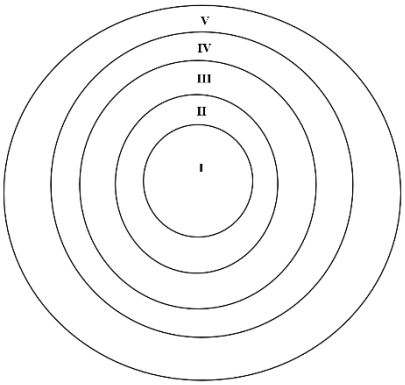


Figure II visualization concentric zones

The first circle (I) contains the central business district and can be considered as the area for commercial purposes, where the city is located and the circle with the most activities. The second circle (II) is the zone that is in transition where the business district and industry are getting invaded within this zone. The third circle (III) is the zone that contains inhabitants who are literally escaped from the areas of deterioration and moved to areas that have the desire for living relatively close by their work. The fourth circle (IV) is the residential area with expensive real estate properties for the higher classes in the city. The last zone, the fifth circle (V) is the most outlying zones with suburban areas with labourers that work within the district zone or in the transition zone (Dear, 2002; Morris, 2013). In short: every zone has its own infrastructural characteristics with processes that take place in every concentric zone.

Based on the developments of these zones, the characteristics have been further elaborated upon and it has become clear that the population in CBD do not only have a commercial purpose, criminality is also unfolding in this zone. Park and Burgess (2012) have set up a zonal hypothesis that citizens with a low SES settle in the CBD of the concentric zones and that people with more own assets, are more concentrated in the suburbs that become larger as more citizens settle themselves there. The first concentric zone is seen as criminal as there is a lot of interhuman contact and the big stream of people make it possible for criminals to move anonymously in the zone (Kinney et al., 2008). Also the infrastructural benefits and the high sense of anonymity contribute to a high number of criminality.

2.4 Social Disorganization Theory

An important contribution on the influence of informal social control and controlling of neighbourhood problems, has been done by the Chicago sociologists Clifford Shaw and Henry McKay in their work Juvenile Delinquency and Urban Areas (1942, 1969). In their work, a first connection was made between the social disorganization of a neighbourhood and the level of crime and criminality in neighbourhoods. Shaw and McKay also state in their research that neighbours with the same shared values, have a constant diminution of social control. When a neighbourhood does not have the capacity to arrange things itself and the inhabitants do not reach consensus about the shared values and norms, the informal social control disappears. In short: low social control in a neighbourhood contributes to less connectedness of the neighbours, causing an increase of criminal activities in a neighbourhood.

The social disorganization theory (hereafter: SDT) acknowledges three different neighbourhood characteristics that can explain the disorganized behaviour. The three components described are: (1) socioeconomic status, (2) residential mobility, and (3) ethnic heterogeneity. In the

last couple of years, SDT has been redefined and a couple of extensions are added. Sampson (1986) has done an extension of the variables that could be tested on neighbourhood level. He not only analysed the social economic status, urbanization, poverty, residential mobility, but also at family disruption (Pratt & Cullen, 2005). This change in approach of criminality forced a different view of approaching at criminality and determining it. Individual factors were considered important, and especially the social environment of the individual. Elaborating on this, the SDT approaches from the individual factors that are posed important for the informal social control within neighbourhoods. To measure how the social control within neighbourhoods can be conceptualized, Sampson, Raudenbush and Earls (1997) introduce the term 'collective efficacy' for the extension of the concept social disorganization. This concept focuses on the presence of informal social control and the extent of trust between neighbours. These connections are being seen as important as it contributes to the solvation of problems such as criminality and the drug problems (Pratt & Cullen, 2005). It causes for a fight against criminality from a theoretical perspective, as the whole neighbourhood feels responsible for the quality of the neighbourhood.

Another way within SDT to explain criminal behaviour is to observe at the coherence within a neighbourhood and the informal social control. Kurbin and Weitzer (2003) extended this approach more by stating that the aforementioned factors (see figure I) explain the criminality in a neighbourhood by the strength of the shared values and informal network. It is easier to have the same values when the neighbourhood allows for strong social networks. Rougher neighbourhoods can be seen as inevitable and not because of the neighbourhood itself, but because the oppositional values are so anchored within the community. Warner and Rountree (2000) define this approach of criminality and inequality as follows: *"It is simply less likely that people will informally punish or denigrate people for inappropriate behaviour if it is unrealistic to expect otherwise"* (p.46). Thus, if the will of the neighbours to carry out the same values is not present, then it is not even possible that these values will be shared by other people if no one gets addressed to its deviant behaviour.

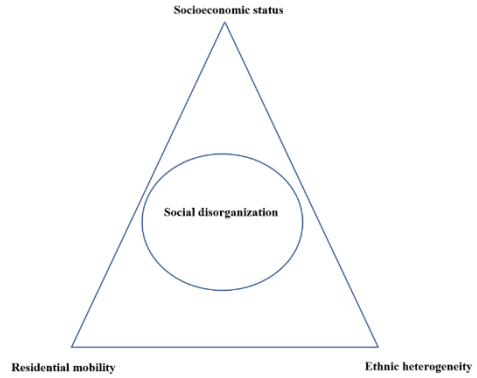


Figure III Components of SDT

Another added concept within the SDT is the naming of initial areas within the disorganised neighbourhoods. Shaw and McKay (1969) went on with the theory of Burgess (2012) and his concentric zones. On the basis of these zones, Shaw and McKay (1969) looked at the explanation of criminality in every concentric zone. Shaw and McKay (1969) called this the interstitial areas, as the inner circles are seen as most criminal. Often, in these interstitial areas many migrants settled there for job opportunities. This corresponds with the characteristics of the first concentric zone; that lots of commercial activities take place. The migrants coming to the city were mostly focused on finding work within the zones, and had less resources that could help them in having a high level of SES.

The social disorganization theory will be applied, as this theory assumes that SES, ethnical heterogeinity and residential mobility, causes social disorganization. The social disorganization theory emphasize on the earlier mentioned factors can be considered as circumstances that increase criminality and therefore suitable for this research to test criminality (in this case: discovered hemp plantations).

2.5 Social Control Theory

Hirschi's *Causes of delinquency* (2017), is the foundation of the SCT and determines the influence of social control of crime in neighbourhoods. Hirschi (2017) points out that the extent to which an individual commits crime is related to how socialized an individual is in his personal environment. The intention in Hirschi´s SCT is not to try to find an explanation for the deviant behaviour, the focus is at the mechanisms that are related to conventional society. Hirschi (2017) elaborates with the SDT that considers informal social control as a vital function to determine deviant behaviour. Moreover, Hirschi (2017) points out in more depth the importance of the social informal control and the mechanisms that interwoven with each other.

The SCT explains that conformity is an important element that can be achieved by socialization; the creation of a bond between individuals and their environment (Wiatrowski, Griswold & Roberts, 1981). The four elements that Hirschi (2017) distinguishes are: (1) attachment, (2) commitment, (3) involvement, and (4) belief. The first element concerns the family situation of the individual and the extent of connection in the family environment of the child and the parents. The commitment concerns the ambition of individuals for getting their diplomas, their job status and how much they value these things. When individuals do not see the importance of getting a degree or having a job, this will lead more often to delinquent behaviour. Compared to individuals that do have clear goals concerning their future, individuals that do not have those values and goals have more problems, as they orientate themselves more on other activities (e.g. smoking and drinking). The third element, involvement, concerns the participation of individuals (e.g. sport), that lead to socially valued successes. This success will stimulate the individual, resulting in other socially valued successes (e.g. learning) and investing more in high status occupations. The fourth element is belief and concerns the acceptation of moral validity of individuals compared to the values within society. Central point in this element is that when an individual feels less connected to the conventional rules that are based in society, the urge of delinquent behaviour is more present. Hirschi (2017) goes even a step further by stating that individuals recognize the shared values and validity of it, because of the worsening and weakening social connections in their environment, they will feel less connected by the dominant values that are accepted within society. As the individuals do not feel connected to the social norms and values, this will lead to deviant behaviour. The social environment is regarded by Hirschi (2017) as vital to control delinquent behaviour and this has also been agreed upon by other scientists in the criminology field.

The SCT is developed in the past decades and the mechanisms are more developed by several scientists (see Wiatrowski, Griswold & Roberts, 1981; Agnew, 1985). The importance of the social environment and the performance of individuals with the four control mechanisms are discussed in more depth. Sampson and Laub (1997) explain in *A Life-Course Theory of Cumulative Disadvantage and the Stability of Delinquency* the social environment of the individual and the relation with delinquent behaviour. Sampson and Laub (1997) state that originally criminality focused only on the individual and had less attention for the developmental implications of anti-social behaviour and the stability of the time and circumstances. Sampson and Laub (1997) explain delinquent behaviour as slowly formed by the social living conditions (e.g. school performance, family situation) and the individual characteristics (e.g. IQ) and that these conditions contribute to the origin of delinquent behaviour (Wilson and Hermstein 1985). However, the social ties within society are important to withhold individuals to proceed in criminal activities. In short, the influence of social control mechanisms can be seen as important to determine the existence of delinquent behaviour.

The extent of realization of the social ties with others in the direct environment and the extent to which an individual is known with the consequences of these social ties, influence the choice for every individual to commit crime. It is thus important to know that an individual can get influenced by the social control mechanisms of its direct environment or institutions when it turns to deviant behaviour.

2.6 Positioning dependent variables and independent variable

This study demonstrates the discovered hemp cultivators within the municipality of Enschede. Due to the large amount of available data, it was possible to analyse the hemp plantations in more depth together with the neighbourhood characteristics of the CBS. The independent variables are the neighbourhood characteristics based upon the SDT and SCT and the individual. The independent variable is the amount of discovered hemp plantations. In literature it is stated that crime is caused by events at neighbourhood and individual level. Nevertheless, due to the scope of this research, the focus in the analysis is at the neighbourhood characteristics. A further operationalization of the dependent variables and independent variables will be discussed further in the next chapter, *Methodology*.

2.7 Overlap within the theories

Reflecting on the theories, shows a certain overlap between the different theories; they are closely connected to each other. That theories are connected to each other has to do with the fact that they do not belong to one theory, but that it intertwines with each other. An example is the residential mobility, that is being seen as fundamental within the social control theory, for carrying the same values within a neighbourhood. When the residential mobility within a neighbourhood is high, and therefore the social control also high, meaning that in neighbourhoods with less social control deviant behaviour can be caused.

Another example of intertwined theoretical concepts is the ethnical heterogeneity. The social disorganisation theory says that ethnical heterogeneity can cause deviant behaviour, as in some cases the people living there do not speak the language. As communication becomes hard, this causes for a decline in social control; neighbours do not of each other what is happening within the neighbourhood and they will also not talk to each other about their behaviour. In first instance, the literate saw the concepts from the social disorganisation loose from the social control theory, however more attention has been given for the role of informal social control mechanisms and the influence it has on deviant behaviour. The theories have been further developed by different scientists and they saw the importance of the implementation of social control together with deviant behaviour (Sampson & Groves, 1989; Coleman, 1990). In short: social control mechanisms and deviant behaviour cannot be seen apart from each other, but are intertwined when it concerns the explanation of criminality.

2.8 Critical reflection

This paragraph gives a short overview of what has been discussed above and this results in hypotheses that will be answered in this research. This research will try to find an explanation for the question why in some neighbourhoods there are more hemp plantations found than in other neighbourhoods. The hemp plantations in this research are the dependent variables and the neighbourhood characteristics are analysed as the independent variables. The unit of analysis in this research are the different kinds of neighbourhoods in Enschede and the connected neighbourhood characteristics. It is unclear how the spread of hemp plantations is in the neighbourhoods of Enschede; this research tries to give an insight in the neighbourhoods where hemp plantations are found. Also, the neighbourhood characteristics will be analysed and how there are connected to the dependent variable.

The neighbourhood characteristics used in this research, are based on ecological theories.. A point of criticism is the assumption of stable ecological structure. The ecological theories of urban dynamics do not imply what changes occur over time within the ecological environment (Bursik, 1988). This is noticeable in the concentric zones theory of Burgess (2012). In the past years there has been some criticism at the concentric zone theory by their rigid way of dividing cities in zones. Nowadays the composition of neighbourhoods has changed rigorously and the criticism on the concentric zone theory is that the sociologists from Chicago did not form the neighbourhoods in circles, but more on the political and economic changes of the neighbourhoods (Sampson, 2013). Moreover, in recent years there have been considerable changes in the transformation of transport possibilities, information technology, change of the world economy, further urbanisation, globalisation and thus a restructuring of society.

A second point of criticism at the ecological approach is the measurement of crime as indicator for deviant behaviour. Important to take in consideration, is the extent to which neighbourhoods are measured in order to clarify the distribution of criminality and delinquency in neighbourhoods. In neighbourhoods with a low reported criminality number, the delinquent behaviour would had been just as high (Bursik, 1988; Sampson, 2012). In neighbourhoods with more criminality, there is also more police control and thus automatically more delinquents. In other words, focussing on the same criminal areas can result in a *self-fulfilling prophecy*.

An aspect connected to the self-fulfilling prophecy is the amount in which there can be spoken of a dark number. The registered criminality only contains the discovered criminality and there is always an amount of unknown criminality. That is why it is important to make a side note on the analysed data: this is just a certain amount that takes place as. The ecological theories all focus on macro-level. However, not all criminality can be explained at macro-level symptoms or developments. On individual level, some activities can be developed that can be marked as deviant behaviour. This

research, however, only focuses on neighbourhood level and the level of criminality can therefore not be explained. When the results on macro-level would also count on individual level, then we can speak of an ecological fallacy. This type of fallacy argues that aggregated data on high level (neighbourhoods) could also count on lower level (individual) (Sampson & Wilson, 1995). An ecological fallacy is destructive for the variance and interpretation of the outcomes of this research. In short: the aggregated data can explain the hemp plantations on neighbourhood level, not on individual level.

A last point of criticism is connected to the formulation and demarcation of explaining crime and delinquency in literature. The focus in literature is often at the neighbourhood characteristics, but to have a broader perspective of the ecological theories, historical, economic and political dynamics within neighbourhoods should also be applied (Bursik, 1988). By approaching more in detail why delinquent behaviour and crime occurs, this will provide for more information over the development throughout the years.

2.9 Hypotheses

Based on the aforementioned literature, a number of hypothesis will be formulated.

In the Central Business District, the neighbourhoods with low SES are concentrated and the neighbourhoods with higher SES are located in the outer concentric zones (Burgess, 2012):

Concentric Zones Theory (H1): The concentric zone model is representative for explanining discovered hemp plantations.

Social Disorganization Theory through residential mobility (H2): In neighbourhoods with higher residential mobility, are more often discovered hemp plantations.

Furthermore, Shaw and McKay (1969) discuss that ethnic heterogeneity in a neighbourhood leads to more social disorganization within a neighbourhood. The following hypothesis is formulated:

Social Disorganization Theory through ethnical heterogeinity (H3): In neighbourhoods with higher ethnical heterogeinity are more often discovered hemp plantations.

The social disorganization theory emphasises the social economic status of a neighbourhood and how it influences the spread of criminality. By example, in neighbourhoods with an average lower income, there are less economic resources in comparison with neighbourhoods with relatively higher incomes. Due to the lack of (financial) resources and dissatisfaction of their own financial situation, individuals undertake action to supplement their income by engaging in criminal activities. The next hypothesis is focused on the average income in a neighbourhood against the amount of aggregated hemp plantations per neighbourhood:

Social Disorganization Theory through owner occupied property (H4): In neighbourhoods with a lower percentage owner occupied properties, are more often discovered hemp plantations.

Other indicators for social economic status from the social disorganization theory, is the average value of houses. Neighbourhoods with higher housing prices and with a higher income, are less willing to engage in criminal activities as they can provide for themselves in their needs. This results into the following hypothesis:

Social Disorganization Theory through real estate value (H5): In neighbourhoods with a lower real estate value, are more often discovered hemp plantations.

Social Disorganization Theory through average income (H6): In neighbourhoods with a lower average income, are more often discovered hemp plantations.

Another indicator of the social economic status of a neighbourhood is the amount of social benefits that individuals receive against the amount of hemp plantations in the neighbourhoods of Enschede. In neighbourhoods with more social benefits, there are problems to care for themselves and are more tended to engage in criminal activities. The following hypothesis has been formulated:

Social Disorganization Theory through social benefits (H7): In neighbourhoods with a higher number of social benefits, are more often discovered hemp plantations.

In the SCT and the SDT, it is stated that crime is concentrated in the same neighbourhoods in comparison with other non-criminal neighbourhoods. In this research, crime consists the registered crimes against public order and the registered thefts. This results in the following hypothesis:

Social Control Theory through registered crime (H8): In neighbourhoods with a higher number of registered criminal activities, are more often discovered hemp plantations.

It has been stated by many scientists that in disorganized neighbourhoods, is more often criminality as there is less social control. This results in the following hypothesis:

Social Control Theory through population density (H9): In neighbourhoods with a higher population density, are more often discovered hemp plantations.

Social Control Theory through uninhabited properties (H10): In neighbourhoods with more uninhabited properties, are more often discovered hemp plantations.

In the next chapter (3) the methodology part of this research will be further explained and contains the use of the data sources, operationalization of the variables derived from the theories, type of analysis, explanation of the applied statistical tests and replicability of the data.

3. Methodology

In the first chapter the intented objective(s) for doing research about discovered hemp plantations in the municipality of Enschede were elaborated upon. Furtermore, the research question and sub questions were formulated. The second chapter included the theoretical basis of the research which constitutes subsequently the foundation on which the hypotheses were constructed. The aim of the current chapter is to explain the different applied research methods, how the data was collected, processed, analysed and made suitable for doing further statistical analysis. In the last part of this chapter, the limitations of the data will be briefly discussed.

3.1 Research area and legal context

This research was carried out for the RBT of the police in the municipality of Enschede. The municipality of Enschede covers an area of 142,72 km2 and approximately 158.261 inhabitants (CBS, 2018). The choice for analysing the municipality of Enschede had to do with the fact that the municipality of Enschede alone is responsible for more than the half of the hemp plantations within the region of Twente (Nationale Politie, 2018). This research will provide more insight for the police department of Enschede on the locations of the discovered hemp plantations in the years of 2015, 2016 and 2017.

The criminalisation of hemp cultivation is included in the Opium Act, which is part of the Penal Code. Section 3 of the Opium Act describes that the following actions are subject to legal proceedings in accordance with the substances in list II (including hemp): import and export, preparation, processing, sale, delivery, supply or transport, possessing and manufacturing (Wetten Overheid, 2018). Classification of various districts and neighbourhoods within Enschede's municipal boundaries is constructed with the use of data from the CBS database (CBS, 2015; CBS, 2017). This data classification is of socioeconomic nature.

3.2 Data sources

This research on discovered hemp plantations has been executed by analysing the data that was collected by the police on the hemp plantations. This data is stored at the information system of the Police, called in Dutch *Basis Voorziening Handhaving* (hereafter: BVH). In this information system, all the raw data is classified in different categories, including the discovered hemp plantations have a classification. Each case is classified with a unique number that is linked to the offense or crime of possessing and cultivating hemp. Another source of information is CBS, more specifically the information on neighbourhoods (*CBS Wijken en Buurten*, 2018). The database of CBS was used to find all the information on the districts and neighbourhoods within the municipality of Enschede. Scientific databases (J-stor, Scopus, LexisNexis, Google Scholar and Browzine) were used for the collection of articles that connect to the specific subject of this thesis and therefore suitable as a source for this research.

3.2.1 Instruments

In this research, two software programs were used to acquire insight in the collected data. The first software program was SPSS, used to make statistical analyses, after firstly recoding all the data. The second software program is Mapinfo, in which it is possible to have a visualization of coded data on the hemp that can be traced back to neighbourhood level. Lastly, codification schemes were made in order to code the information in a correct way. The next paragraph will elaborate further upon this.

3.2.2 Data structuring, processing and analysis

The data that was used in this research has been made available by the police and contains all the discovered hemp plantations in the municipality of Enschede between the period of January 2015 and December 2017 (N=334). The data analysed in this research was divided into two main groups: (1) neighbourhood characteristics of Enschede and (2) characteristics of the hemp plantations. The analysed aggregated dataset contains all the neighbourhoods of the municipality of Enschede (N=70) combined with the neighbourhood characteristics and the hemp data aggregated on the characteristics. To maintain consistency and clarity of the data, the collected information of the hemp plantations were

separated per month and filled in, in the dataset. For every month the data was checked and controlled to see whether it was processed in a correct way and within the correct categories. An important consideration during processing the data was to keep it anonymized and not traceable to specific locations. The data-sets about the locations of the hemp plantations and information of neighbourhoods were merged into one masterdataset. By merging these datasets, it became possible to aggregate on different levels within the dataset itself. Each hemp plantation has been given a police number in the BVH system. This is consequently coded in this research with a unique hemp plantation number for the purpose of analysis. Every hemp plantation could be retraced by reversing these steps and identified in the BVH system. This method garantuees a degree of anonymity.

The aim of this process was to create one master dataset concerning the two earlier mentioned categories. It was necessary to structure the data in a manner that it was suitable for the statistic program SPSS and that the data could be aggregated on neighbourhood level. The information about the hemp plantations had to be coded by making use of a codification scheme. This codification scheme contains the variables of the two different groups that could be found in the appendices and were discussed in paragraph 3.2.1. In this research, the decision was made to construct a codification scheme for the discovered hemp plantations and neighbourhood characteristics and were coded and processed. Two codification schemes were designed that represented the content of the data.The structuring was used by dividing the neighbourhood characteristics according to socio-economical characteristics and socio-demographical characteristics. The criminality numbers have also been classified under these characteristics.

3.2.3 Constructing the master dataset

To come to an aggregation of the data at neighbourhood level, five steps need to be taken that eventually lead to the final *master dataset*. The first step focuses on the explorative manner of analysing the present data from the police information system and to select data that is suitable for this study. The aim of this step is to gain insight into the available data. The second step is to construct the coding that is based on the available police data. The third step was to code all the categorized information and to make it useable for SPSS. The fourth step was, based on the aforementioned coded data, to create two datasets (neighbourhood and plantation information). The last step was to integrate all the information and to create a *master dataset* in order to aggregate on neighbourhood level and to have more insight in the information of the neighbourhoods, the hemp plantations and the cultivators.

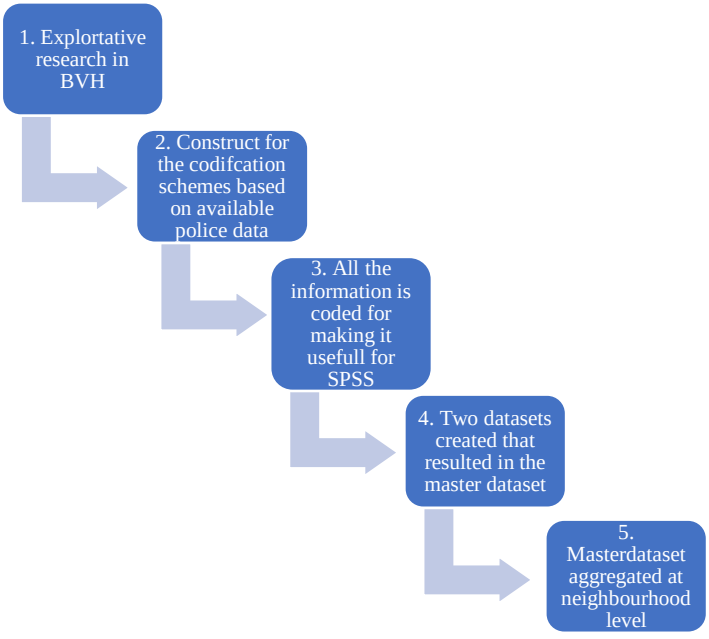


Figure IV completing master dataset

3.3 Research method

3.3.1 Research design

The goal of this study was to improve the analysis of the hemp plantations with the use of neighbourhood characteristics and provide the police more insight in their data about hemp plantations. One part of this study has a describing character, where the raw data will be described as it is known in the dataset. The other part of this study has an explanatory character, in order to find out which connections can be made within the different variables that has been researched. To analyse whether there is a connection, the neighbourhood characteristics and hemp plantations characteristics and their locations have been analysed in multivariate and bivariate manner.

3.3.2 List of variables

In the below mentioned table, two different categories of variables is displayed. The first part of the list contains the neighbourhood characteristics about socioeconomic variables and the second part contains the characteristics of the dissovered hemp plantations. The neighbourhood characteristics are used for a principal component analysis and construct new latent variables.

In table I the list of variables of the two categories are displayed. The two categories are (1) neighbourhood characteristics and (2) hemp plantation characteristics. The master-dataset contains the below displayed characteristics. These characteristics are analysed as independent variables. The extensive number of variables are difficult to comprehend and therefore a factor analysis was executed to an easy to comprehend overview of the components. In chapter 4 the component analysis contains Eigenvalues that explain the variance of each component separately. The principal component analysis has resulted in four different components:

- Component 1: SES neighbourhoods;
- Component 2: Neighbourhoods social control;
- Component 3: Poor neighbourhoods;
- Component 4: Older criminal neighbourhoods.

Constructing these four components results in four hypotheses that will be tested in chapter four. This results in the following four hypotheses:

1. **Hypothese SES**: Socioeconomic Status is related with the discovered hemp plantations
2. **Hypothese Social control**: Social Controle is related with the discovered hemp plantations
3. **Hypothese Poorer neighbourhoods**: Poorer neighbourhoods are related with the discovered hemp plantations
4. **Hypothese Older criminal neighourhoods**: Older criminal neighbourhoods are related with the discovered hemp plantations

List of variables	
Neighbourhood characteristics	**Hemp plantation characteristics**
• Average income • Population density • Amount of private households • Percentage persons with migration background • Percentage of rental properties • Percentage of owner-occupied properties • Social payments • Real estate value	• Discovered hemp plantations • Amount of hemp plants • Confiscation (in €)

• Vandalism, offences and disturbing public order • Total amount of thefts • Real estate build after 2000	

Table I List of the variables

3.3.3 Data-analysis

The KMO and Bartlett's test is a measure to determine the adequacy for each latent variable. The KMO and Bartlett's Test indicates the quality of the components and the coherence between the components (North et al., 1982). Conducting this test indicates the usefulness and the quality of the data. The rule of thumb for using the outcomes of the principal component analysis is as follow:

- *KMO <0.5 assumption not met*
- *KMO >0.5 assumption met*

The test Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.59 and the test is significant (0.00) and therefore reliable to draw conclusions for this research. So, the conditions are met for the Kaiser-Meyer-Olkin Measure (North et al., 1982).

Table II KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.59
Bartlett's Test of Sphericity		
	Approx. Chi-Square	39.161
	df	6
	Significance	0.00

3.4 Operationalization

Table III displays an overview of the operationalization of the variables that are applied in this research. It provides an understanding of the variables that have been derived from the theory, in what manner the variables are involved into the different hypotheses and how the theoretical variables are operationalized in combination with the neighbourhood characteristics of Enschede.
See table IV for the descriptive statistics of the theoretical derived variables.

Sub-question	Theories	Hypotheses	Variables	Operationalization
What distribution of hemp plantations doe we observe in Enschede?	Concentric Zone Theory	H1	Concentric zones	Based on geographical allocation
	Social Disorganization Theory	H2	Residential mobility	Percentage of rental properties
	Social Disorganization Theory	H3	Ethnic heterogeneity	Relative percentage of inhabitants with a migration background [1]

[1] Inhabitants wih a migration background has been made relatively by setting the number of inhabitants with a migration background against the total number of inhabitants in the neighbourhood.

Which neighbourhood characteristics are related with the distribution and geographical location of the discovered hemp plantations per neighbourhood in the municipality of Enschede?	Social Disorganization Theory	H4	Socioeconomic Status & Residential Mobility	Percentage of owner-occupied properties
	Social Disorganization Theory	H5	Socioeconomic Status	Average real estate value in euro's (€)
	Social Disorganization Theory	H6	Socioeconomic Status	Average income of inhabitants per neighbourhood
	Social Disorganization Theory	H7	Socioeconomic Status	Relative amount of social payments per neighbourhood
	Social Control Theory and Social Disorganiza	H8	Crime	Registered crime in neighbourhoods[2]
	Social Control Theory	H9	Social control mechanisms	Population density
	Social Control Theory	H10	Social control mechanisms	Uninhabited property

Table III Operationalization scheme

3.4.1 Explanation of the operationalization

From the Concentric Zone Theory, Social Disorganization Theory and the Social Control Theory, six variables are derived and operationalized: (1) concentric zones, (2) residential mobility, (3) ethnic heterogeinity, (4) SES, (5) crime and (6) social control mechanisms. SES for neighbourhoods is operationalized in the following manner: average real estate value, average income per inhabitant, the total amount of social payments and the amount of new build real estate. SES is described as the economic position (e.g. financial possibilities) or accessibility to human resources (e.g. education) (Bradly & Corwyn, 2002). SES in this research mostly focuses at the financial situation of neighbourhoods and that is why this variable has been operationalized as followed: the average value of real estate in a neighbourhood, average income in a neighbourhood, relative number of social benefits and real estate built after 2000.

Social control mechanisms are operationalized as population density, owner occupied property and the vacancy rate per neighbourhood. In general, owner occupied property creates for a stable population of inhabitants, as the population of inhabitants stay there more often for a longer period of time and they feel the responsibility of keeping up the (high) standard of the neighbourhood. Population density has also been used as an indicator for determining the function of the social control mechanisms. It is assumed that high population density indicates that neighbours that live close to each other, are mostly concentrated in apartments or townhouses. This means that people that do not live in neighbourhoods as the aforementioned, more often have anonymized lives and know their neighbours less. There is also a low amount of social contact between the neighbours. However, it implies not that every neighbourhood with a high degree of population density has more social control. The vacancy rate per neighbourhood makes for a reduced social control as the distance between the neighbours becomes bigger literally and figuratively, with the consequence that the commitment to invest in social relationships becomes strained.

[2] Crime contains the absolute numbers of registered offences against public order and registered thefts

Residential mobility is operationalized as percentage of rental properties per neighbourhood. It provides insight of the composition of the neighbourhoods and their inhabitants. In neighbourhoods with relatively more rental properties, there is higher residential mobility due to the changing population of inhabitants. Rental properties are generally inhabited for a short period of time in comparison with owner occupied properties. Due to the changing population in neighbourhoods it results in less social control and cohesion because inhabitants of the core population of inhabitants is continuously changing and feel less responsible for the status of the neighbourhood (Uitermark & Duyvendak, 2007). When the population of inhabitants is continuously changing in neighbourhoods, inhabitants experience harder difficulty transferring shared values and norms to each other. Sharing norms and values in neighbourhoods increase the social control and cohesion. In short, when inhabitants share the same values and norms, inhabitants that deviate from the established norms are corrected by the core of inhabitants and are subjected to the social control mechanisms in neighbourhoods. Ethnic heterogeneity was operationalized by taking into account the inhabitants with a migration background (western and non-western countries) and has been made relative to the total amount inhabitants per neighbourhood.

3.4.2 Operationalization of Social Disorganization

Socioeconomic Status

SES is being seen as an important indicator for determining criminality on neighbourhood level (Sampson & Groves, 1989; Sampson, Raudenbush and Earls, 1997). If the neighbourhood shows economic decline, this can lead to a higher chance of victimization. The abovementioned process goes hand in hand with the concentration of low-income groups and thus helps the social disorganization in a neighbourhood (van Wilsem, Wittebrood & de Graaf, 2003). Within the literature, SES is being approached and operationalized in different ways in order to determine the SES of a neighbourhood. To operationalize SES, the average house value (Sampson & Groves, 1989) and average income (Ratcliffe, 2002) are used.

Nonetheless, Veltmeyer (2002) describes the importance of social benefits as an important indicator for determining welfare. Within the literature, the social payments are not explicitly discussed; the focus in literature is more aimed at welfare services that have been made available by the government.

This implies that services, provided by the government, can be used in different ways within research. In further analyses of research the resources are being operationalized in a neighbourhood as the number of social benefits within a neighbourhood. This can be different kinds of benefits, such as unemployment benefits, incapacity benefits and welfare benefits. Also, owner-occupied properties are seen as an indicator for SES and residential mobility. Owner-occupied properties are an important indicator for residential mobility, as it takes care of a stable population of inhabitants within a neighbourhood (Taylor, 1996). In his research, Taylor (1996) noticed that a couple of inhabitants provided for ecological stability of the population of inhabitants and he noticed a correlation of 0.77 between the census and the interviewed samples on the proportion of owner occupied households. The number of owner-occupied properties can also be approached from an economic angle of approach. The number of owner-occupied properties in a neighbourhood indicates that the owner has the financial resources to buy a home himself. As these owners make an investment in a house, they will probably stay there for a longer period of time. Velez, Lyons & Boursaw (2007) explain that existing owners may be unable to sell their homes because either they cannot attract buyers or buyers cannot secure finance for their mortgage.

Residential mobility

In neighbourhoods with less social contact, the social cohesion among inhabitants of the neighbourhoods is less present and thus inhabitants feel less responsible for the wellbeing of the neighbourhood. A high amount of residential mobility makes it that the composition of a neighbourhood is continuously moving. It does not imply that problems and difficulties at neighbourhood level can always be solved. However, if inhabitants of the neighbourhood feel responsible for the wellbeing of the neighbourhood, this can result in less social cohesion. The investment by current inhabitants in other inhabitants decreases because of the residential mobility as

the turnover is so high that there literally is no time to build a connection and to contribute to the shared values of the neighbourhood.

Ethnical heterogeneity
People from a different ethnical background that need to move to another country in other to have a 'better' life, have more often fewer financial resources to take better care of themselves and their families. Often, people from other ethnical backgrounds do not understand the language, which makes communication with others difficult. It causes a lower sense of social connectedness with the neighbourhood (Carr, 2008). With the consequence that individuals feel less connected and will contribute less for the community, while this is an important aspect to feel more connected and to contribute to the informal social control in the neighbourhood. Proof of Shaw and McKay's (1969) work, after studying the collected data on criminality in neighbourhoods, is that the criminality and delinquency stayed concentrated in the same neighbourhoods, no matter who lived there (Carr, 2008). In short, social disorganization in a neighbourhood was not only the cause of the flaw or failing of the individual; neighbourhood factors are also seen as an important cause of criminal activities within a neighbourhood.

3.4.2 Operationalization of the social control mechanisms
This operationalization will discuss the key concepts from the literature and will act as indicators for researching the social control within neighbourhoods.

Population density
The higher the amount of population density, the higher the sense of unsafety in neighbourhoods and the higher sense of criminality. An explanation for this is that the neighbours live relatively close by each other and thus criminal activities will be noticed more often and sooner. On the other side, the infrastructure of population dense neighbourhoods also cause a high amount of anonymity. This will be the main point in the operationalization and further discussion of the social control mechanisms will be set out. Less social control makes it that individuals can move around relatively anonymously and this can lead to deviant behaviour. The decreasing link with the neighbourhood, makes also for a decrease in interest in the neighbours. A consequence can be that the connection with the neighbourhood declines and this poses for a turn to criminality.

Looking at Sampson and Laub (1997), it is important to have social control within a neighbourhood and to acknowledge it as an important mechanism. The social control and pointing one's behaviour out, are important elements in preventing delinquent behaviour. Infrastructure has a big part in the anonymity of neighbours and can lead to less social control. The mutual connectedness in a neighbourhood is an important characteristic where neighbours approach each other and feel connected to the neighbourhood.

Uninhabited property
Uninhabited properties cause literally and figuratively for a distance between the neighbours. The distance contributes to a decrease in social control, as the neighbourhood worsens by empty properties and it takes a long time to get to know new neighbours. The less someone knows about his or her neighbours, the less the shared values will be as the neighbours do not know of each other what they share as values because they are not in contact with each other.

3.5 Limitations
The data used in this research beholds the hemp plantaions in which the cultivator was apprehended. This creates a degree of selection bias. The results can only be applied for the apprehended hemp cultivator and not for the entire population of hemp cultivators. As only the discovered hemp cultivator has been analysed within this study, no assumptions can be made on the population that has yet to be discovered. Not all criminality can be discovered or traced which in the study of criminology commonly is referred to as the 'dark number'. Ferrell (2014) explains that estimating a delinquent population can be problematic for various reasons. The first reason is the registration of the offender of the crime. Situations occur where the crime is registered by enforcement agencies, but the offender is

not present at the crime location or cannot even be found. Another possible reason for the dark number is that not all criminal offences get noticed in the surrounding of the criminal location (Ferrell, 2014). This is also the bottleneck of the problem, as the dataset only contains information on the population of discovered hemp cultivators in the municipality of Enschede. This means that only a conclusion can be given on this population and not on the whole population of hemp cultivators in the municipality of Enschede. Ferrell (2014) stresses that the research into delinquent populations does not fully cover the totality of law infrictions, therefore it is difficult to carry out a fully representative sample, however it does provide some insight into the population of the delinquent group, because they belong to the intended population. Van Dijk (2010) points out this difficulty in his research and explains that the available police data can be incomplete as not all crimes actually committed are recorded and therefore conclusions must be drawn with caution. If we extend these findings to this study, the dark number is caused by the police capacity available to trace all hemp plantations within the Enschede municipal boundaries and persons who can be apprehended. Overall, this research obtains insight in the apprehended hemp cultivator, neighbourhoods where hemp plantations are located and their real estate location and therefore only conclusions can be drawn from the hemp plantations that are discovered.

3.6 Collecting, processing and replicability of the data

Before this research commenced, a screening took place to into my personal integrity and reliability for issuing a security waiver to work with confidential data. As soon as the screening was successfully completed, I had to sign a confidentiality agreement in which it was indicated that there would be criminal consequences if I would expose classified information. One of the main requirements is that the information could physically taken out of the secure environment of the police department, that the information cannot be shared with third parties and that the research should always take place in a secured environment. In this research two different kinds of information were used: information of hemp plantations (e.g. number of hemp plants) and information of neighbourhood characteristics from the CBS. An officer from the criminal investigation department who is responsible for the registration of hemp plantations, delivered the information about the hemp plantations.

The thesis is approved by the Ethical Commission (EC) of the University of Twente with application number 18401. For the replicability of this study, the dataset is saved at the internal storage of the department ‘Analyse & Onderzoek’.

For the neighbourhood characteristics I used the database *Kerncijfers Wijken en Buurten* provided by the CBS. This database contains information on neighbourhoods and areas in the Netherlands. For this research, neighbourhood characteristics of Enschede were used, which made it also possible to filter on socioeconomic characteristics and these were then used for my own master dataset. For the verifiability, the syntax with all neighbourhood information has been put in the appendix of this thesis. Visualization of the discovered hemp planations throughout the neighbourhoods of Enschede provided more insight in the distribution and locations of the plantations. This has been done with the help of a software program, Mapinfo, under supervision of an Intelligence Specialist at the police office. This software program also makes use of the neighbourhood classification of CBS, which made it that the data could be directly taken over in the software program without having to recode any values.

4. Results

This chapter contains the results of the discovered hemp plantations in combination with the hemp plantation characteristics between the period January 2015 and December 2017. Paragraph 4.1 is descriptive and provides an overview of the distribution of hemp plantations and the population of discovered hemp cultivators. Paragraph 4.2 includes the visualization of the discovered hemp plantations at neighbourhood level in the municipality of Enschede. Paragraph 4.3 includes the principal component analysis about the neighbourhood characteristics in the municipality of Enschede. Paragraph 4.4 includes the correlations of the components with the concentric zones and the dependent variable (amount of discovered hemp plantations). Paragraph 4.5 contains the regressions of the neighbourhood characteristics of Enschede. The last paragraph (4.6) contains the results of the hypotheses of this research.

4.1 Descriptive statistics

Table IV Descriptive statistics of the hemp plantation characteristics and the 15 neighbourhood characteristics[3]

Items	Valid N	Mean	S.d.	Min.	Max.
Hemp plantation characteristics					
Discovered hemp plantations	334	4.76	5.94	0	25
Hemp plants per plantation	334	308	243	0	1772
Confiscation (in €)	334	22.768,56	36.776,29	0	490.000
Neighbourhood characteristics[4]					
SES					
Total number of social payments	66	314	268	0	960
Number of social inability payments	66	144	113	0	420
Amount of unemployment payments	66	51	34	0	130
Number of social security payments	66	118	135	0	470
Relative percentage migration background	70	22.95	12.64	0	55.93
Average income (in €)	65	21.341,54	4.937,58	12.500	40.200
Social Control Mechanisms					
Population density	69	3717	2675	24	8853
Percentage of rental properties	68	43.16	22.29	3	96.00
Real estate characteristics					
Real estate build before 2000(%)	67	82.23	23.02	0.00	100.00
Percentage of uninhabited property	67	5.88	5.81	1.00	29.00
Average real estate value (in €)	64	193.000	90.318,66	103.000	491.000
Percentage of owner occupied property	67	54.63	22.71	4.00	96.00
Criminality [5]					
Criminal offences against public order	67	5.34	4.75	0	31
Registered thefts per year	67	4.42	3.14	0	16

4.1.1. Hemp plantation characteristics

Over the period 2015, 2016 and 2017 334 hemp plantations were discovered in the municipality of Enschede. In the table above the valid N differs The minimum of discovered hemp plantations is 0 and the maximum of discovered hemp plantations per neighbourhood is 25. Over the different neighbourhoods are 4.76 discovered hemp plantations per neighbourhood with a standard deviation of 5.94. The mean of the discovered hemp plants is 308 with a standard deviation of 243 hemp plants. The minimum of discovered hemp plants is 0 in the municipality of Enschede. Possession of a hemp plantation is punishable by law and therefore it is possible for organizations (e.g. real estate companies, energy companies) to confiscate financial compensation for the material damage. The mean of the financial confiscation is €22.768,56 with a standard deviation of €36.776,29. The minimum confiscation is €0 and the maximum confiscation is €490.000,-.

[3] The neighbourhood characteristics of Enschede derived from the Central Office of Statistics (CBS, 2017; CBS, 2015)
[4] The N differs as not all valid cases are under a certain minimum as explained in appendix III
[5] The number of registered criminal offences is per 1000 inhabitants per neighbourhood

4.1.2 SES

The SES of neighbourhoods includes the work situation (e.g. social payments), migration background, financial situation (e.g. average income). The total number of social payments in the neighbourhoods of Enschede has a minimum of 0 with a maximum of 960 social total payments. The mean of the total number of social payments is 314 with a standard deviation of 268. The mean of the relative percentage of inhabitants with a migration background (non-western and western migrants) is of 22.95 and a standard deviation of 12.64. The minimum of inhabitants with a migration background is 0 and maximum 55.93. The minimum average income between the different neighbourhoods of Enschede is €12.500,- and maximum of €40.200,-. The average income per year of the different neighbourhoods per inhabitants is €21.341,54 with a standard deviation of €4937,58.

4.1.3 Social Control Mechanisms

Social control mechanisms are the mechanisms in which inhabitants of neighbourhoods control each other and carry out the same norms and values. The mean population density in the different neighbourhoods in the municipality of Enschede is 3717 inhabitants per km^2. The standard deviation of the population density of Enschede is 2675 inhabitants per km^2. The minimum population density of the neighbourhoods in Enschede is 24 inhabitants per km^2 with a maximum of 8853 inhabitants per km^2.

4.1.4 Real Estate Characteristics

The real estate characteristics concern the information at neighbourhood level about the status of real estate (e.g. average real estate value or inhabited property).The mean percentage real estate in neighbourhoods of the municipality that is built before 2000 is 82.23 with a standard deviation of 23.02. The minimum of real estate that is built before 2000 in Enschede is 0 and maximum of 100. The mean percentage of uninhabited property in the neighbourhoods of Enschede is 5.88 with a standard deviation of 5.81. The minimum percentage of uninhabited property in the neighbourhoods of Enschede is 1 with a maximum of 29.

4.1.5 Crime

Crime is measured by combining the registered violation of public order and the registered thefts. The mean of registered criminal offences against public order is of 5.34 per 1000 inhabitants. The standard deviation of the registered criminal offences against public order is 4.75 per 1000 inhabitants. The minimum of registered criminal offences against public order is 0 and has a maximum of 31 registered criminal offences against public order. The mean of the total number of thefts per 1000 inhabitants is of 4.42. The standard deviation of thefts in the neighbourhoods of Enschede is 3.14. The minimum of thefts in the neighbourhoods of Enschede is 0 and the maximum number of thefts in the neighbourhoods is 16.

4.2 Descriptive sub-question regarding hemp plantations in Enschede

The descriptive sub question is about the distribution of hemp plantations through the neighbourhoods of Enschede: *What distribution of hemp plantations can be observed in the municipality of Enschede?* This sub-questions aims to answer if a distribution of hemp plantations throughout the neighbourhoods of the municipality of Enschede can be discovered.

4.2.1 Visualization and distribution of the discovered hemp plantations

The main research question in this study relates to the explanation of the discovered hemp plantations in the neighbourhoods of Enschede. To clarify the distribution of the hemp plantations, this aspect splitted up in two components: (1) the amount of discovered hemp plantations and (2) the locations of the discovered hemp plantations and the distribution of the hemp plantations throughout the neighbourhoods.

4.2.2 Discovered hemp plantations (2015, 2016 & 2017)

Table V displays the distribution of the discovered hemp plantations throughout the years 2015, 2016 and 2017. The discovered hemp plantations are uniform distributed over the years. In the below displayed visualization (table V*)* the discovered hemp plantations over the neighbourhoods of Enschede over the period 2015, 2016 and 2017 are accumulated and the colours stand for the discovered hemp plantations. The first number is the year when the hemp plantations are discovered and the second number are the amount of discovered hemp plantations and third the relative percentage for that year.

Table V discovered hemp plantations throughout the years

Year	N (total is 334)	Relative percentage of discovered hemp plantations
2015	117	35%
2016	111	33%
2017	106	31%

Observing the distribution of the hemp plantations, eight neighbourhoods are classificated in the highest category of discovered hemp plantations. The neighbourhoods with the highest amount of discovered hemp plantations are distributed throughout de municipality and concern the following neighbourhoods: (1) Deppenbroek, (2), Mekkelholt, (3), Twekkelerveld, (4) Stevenfenne, (5) Boswinkel-De Braker, (6) Stroinkslanden-Zuid, (7) Wesselerbrink N.O. and (8) de Bothoven.
The observed hemp plantations classified in the highest category are random distributed throughout the neighbourhoods of Enshede. Further information regarding the discovered hemp plantations are placed in appendix VI. The discovered hemp plantations are, in general, located in neighbourhoods with relative lower SES. In the outlying areas of the municipality are less discovered hemp plantations.

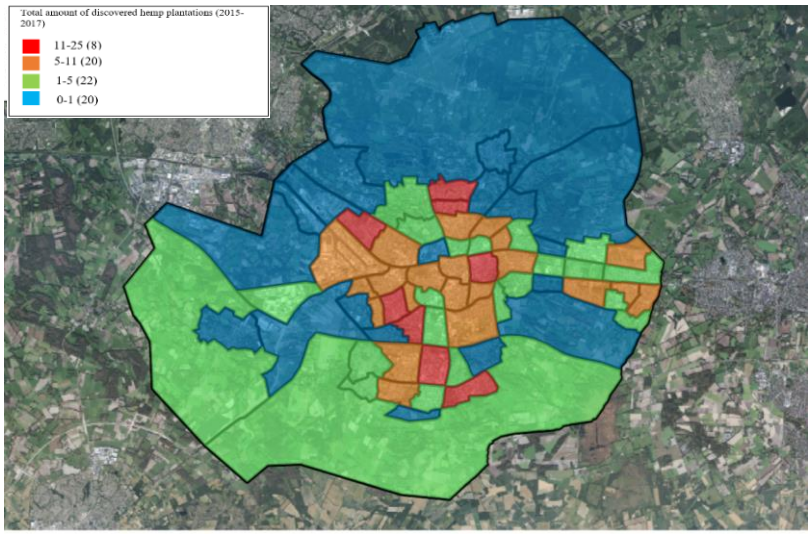


Figure V discovered hemp plantations (2015-2017)

4.2.3 Discovered hemp plantations throughout the years

In this section of the results, the discovered hemp plantations over the years 2015, 2016 and 2017 are separately discussed and analysed in chronological order. The beneath displayed visualization of the hemp plantations contain the neighbourhood number based at classification of the CBS (see Appendix V, figure 5.1) (CBS, 2018). The discovered hemp plantations are located around the city center of Enschede. One neighbourhood in 2015 is categorized with the most discovered hemp plantations and concerns the neighbourhood the Bothoven. The second highest classificated neighbourhood with discovered hemp plantations is Hogeland-Noord and is nearby located the neighbourhood de Bothoven. Furthermore, the neighbourhoods that are classified in the second highest category are commonly located at the densely populated neighbourhoods in the outer areas of Enschede and concerns the neighbourhoods (21) Boswinkel-De Braker, (31) Twekkelerveld, (61) Stroinkslanden-Zuid, (63) Wesselerbrink N.O., (70) Industrie- en Havengebied and (83) Eekmaat. Observing the discovered hemp plantations in 2016, the discovered hemp plantations are located in the urban areas with 5-11 discovered hemp plantations. In the outer areas of Enschede are little to none discovered hemp plantations. In the visualization of 2017 can be observed that foremost of the discovered hemp plantations are located in densily populated areas. In the outer areas of Enschede, are less discovered hemp plantations and are classificated in 0-1. The neighbourhoods with the most discovered hemp plantations (5-11) in 2017 are located in the neighbourhoods Twekkelerveld (3), Boswinkel-De Braker (21), Stevenfenne (23), Twekkelerveld (31), Mekkeltholt 43, Deppenbroek (44), Stroinkslanden-Zuid (61) and Wesselerbrink-Z.W. (65).

4.2.4 Concentric zones and hemp plantations

Every concentric zone within the model of Burgess (2012) has their own characteristics. The first ring has the characteristic that it is the economic heart and this is also the place where most activities take place and where the most interhuman contact takes place. The concentric zones have been set around the different neighbourhoods, keeping the geographical location of the neighbourhoods in mind. For the division of neighbourhoods, the division of CBS has been used. Observing the concentric zones, it is noticeable that the number of neighbourhoods that fall in the highest category also are found with the discovered hemp plantations, making it look randomly assigned within the concentric zones. The fifth ring of the model is the only one in which it seems there are no neighbourhoods in the highest categorization where hemp plantations are discovered. The structure of the categorization of hemp plantations is as follows: zone I contains 62,5%, zone II 62,5%, zone III 40%, zone IV 13,3% and zone V 18.75%. What stands out is that mostly in the first two zones there is a high percentage of discovered hemp plantations and the third category is also relatively high. The fourth and fifth zone have considerably less discovered hemp plantations.

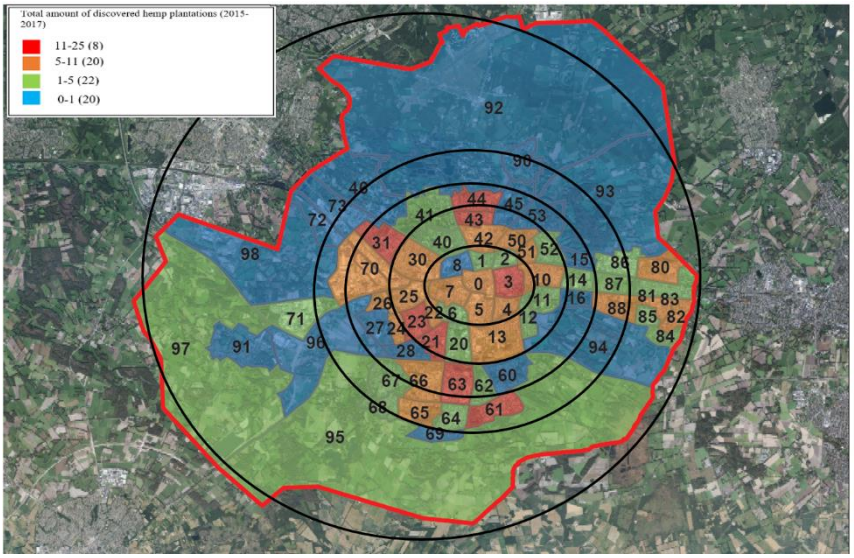


Figure VI Concentric Zones

4.2.5 Correlations of concentric zones with the discovered hemp plantations

Observing the visualization of Enschede together with the discovered hemp plantations throughout the neighbourhoods of Enschede. A concentration of hemp plantations can be observed within the first two concentric zones of the model of Burgess. The two concentric zones both contain 62.50% of the discovered hemp plantations within the two highest classifications of discovered hemp plantations in neighbourhoods. The outer concentric zones demonstrate less discovered hemp plantations as shown in the visualization. The results of the correlation analysis are significant and contains a correlation of -0.25.

Table VI Correlations with Concentric Zones

Discovered hemp plantations	*Correlation*	*Significance*
Concentric zones	-0.25**	0.04

** significant at level 0.05

4.2.6 Hypothesis regarding distribution

The first hypothesis that is related to the distribution of discovered hemp plantations is:

Concentric Zones (H1): The concentric zone model is representative for explanining discovered hemp plantations.

The concentric zone model domenstrates a negative correlation of -0.25 and a significance of 0.04. Despites the results is significant, the correlation is weak. Therefore, H1 is rejected.

4.3 Sub-question regarding geopgraphical distribution

For the answering of the second sub question, the hemp plantations are analysed together with the neighbourhood characteristics to clarify and explain the geographical locations of the discovered hemp plantations in neighbourhoods. This leads to the following analytical sub-question: "*Which neighbourhood characteristics are related with the distribution and geographical location of the discovered hemp plantations per neighbourhood in the municipality of Enschede"?*

4.3.1 Correlations

Table VII Correlation matrix

Correlation neighbourhood characteristics with discovered hemp plantations		
	Correlation	Significance
Percentage owner occupied property	-0.44**	0.00
Percentage of rental properties	0.45**	0.00
Relative amount of social payments	0.51**	0.00
Relative amount of social security payments	0.58**	0.00
Amount of social inability payments	0.30**	0.02
Amount of unemployment payments	0.25*	0.04
Migration background	0.59**	0.00
Average income	-0.47**	0.00
Average real estate value	-0.53**	0.00
Percentage of uninhabited property	-0.16	0.19
Population density	0.56**	0.00
Registered crime	0.31**	0.01
Real estate build before 2000	0.16	0.20

** Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

4.3.2 Test of hypotheses

The second hypothesis relates to the residential mobility in the neighbourhoods of Enschede. The residential mobility in this research is operationalized as the percentage as the percentage rental properties per neighbourhood. This leads to the following hypothesis:

Social Disorganization Theory through residential mobility (H2): *In neighbourhoods with a higher residential mobility, are more often discovered hemp plantations.*

Observing the correlation matrix, the residential mobility (see rental properties), demonstrates a correlation of 0.45. Furthermore, the scatterplot in appendix IX shows a strong correlation together with the dependent variable (discovered hemp plantations). The outcomes of the correlation show support for *H2* about the residential mobility in the neighbourhoods of Enschede. The Social Disorganization Theory demonstrates high residential mobility in neighbourhoods a decent indicator to determine the discovered hemp plantations (see Social Disorganization Theory). In short, *H2* can be accepted.

The third hypothesis is about the ethnical heterogeneity of neighbourhoods. In chapter 2 this dimension is discussed. For this research the ethnical heterogeinity is operationalized as the inhabitants with a migration background (non-western and western) and results in the following hypothesis:

Social Disorganization Theory through ethnic heterogeinity (H3): *In neighbourhoods with a higher ethnical heterogeinity, are more often discovered hemp plantations.*

The outcome of the correlation analysis demonstrates support for the theoretical derived concept about ethnical heterogeneity in neighbourhoods and criminality. The output of the correlation analysis shows a high correlation of 0.59 and a correlation can be observed between ethnical heterogeinity and discovered hemp plantations.The scatterplot, a positive relationship between the discovered hemp plantations and migration background can be observed. Therefore, *H3* can be accepted.

The fourth hypothesis concerns the presence of owner-occupied property in neighbourhoods in relation to criminality. Owner-occupied property results in a stable group of inhabitants in a neighbourhood with enough own capital to buy a house. Generally, due to the possession of financial resources, the inhabitants are in general not inclined to get involved into criminality. This results in the following hypothesis:

Social Disorganization Theory through owner occupied properties (H4):*In neighbourhoods with a lower percentage owner occupied properties, there is higher chance of discovered hemp plantations.*

The output from the principal demonstrates a correlation of -0.44 and can be considered as meaningful. Furthermore, the scatterplot of the owner occupied properties in relation with the discovered hemp plantations, a positive relationship can be observed. Hence, *H4* can be accepted.

The fifth hypothesis contains the average real estate value for het SES of neighbourhoods. The SES of neighbourhoods provides an indication of the financial possibilities of the inhabitants in neighbourhoods. How more financial resources, how generally less incline in criminality occurs. Nevertheless, this must not evoke the suggestion that inhabitants that commit crime are only located in neighbourhoods with lower real estate value. Criminals who are relatively higher at the criminal ladder, can live in the neighbourhoods with higher real estate value. For this research it is hard to discover, due to the dark number and the scope of this research and conclusions are drawn at the aggregated data. The following hypothesis is formulated regarding real estate value:

Social Disorganization Theory through average real estate value (H5)*: In neighbourhoods with a lower average real estate value, are more often discovered hemp plantations.*

In the correlation analysis can be observed that the real estate value has correlation of -0.53 with discovered hemp plantations. The scatterplot of the average real estate value demonstrates a negative relationship between real estate value and discovered hemp plantations. Hence, *H5* can be accepted.

The sixth hypothesis is even related to the SES of a neighbourhood. The average income in neighbourhoods provides insight in the financial situation of inhabitants. The average income is hypothesized as following:

Social Disorganization Theory through average income (H6)*: In neighbourhoods with a lower average income, are more often discovered hemp plantations.*

The correlation of the average income in relation with discovered hemp plantations is -0.47. The negative correlation demonstrates that the height of the income is negative correlated. Hypothetical, how higher the income, how less discovered hemp plantations. Therefore, *H6* is accepted.

This type of SES of a neighbourhood was used as an indicator for the work status of neighbourhoods. The amount of social payments has been made relative with the amount of inhabitants per neighbourhood. The total amount of social payments are summed up and leads to the following hypothesis:

Social Disorganization Theory through social benefits (H7)*: In neighbourhoods with a higher number of social payments, are more often discovered hemp plantations.*

Social payments are measured with three different types of social payments, *H7* is split up in three more sub-hypothesis:

Social Disorganization Theory through social security payments (H7a)*: In neighbourhoods with relatively more social security payments, are more often discovered hemp plantations.*

Social Disorganization Theory through social incapacity payments (H7b)*: In neighbourhoods with relatively more social incapacity payments, are more often discovered hemp plantations.*

Social Disorganization Theory through unemployment payments (H7c)*: In neighbourhoods with relatively more unemployment payments, are more often discovered hemp plantations.*

H7 contains a correlation of 0.51. This indicates that the social payments have a relation in the number of discovered hemp plantations. Furthermore, analysing the scatterplot of the summed up social payments, a positive relationship can be observed between the discovered hemp plantations and social payments. The first sub-hypothesis concerns the social security payments and demonstrates a correlation of 0.58. The second sub-hypothesis contains a correlation of 0.30 with regard to the discovered hemp plantations. The third hypothesis contains of correlation of 0.25 in relation with unemployment payments and discovered hemp plantations. Due to the high correlations of the central hypothesis and the sub-hypotheses *H7* can be accepted.

In the SCT the presence of social control mechanisms amongst inhabitants is considered important for the status of the neighbourhoods. In neighbourhoods with less functioning of these social control mechanisms, the chance of criminality increases. The social control in neighbourhoods can be reduced by infrastructure that can downsize the functioning of those mechanisms, by example flats that can result in isolated living in neighbourhoods and less shared values. This results in the eighth hypothesis:

Social Control Theory through registered crime (H8)*: In neighbourhoods with a higher number of registered crime rates, are more often discovered hemp plantations.*

The correlation of crime in neighbourhoods is 0.31 and a relation can be observed with the registered crimes and the number of discovered hemp plantations. Furthermore, the scatterplot with the dependent variable shows a moderate correlation. Hence, *H8* can be accepted.

To high population density creates less social control in neighbourhoods and results in less social cohesion due to the anonimized way of living for each inhabitants. This results in the following hypothesis:

Social Control Theory through population density (H9)*: In neighbourhoods with a higher population density, are more often discovered hemp plantations.*

H9 contains the population density in neighbourhoods with a correlation of 0.56 and can a strong correlation can be observed between the population density and the discovered hemp plantations. Moreover, the scatterplots shows a positive correlation with the dependent variable. In short, *H9* can be accepted.

Social Control Theory uninhabited property (H10)*: In neighbourhoods with more uninhabited property, are more often discovered hemp plantations.*

The item uninhabited property in the fourth component demonstrates a correlation of -0.16. Furthermore, the scatterplot of uninhabited property with the dependent variable, demonstrates a moderate negative relationship with the independent variable. *H10* can be rejected.

4.4 Dimensions and items of Principal Component Analysis

An explorative principal component analysis with Varimax rotation and Kaiser Normalization of 15 neighbourhood characteristics was conducted and underlying four componentns of neighbourhoods that are extracted from the characteristics. From the 15 derived neighbourhood characteristics items, four dimensions can be identified: (1) SES neighbourhoods, (2) Social Control in neighbourhoods, (3) poorer neighbourhoods and (4) older criminal neighbourhoods. From the principal-components analysis can be observed that in each component a number of negative and positive loadings on the component are present. Each component separately. High positive loadings first, followed by high negative loadings.

Table VIII Results of principal component analysis for 15 neighbourhood characteristics of Enschede in 2017

Dimensions and items	Component 1	Component 2	Component 3	Component 4
	Eigenvalue = 6.25	Eigenvalue = 2.67	Eigenvalue = 1.36	Eigenvalue= 1.09
Neighbourhood characteristics				
Component 1: SES in neighbourhoods				
Percentage owner occupied property	**0.93**	0.03	-0.08	-0.20
Percentage of rental properties	**0.92**	-0.01	-0.07	-0.18
Amount of social security payments	**0.83**	-0.18	0.34	-0.07
Total amount of social payments[6]	**0.83**	0.09	0.44	0.04
Migration background	**0.76**	0.40	-0.04	-0.11
Amount of social inability payments	**0.68**	-0.06	0.26	0.12
Average income	**0.78**	0.22	-0.10	-0.17
Average real estate value	**0.52**	0.56	-0.43	-0.35
Component 2: Social Control in neighbourhoods				
Percentage of uninhabited property	-0.07	**0.85**	0.40	0.17
Population density	0.43	**-0.77**	0.15	0.21
Component 3:Poor neighbourhoods				
Amount of unemployment payments	0.13	-0.13	**-0.88**	-0.13
Criminal offences against public order[7]	-0.22	0.34	**-0.52**	**0.54**
Component 4:Older criminal neighbourhoods				
Total number of thefts[8]	-0.26	0.11	-0.20	**0.71**
Real estate build before 2000	-0.04	-0.06	0.03	**0.66**
Criminal offences against public order[9]	-0.22	0.34	-0.52	**0.54**

Rotation Method: Varimax with Kaiser Normalization (rotation converged in 5 iterations).
Bold: highest component loadings for each item ($\geq$ 0.5).

4.4.1 Variance of the components

The eight items within the 'SES neighbourhoods' dimension contains the socioeconomic status of the neighbourhoods and their inhabitants. The items that were derived are, among others, the economic

[6] All the numbers of social benefits has been made relatively by setting the number of benefits against the number of inhabitants (also for unemployment, social inability and social security payments.
[7] Per 1000 inhabitants
[8] Per 1000 inhabitants
[9] Per 1000 inhabitants

status of the neighbourhoods (e.g. average income and average real estate value). Average income and average real estate value of neighbourhoods are decent indicators to illustrate the financial situation of the inhabitants. The average income and average real estate value in neighbourhoods are decent indicators of the SES of neighbourhoods (Agnew, 2008; Skogan, 1986; Brantingham & Brantingham, 1995; Garmaise & Moskowitz, 2006). The first derived component was by far the strongest, with an Eigenvalue of 6.21 and explains 44.33% of the variance of the neighbourhood characteristics. The second derived component are the neighbourhoods with less social control and contains two derived items (uninhabited property and vacancy in neighbourhoods). This dimensions was the second strongest component derived from the analysis with an Eigenvalue of 1.93 and explains 13.78% of the variance of the neighbourhood characteristics. The third strongest component with an Eigenvalue of 1.33 and explain 9.47% of the variance in this component analysis. The fourth component, and the less strong component, is the fourth component with an Eigenvalue of 1.08 and explains 7.70% of the variance.

4.4.2 Component loadings

The first component contains eight items that can explain related items within the SES component. The two items with the highest component loadings are the percentage of owner occupied property (0.93) and the percentage of rental properties (0.92). The items that follow are the social security payments and the total amount of social payments contain a factor loading of 0.83. The items with the factor loading in the first component is the real estate value with 0.52. The second component contains two items that all demonstrates strong correlations of neighbourhoods with less social control. The second component contains two items with one positive factor loading for uninhabited property (0.85) and the second item, population density, presents a negative factor loading of -0.77.

The third component contains two items; criminal offences and the unemployment payments in the dimension poorer neighbourhoods. The amount of unemployment contains a factor loading of -0.88 and the criminal offence against public order within the neighbourhoods demonstrates a component loading of -0.52. The fourth and last component contains three items: (1) the number of thefts and real estate build before 2000 with a component loading of 0.71, (2) the real estate build before 2000 demonstrates a component loading of 0.66 and (3) criminal offences against public order with a factor loading of 0.54.

4.4.3 Descriptive statistics components

From the principal component analysis four new components are derived. The descriptive statistics of each component is separately visulzed in table IX.

Table IX Descriptive Statistics

Descriptive Statistics components	N	Min	Max	Mean	Std. Dev.
Component 1: SES	70	51.35	100	70.45	11.72
Component 2: Social Control	69	0.60	87.11	40.71	19.97
Component 3: Older criminal neighbourhoods	67	1.50	81.75	64.99	17.86
Component 4: Poor neighbourhoods	67	0.00	90.66	18.37	12.89

4.4.4 Correlations of components with the discovered hemp plantations

In the beneath displayed correlation matrix can be observed that Component 1 (SES) and Component 2 (less social control) are both significant in relation to the independent variable (amount of discovered hemp plantations). The first component an strong negative correlation can be observed of -0.55 with the discovered hemp plantations. How higher de SES in the neighbourhoods, how less discovered hemp plantations can be observed. The second component contains a positive correlation between less social control in neighbourhoods and the amount of discovered hemp plantations. The less social control there is in neighbourhoods, how more discovered hemp plantations over the years.

Table X Correlations

Components	*Correlation*	*Significance*
Component 1: SES in neighbourhoods	-0.55*	0.00
Component 2: Social Control in neighbourhoods	0.55*	0.00
Component 3: Poorer neighbourhoods	0.29**	0.02
Component 4: Older criminal neighbourhoods	0.19	0.13

*significant at level 0.01
** significant at level 0.05

4.5 Multiple Regression & Multicollinearity

Before conducting the multiple regression, testing the multicollinearity is important for the reliability of the test. Multicollinearity between predictors makes it difficult to asses the individual importance of a predictor. Observing the collinearity statistics, the Value Inflation Fator (VIF) beneath 10 and the tolerances are above the setted standard of 0.2. Interpreting the rules of thumb, no multicolliearity occurs within this multiple regression (see Field, 2013). In the appendix VII table 8.9, the output from the multicollinearity is added.

The beneath displayed regression are applied to test the derived components from the principal component analysis.

Table XI Multiple Regression with dependent variable	B	Significance
Model summary		
SES	0.001	0.84
Social Control	0.001	0.70
Poorer neighbourhoods	0.011	0.00
Older criminal neighbourhoods	0.001	0.79

Dependent variable: discovered hemp plantations

4.5.1 Hypotheses for multiple regression

The B of the SES component in relation with the discovered hemp plantation is 0.001 and the significance is 0.84.

Hypothesis SES: Socioeconomic Status is related with the discovered hemp plantations.

Due to the low B and the low level of significance, hypothesis SES is rejected.

The B of the Social control component in relation with the discovered hemp plantation is 0.001 and the significance is 0.70.

Hypothesis Social control: Social Control is related with the discovered hemp plantations.

Due to the low B and the low level of significance, hypothesis Social control is rejected.

The B of the Poorer neighbourhoods component in relation with the discovered hemp plantation is 0.011 and the significance is 0.00.

Hypothesis Poorer neighbourhoods: Poorer neighbourhoods are related with the discovered hemp plantations.

Due to the B and the level of significance, hypothesis Poorer neighbourhoods is accepted.

The B of the Older criminal neighbourhoods component in relation with the discovered hemp plantation is 0.001 and the significance is 0.79.

Hypothesis Older criminal neighourhoods: Older criminal neighbourhoods are related with the discovered hemp plantations.
Due to the low B and the low level of significance, hypothesis Older criminal neighbourhoods is rejected.

5. Conclusion, limitations and discussion

5.1 Conclusion

The research question in this thesis entitled: "*How can it be explained that certain neighbourhoods in the municipality of Enschede have more hemp plantations compared to other neighbourhoods in the period of 2015 to 2017?"* This question was split up into two sub-questions: (a) "What distribution of hemp plantations can be observed in the municipality of Enschede?" and (b) "Which neighbourhood characteristics are related with the distribution and geographical location of the discovered hemp plantations per neighbourhood in the municipality of Enschede?"

Distribution of hemp plantations

Within Enschede it was prior to this research not clear how the plantations were distributed over the different neighbourhoods. It was important for the police to gain insight into which neighbourhoods these plantations were located and also the number of hemp plantations that were discovered per neighbourhood. The distribution of the hemp plantations did not only contains the summed up hemp plantations over the years, the hemp plantations are on year by year basis analysed. At first sight, it appears that there is not a robust pattern of distribution from year to year. Which suggest that the distribution seems to be a product of randomization. However, when you aggregate the separate years of observation into a longer period a clear pattern of distribution of hemp plantations over the neighbourhoods of Enschede emerges, ruling out the idea the distribution is merely based on randomization and not one or more underlying explaining variables. The Concentric Zone Theory was used for a theoretical explanation of the hemp plantations. The theoretical explanation for crime (see Concentric Zone Theory) one pattern could be observed. Most of the hemp plantations are concentrated in the first two concentric zones. The outer concentric zones have in general less discovered hemp plantations in comparison with the neighbourhoods with a higher population density.

Neighbourhood characteristics

Most of the neighbourhood characteristics that emerged from the principal component analysis were strongly related to the component SES. The variance of the component was 44.33% and was therefore a strong representation of the SES component. The regression analysis also shows that the SES at neighbourhood level in relation to the dependent variable shows a negative relationship. Which means that in neighbourhoods over the period 2015, 2016 and 2017 with a lower SES, there is a higher expectancy of discovered hemp plantations.

The second component derived from the principal component analysis was the new constructed variable *Social Control in Neighbourhoods*. When the social control in a neighbourhood decreases, there appears to be a relationship with the number of hemp plantations discovered. In general, the less social control there is in a neighbourhood, the stronger the relationship with the number of hemp plantations discovered. The scatterplot also visualizes this positive relationship between these two variables.

Main conclusion

In closing, an answering of the main research question and its two sub questions will be provided for in a consize fashion. For logical reasons the sub questions will be addressed first. The first sub question concerns the distribution of the discovered hemp plantations and was formulated as follows: "What distribution of hemp plantations can be observed in the municipality of Enschede?". The research seems to indicate that the distribution cannot be explained merely on the basis of random factors. A robust geographical pattern seems to emerge when multiple years of observation are aggregated, being that some neighbourhoods are consisentently coming up of hemp plantations while other neighbourhoods are remarkable underrepresented. Going on to the second sub question, which concerns the explanatory power coming forth out of neighbourhood characteristics. This sub question was formulated as follows: "Which neighbourhood characteristics are related with the distribution and geographical location of the discovered hemp plantations per neighbourhood in the municipality of Enschede?". This research points out that a number of neighbourhood characteristics explain the distribution and geopgraphical location with a variance of 16.2% (Multiple Regression Analysis), the

main ones entailing of socioeconomic status, social control, poor neighbourhoods and criminal neighbourhoods. This leads to answering the main question in conclusion: “How can it be explained that certain neighbourhoods in the municipality of Enschede have more hemp plantations compared to other neighbourhoods in the period of 2015 to 2017?” This research indicates a robust pattern of distribution of hemp plantations in the municipality of Enschede over its different neighbourhoods. That some neighbourhoods have more hemp plantations compared to other neighbourhoods can be explained best by certain neighbourhood characteristics, in particular socioeconomic status and social control.

5.2 Limitations

In this research the choice was made to focus on the neighbourhood level to analyse discovered hemp plantations. To elevate above the unique cases level, but specific enough for nuance and providing data that beholds operational value for policy interventions and enforcing purposes by avoiding a too high level of aggregation in which operational meaning gets lost.

However, this research and dataset had limitations. The first limitation is that the dataset was focused on neighbourhood level. Like indicated on the micro and macro links, criminality can also be explained with the help of individual situations. What is described on neighbourhood level, does not need to mean that this also is applicable for individual cases and the choice of going into the hemp plantations scene (See Sampson, 2013). Having a hemp plantation can also be explained by individual choices and not with the use of neighbourhood characteristics. It is wrong to assume that statistical data of an aggregated dataset can also be applied to individuals that are part of an aggregate (also known as *ecological fallacy*) (Andresen & Malleson, 2011).

A second limitation is focusing at certain neighbourhoods will result in more discovered hemp plantations. In the social sciences this is called the *self-fulfilling prophecy*. In short, the more the focus is on a certain area by the police, the higher the registration of criminality (Ferraro, Pfeffer, & Sutton, 2005). Besides, when the effort of police resources (manpower and detection) is more focused on the areas with more criminality, more criminality will also be registered. While, in neighbourhoods with less criminality, the same level of criminality takes place because the focus is not on these neighbourhoods, the registered criminality is lower.

The third limitation is that the dataset only contains information on the discovered hemp plantation in the periods of 2015, 2016 and 2017. This results in a *dark number* and only conclusions can be drawn on discovered hemp plantations. A dark number refers to the idea that not all criminality can be discovered by the police. It means that this does not contain all the hemp plantation of Enschede on neighbourhood level. The discovered hemp plantations have to do with the capacity utilization of the police. Also, it is remarkable in the visualization there many discovered hemp plantations are found in the rural neighbourhoods of Enschede. The suburbs show little discovered hemp plantations. On the one hand this can mean that there are no discovered hemp plantations and on the other hand it can be the case that there is less police capacity and that the police does not search in the suburbs for hemp plantations.

5.3 Policy recommendations

The first recommendation for the police is to intensify the cooperation with third parties that experience the negative effects of the hemp plantations (e.g. energy suppliers, real estate cooperations). By cooperating together with the earlier mentioned third parties and combining information a more exetensive analysis can be conducted to recognize patterns that can support a better understanding of the underlying problems, like criminal facilitation of real estate locations. Furthermore, more extensive analysis over more years will result in a more complete overview of the geographical distribution in Enschede and will increase the reliability of the discovered hemp plantations and show a more robust pattern over the years.

The second recommendation for the police is to ensure that information is interpreted and entered in a uniform fashion into the police systems. Even though the data is consistent and integer, every agent has its own way of working and the mutation therefore takes place in a different way. The important thing is that together there should be decided what is understood under different hemp plantation characteristics. Now it often occurs that there are different ways of looking at the

characteristics. The operational information is mostly focused on detection, be able to perform to extensive analyses of hemp plantations, individuals and locations are important and this is necessary so in the future hemp plantations can be discovered in a much pragmatic way. It seesms the case that the current knowledge gap in the mechanisms behind hemp plantation distribution, causes a fall bak on the heuristic of looking into the “obvious” suspect of low SES status. There should be more detection on the background and further problems that are behind the people of a hemp plantation. A more extensive understanding of the mechanisms and variables involved in the individuals that initiate en maintain hemp cultivation capacity could be valuable pursuit in further research. This has the consequence that there is no representative of the total population of hemp growers.

Furthermore, many people have debts and are in a financial vulnerable position. In combination with the consideration that being caught with a hemp plantation has a relatively low sentence, while the revenue of a hemp plantations are high. This results in people rather having a hemp plantation and doing their time, than not having a hemp plantation and experiencing financial hardship. In the report, *Georganiseerde criminaliteit*, is suggested that relative low sentence in relation to the committed offense are not effective as only the low end of the criminal spectrum is being caught, while the big criminals stay out of sight (Kleemans et al., 2002). A big share of the discovered hemp plantations entail cultivators that are in a significant disadvantaged economic position. The confiscation of the profit can most often not be executed, as the hemp growers often have little equity. Which furthermore hinders the compensation of negative effected third parties, like energy suppliers.

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Appendices

Appendix I codification scheme hemp plantations

1.	Identity of the hemp plantation:
2.	Year of discovering the hemp plantation:
3.	Districts: (0) Binnensingelgebied (1) Hogeland-Velve (2) Boswinkel – Stadsveld (3) Twekkelerveld –T.H.T. (4) Enschede-Noord (5) Ribbelt – Stokhorst (6) Enschede-Zuid (7) Bedrijfsterreinen Enschede-West (8) Glanerbrug en omgeving (9) Landelijk gebied en kernen [10]
4.	Neighbourhoods: (0) city (1) Lasonder-Zeggelt (2) De Laares (3) de Bothoven (4) Hogeland-Noord (5) Getfert (6) Veldkamp Getfert-West (7) Horstlanden-Stadsweide (8) Boddenkamp (10) Velve-Lindehof (11) Wooldrik (12) Hogeland-Zuid (13) Varvik-Diekman (14) Sleutelkamp (15) 't Weldink (16) de Leuriks (20) Cromhoffsbleek-Kotman (21)Boswinkel-de Braker (22) Pathmos (23) Stevenfenne (24) Stadsveld-Zuid (25) Elferink-Heuwkamp (26) Stadsveld-Noord Bruggert (27) Zwering (28) Ruwenbos (30) Tubantia-de Toekomst (31) Twekkelerveld (40) Walhof-Roessingh (41) Bolhaar (42) Roombleek-Roomveldje (43) Mekkelholt (44) Deppenbroek (45)Voortman-Amelink (46) Drienerveld (50) Schreurserve (51) Ribbelt-Ribbelerbrink (52) Park Stokhorst (53) Stokhorst (60) Stroinkslanden N.O. (61) Stroinkslanden-Zuid (62) Stroinkslanden N.W. (63) Wesselerbrink N.O. (64) Wesselerbrink Z.O. (65) Wesselerbrink Z.W. (66) Wesselerbrink N.W. (67) Helmerhoek-Noord (68) Helmerhoek-Zuid (69) het Brunink (70) Industrie- en Havengebied (71) Marssteden (72)Koekoeksbeekhoek (73)Kennispark (80) Glanerveld (81) Bentveld-Bultserve (82) Schipholt-Glanermaten (83) Eekmaat (84) Oikos (85) Eilermarke (86) de Slank (87) Dolphia (88) Eekmaat-West (90) dorp Lonneker (91) dorp Boekelo (92) Buurtschap Lonneker-West (93) Buurtschap Noord-Esmarke (94) Buurtschap Zuid-Esmarke (95) Buurtschap Broekheurne (96) Buurtschap Usselo (97) Buurtschap Goorseveld (98) Buurtschap Twekkelo
5.	Absolute number of plants:
6.	Estimated confiscation in euro (€):

[10] Neighbourhoods classifcation of the CBS

Appendix II Codification scheme districts and neighbourhoods

1. Districts: (0) Binnensingelgebied (1) Hogeland-Velve (2) Boswinkel – Stadsveld (3) Twekkelerveld –T.H.T. (4) Enschede-Noord (5) Ribbelt – Stokhorst (6) Enschede-Zuid (7) Bedrijfsterreinen Enschede-West (8) Glanerbrug en omgeving (9) Landelijk gebied en kernen [11]
2. Neighbourhoods: (0) city (1) Lasonder-Zeggelt (2) De Laares (3) de Bothoven (4) Hogeland-Noord (5) Getfert (6) Veldkamp Getfert-West (7) Horstlanden-Stadsweide (8) Boddenkamp (10) Velve-Lindehof (11)Wooldrik (12) Hogeland-Zuid (13) Varvik-Diekman (14) Sleutelkamp (15) 't Weldink (16) de Leuriks (20) Cromhoffsbleek-Kotman (21)Boswinkel-de Braker (22) Pathmos (23) Stevenfenne (24) Stadsveld-Zuid (25) Elferink-Heuwkamp (26) Stadsveld-Noord Bruggert (27) Zwering (28) Ruwenbos (30) Tubantia-de Toekomst (31) Twekkelerveld (40) Walhof-Roessingh (41) Bolhaar (42) Roombleek-Roomveldje (43) Mekkelholt (44) Deppenbroek (45)Voortman-Amelink (46) Drienerveld (50) Schreurserve (51) Ribbelt-Ribbelerbrink (52) Park Stokhorst (53) Stokhorst (60) Stroinkslanden N.O. (61) Stroinkslanden-Zuid (62) Stroinkslanden N.W. (63) Wesselerbrink N.O. (64) Wesselerbrink Z.O. (65) Wesselerbrink Z.W. (66) Wesselerbrink N.W. (67) Helmerhoek-Noord (68) Helmerhoek-Zuid (69) het Brunink (70) Industrie- en Havengebied (71) Marssteden (72)Koekoeksbeekhoek (73)Kennispark (80) Glanerveld (81) Bentveld-Bultserve (82) Schipholt-Glanermaten (83) Eekmaat (84) Oikos (85) Eilermarke (86) de Slank (87) Dolphia (88) Eekmaat-West (90) dorp Lonneker (91) dorp Boekelo (92) Buurtschap Lonneker-West (93) Buurtschap Noord-Esmarke (94) Buurtschap Zuid-Esmarke (95) Buurtschap Broekheurne (96) Buurtschap Usselo (97) Buurtschap Goorseveld (98) Buurtschap Twekkelo
3. Population density (amount of inhabitants per km2)
4. percentage of rental properties per neighbourhoods
5. Amount of social security payments
6. Amount of social inability payments
7. Amount of unemployment payments
8. Average real estate value (*1000)
9. Average income per inhabitant
10. Percentage of uninhabited property
11. Percentage of inhabitants with a migration background

[11] Neighbourhoods classifcation of the CBS

Appendix III Definitions of CBS neighbourhood characteristics

Aantal inwoners
De bevolking van Nederland op 1 januari.
De inwoners van Nederland.
In de bevolkingsaantallen zijn uitsluitend personen begrepen die zijn opgenomen in het bevolkingsregister van een Nederlandse gemeente.
In principe wordt iedereen die voor onbepaalde tijd in Nederland woont, opgenomen in het bevolkingsregister van de woongemeente. Personen die tot de bevolking van Nederland behoren, maar voor wie geen vaste woonplaats valt aan te wijzen, zijn opgenomen in het bevolkingsregister van de gemeente 's-Gravenhage.
In de bevolkingsregisters zijn niet opgenomen de in Nederland wonende personen waarvoor uitzonderingsregels gelden met betrekking tot opneming in de bevolkingsregisters (bijvoorbeeld diplomaten en NAVO militairen) en personen die niet legaal in Nederland verblijven.

Om redenen van statistische geheimhouding zijn de aantallen op wijk- en buurtniveau aselect afgerond op veelvouden van 5.
Bij aselect afronden wordt door loten bepaald of een getal naar boven of naar beneden wordt afgerond. De daarbij gehanteerde kansen zijn omgekeerd evenredig met de afrondverschillen. Gemiddeld wordt een getal hierdoor op zichzelf afgerond. Het gemiddelde afrondverschil per getal is evenwel groter dan het geval is bij afronding op het dichtstbijzijnde veelvoud van 5. Door afrondverschillen is de som van afgeronde getallen niet altijd gelijk aan de afgeronde som. Hierdoor kan het voorkomen dat wanneer een wijk uit één buurt bestaat of een gemeente uit één wijk, dit afgerond niet overeenkomt.

Het komt voor dat van inwoners wel bekend is binnen welke gemeente ze geregistreerd zijn, maar niet exact waar ze verblijven. Deze inwoners zijn daarom wel meegeteld in de gemeentecijfers, maar niet in de cijfers per wijk en buurt. De cijfers per gemeente kunnen daardoor afwijken van de onderliggende wijken of buurten, zelfs wanneer een gemeente slechts uit één wijk bestaat.

Particuliere huishoudens
Particuliere huishoudens bestaan uit één of meer personen die alleen of samen in een woonruimte zijn gehuisvest en zelf in hun dagelijks onderhoud voorzien. Naast eenpersoonshuishoudens onderscheiden we meerpersoonshuishoudens (niet-gehuwde paren, niet-gehuwde paren met kinderen, echtparen, echtparen met kinderen, eenouderhuishoudens en overige huishoudens). De institutionele huishoudens worden hiertoe niet gerekend.

Percentage onbewoond
Peildatum: 1 januari van het desbetreffende jaar.
Het aantal leegstaande woningen is vermeld als percentage van de totale woningvoorraad en wordt alleen vermeld bij minimaal 20 woningen. Niet-bewoonde woningen: Woningen waar op de peildatum 1 januari niemand stond ingeschreven in de Basisregistratie Personen (BRP).

Personen met een migratieachtergrond
Het aantal personen met een migratieachtergrond op 1 januari.
Persoon met een migratieachtergrond:
Persoon van wie ten minste één ouder in het buitenland is geboren.
Persoon met een eerste generatie migratieachtergrond:
Persoon die in het buitenland is geboren met ten minste één in het buitenland geboren ouder.
Persoon met een tweede generatie migratieachtergrond:
Persoon die in Nederland is geboren met ten minste één in het buitenland geboren ouder.

Personen met een migratieachtergrond worden onderverdeeld in westers en niet-westers op grond van hun geboorteland. Tot de categorie 'niet-westers' behoren personen met een migratieachtergrond uit Turkije, Afrika, Latijns-Amerika en Azië met uitzondering van Indonesië en Japan. Op grond van hun sociaaleconomische en sociaal-culturele positie worden personen met een migratieachtergrond uit deze

twee landen tot personen met een westerse migratieachtergrond gerekend. Het gaat vooral om mensen die in voormalig Nederlands Indië zijn geboren en werknemers van Japanse bedrijven met hun gezin.

Koopwoningen
Woningen die eigendom zijn van de (toekomstige) bewoner(s) of in gebruik als tweede woning.
Peildatum: 1 januari van het desbetreffende jaar.
Het aantal is vermeld als percentage van het totaal aantal woningen en vermeld bij 20 woningen of meer per buurt en wanneer het aandeel woningen met eigendom onbekend 50 procent of minder bedroeg.

Totaal aantal diefstallen uit woning/schuur/e.d.
Deze regel geeft het totaal weer van 'Diefstal/inbraak uit woning' en 'Diefstal/inbraak uit schuur/garage/tuinhuis' (per 1000 inwoners).

Mate van stedelijkheid
Op grond van de omgevingsadressendichtheid is aan iedere buurt, wijk of gemeente een stedelijkheidsklasse toegekend. De volgende klassenindeling is gehanteerd:
1: zeer sterk stedelijk >= 2 500 adressen per km²
2: sterk stedelijk 1 500 - 2 500 adressen per km²
3: matig stedelijk 1 000 - 1 500 adressen per km²
4: weinig stedelijk 500 - 1 000 adressen per km²
5: niet stedelijk < 500 adressen per km²

Uitkering: Bijstand
Personen die een bijstandsuitkering op grond van de Wet werk en bijstand (WWB, tot 1 januari 2015) of de Participatiewet (vanaf 1 januari 2015) ontvangen.
Het gaat in deze tabel om algemeen periodieke uitkeringen aan thuiswonende personen tot de AOW-leeftijd.

Wet werk en bijstand (WWB)
Wettelijke sociale voorziening die op 1 januari 2004 in werking is getreden ter vervanging van de Algemene bijstandswet (Abw), de Wet inschakeling werkzoekenden (WIW) en het Besluit In- en Doorstroombanen (ID-banen).
De WWB was tot 1 januari 2015 de wet die in Nederland de ondersteuning bij arbeidsinschakeling en bijstand regelde voor mensen die weinig of geen ander inkomen (waaronder andere uitkeringen) hebben en ook weinig of geen vermogen.
De wet is per 1 januari 2015 gewijzigd en heet sindsdien Participatiewet.

Participatiewet
De Participatiewet vervangt sinds 1 januari 2015 de Wet werk en bijstand (WWB), de Wet Sociale Werkvoorziening (WsW) en een groot deel van de Wet werk en arbeidsondersteuning jonggehandicapten (wet Wajong).
De wet regelt in Nederland de ondersteuning bij arbeidsinschakeling en het verlenen van bijstand door gemeenten voor mensen die weinig of geen ander inkomen (waaronder andere uitkeringen) hebben en ook weinig of geen vermogen.
Werk gaat voor inkomen: oogmerk van de wet is om mensen met of zonder arbeidsbeperking op de kortste weg naar betaald werk te kunnen zetten.
De gemeenten voeren de wet uit en bepalen, binnen de wettelijke grenzen, hun eigen beleid.

De AOW-leeftijd is de leeftijd waarop recht is ontstaan op het basispensioen van de Rijksoverheid op grond van de Algemene Ouderdomswet (AOW).
Tot 1 januari 2013 was de AOW-leeftijd 65 jaar. Vanaf die datum gaat de AOW-leeftijd jaarlijks met één of meerdere maanden omhoog. Zo was de AOW-leeftijd in 2013 65 jaar en één maand, in 2014 was die leeftijd 65 jaar en twee maanden.

De AOW-leeftijd wordt vanaf 2016 in stappen van 3 maanden verhoogd en vanaf 2018 in stappen van 4 maanden. Daarmee wordt de AOW-leeftijd 66 jaar in 2018 en 67 jaar in 2021. Vanaf 2022 wordt de AOW-leeftijd gekoppeld aan de levensverwachting.

Uitkering: WW
Personen die een uitkering ontvangen op grond van de Werkloosheidswet (WW).

Werkloosheidswet (WW)
De wet heeft tot doel werknemers te verzekeren tegen de financiële gevolgen van werkloosheid.
De wet voorziet in een uitkering die gerelateerd is aan het laatstverdiende inkomen uit dienstbetrekking.
De duur van de uitkering is afhankelijk van het arbeidsverleden van de verzekerde. Het Uitvoeringsinstituut Werknemersverzekeringen (UWV) beoordeelt of men voor een WW-uitkering in aanmerking komt.

Uitkering: AO
Personen die een arbeidsongeschiktheidsuitkering ontvangen op grond van de Wet op de arbeidsongeschiktheidsverzekering (WAO), de Wet arbeidsongeschiktheidsverzekering zelfstandigen (WAZ), de Wet werk en Inkomen naar arbeidsvermogen (WIA), de Wet arbeidsongeschiktheidsvoorziening jonggehandicapten (Wajong) en de Wet werk en arbeidsondersteuning jonggehandicapten (wet Wajong).

Wet op de arbeidsongeschiktheidsverzekering (WAO)
Wet die als doel heeft om personen in loondienst te verzekeren van een loonvervangende uitkering bij langdurige arbeidsongeschiktheid.

Wet arbeidsongeschiktheidsverzekering zelfstandigen (WAZ)
Een verplichte verzekering voor zelfstandigen, beroepsbeoefenaren, directeuren-grootaandeelhouders en meewerkende echtgenoten tegen de financiële gevolgen van langdurige arbeidsongeschiktheid. De WAZ is met ingang van 1 augustus 2004 geblokkeerd.

Wet arbeidsongeschiktheidsvoorziening jonggehandicapten (Wajong)
Wettelijke voorziening in de financiële gevolgen van langdurige arbeidsongeschiktheid van mensen die geen aanspraak kunnen maken op de WAO/WIA omdat er geen arbeidsverleden is opgebouwd. Dit zijn mensen die arbeidsongeschikt zijn voor de dag dat zij 17 jaar worden of na hun 17e jaar arbeidsongeschikt worden en een opleiding of studie volgen.

Wet werk en arbeidsondersteuning jonggehandicapten (wet Wajong)
Met ingang van 1 januari 2010 is de Wet werk en arbeidsondersteuning jonggehandicapten (Wet Wajong) in werking getreden.
In tegenstelling tot de 'oude' Wajong hebben jongeren met een ziekte of handicap in de eerste plaats recht op hulp bij het vinden en houden van werk. Daaraan gekoppeld kunnen ze een inkomensondersteuning krijgen.
De 'oude' Wajong blijft gelden voor jongeren die voor 1 januari 2010 een uitkering hebben aangevraagd.

Wet werk en inkomen naar arbeidsvermogen (WIA)
De wet geeft werknemers die na een wachttijd van twee jaar nog minstens 35 procent arbeidsongeschikt zijn, recht op een uitkering.
De wet is zo opgezet dat een persoon gestimuleerd wordt om naar vermogen te werken.
De WIA kent twee regelingen: de regeling inkomensvoorziening volledig arbeidsongeschikten (IVA) en de regeling werkhervatting gedeeltelijk arbeidsgeschikten (WGA).
De IVA regelt een loonvervangende uitkering voor werknemers die volledig en duurzaam

arbeidsongeschikt zijn.
De WGA regelt een aanvulling op het met arbeid verdiende inkomen of een minimumuitkering als men niet of onvoldoende werkt.

Gemiddeld inkomen per inkomensontvanger
Het rekenkundig gemiddeld persoonlijk inkomen per persoon op basis van personen met persoonlijk inkomen die deel uitmaken van particuliere huishoudens.
De waarde is vermeld bij minimaal 100 personen met persoonlijk inkomen in particuliere huishoudens per regio.

Gemiddelde woningwaarde
De gemiddelde waarde onroerende zaken van woonobjecten gebaseerd op de Wet Waardering Onroerende Zaken (WOZ-waarde).Voor de bepaling van de gemiddelde woningwaarde wordt alleen gebruik gemaakt van die WOZ-objecten omschreven als woningen dienend tot hoofdverblijf (WOZ-objectcode 10) en woningen met praktijkruimte (WOZ-objectcode 11) met een waarde groter dan nul euro. De (voorlopig) gemiddelde woningwaarde wordt bepaald met de waardepeildatum van voorgaand jaar, bijv: - 2017: waardepeildatum 1 januari 2016

Wanneer de woningvoorraad kleiner is dan 20 woningen of het aantal WOZ-objecten kleiner is dan 50 wordt er geen WOZ-waarde opgenomen.

Percentage huurwoningen
Peildatum: 1 januari van het desbetreffende jaar.
Het aantal is vermeld als percentage van het totaal aantal woningen en vermeld bij 20 woningen of meer per buurt en wanneer het aandeel woningen met eigendom onbekend 50 procent of minder bedroeg.

Bevolkingsdichtheid
Het (niet afgeronde) aantal inwoners per km² land is bepaald door het (niet afgeronde) aantal inwoners op 1 januari te delen door de (niet afgeronde) landoppervlakte.
De bevolkingsdichtheid is opgenomen indien er 10 of meer inwoners in de buurt voorkomen.

Bouwjaar vanaf 2000
Peildatum: 1 januari van het desbetreffende jaar.
Het aantal woningen met bouwjaar 2000 of later, uitgedrukt in hele procenten van het totaal aantal woningen. Het percentage is vermeld bij 20 woningen of meer per buurt.

Koopwoningen
Woningen die eigendom zijn van de (toekomstige) bewoner(s) of in gebruik als tweede woning.
Peildatum: 1 januari van het desbetreffende jaar.
Het aantal is vermeld als percentage van het totaal aantal woningen en vermeld bij 20 woningen of meer per buurt en wanneer het aandeel woningen met eigendom onbekend 50 procent of minder bedroeg.

Appendix IV Classification of the neighbourhoods

Figure 5.1

0= city	72= Koekoeksbeekhoek
1= Lasonder-Zeggelt	73= Kennispark
2= Laares	80= Glanerveld
3= De Bothoven	81= Bentveld-Bultserve
4= Hogeland-Noord	82= Schipholt-Glanermaten
5= Getfert	83= Eekmaat
6= Veldkamp Getfert-West	84= Oikos
7= Horstlanden-Stadsweide	85= Eilermarke
8= Boddenkamp	86= De Slank
10= Velve-Lindenhof	87= Dolphia
11= Wooldrik	88= Eekmaat
12= Hogeland-Zuid	90= Dorp Lonneker
13= Varvik-Diekman	91= Dorp Boekelo
14= Sleutelkamp	92= Buurtschap Lonneker-West
15= 'T Weldink	93= Buurtschap Noord-Esmarke
16= De Leuriks	94= Buurtschap Zuid-Esmarke
20= Cromhoffsbleek-Kotman	95= Buurtschap Broekheurne
21= Boswinkel-De Braker	96= Buurtschap Usselo
22= Pathmos	97= Buurtschap Goorseveld
23= Stevenfenne	98= Buutschap Twekkelo
24= Stadsveld-Zuid	
25= Elferink-Heuwkamp	
26= Stadsveld-Noord Bruggert	
27= Zwering	
28= Ruwenbos	
30= Tubantia-Toekomst	
31= Twekkelerveld	
40= Walhof-Roessingh	
41= Bolhaar	
42= Roombeek-Roomveldje	
43= Mekkelholt	
44= Deppenbroek	
45 Voortman-Amelink	
46= Drienerveld-UT	
50= Scheurserve	
51=Ribbelt-Ribbelerbrink	
52= Park Stokhorst	
53= Stokhorst	
60= Stroinkslanden N.O.	
61= Stroinkslanden-Zuid	
62= Stroinkslanden N.W.	
63= Wesselerbrink N.O.	
64= Wesselerbrink Z.O.	
65= Wesselerbrink Z.W.	
66= Wesselerbrink N.W.	
67= Helmerhoek-Noord	
68= Helmerhoek-Zuid	
69= Het Brunink	
70= Industrie- en Havengebied	
71= Marssteden	

figure 5.2

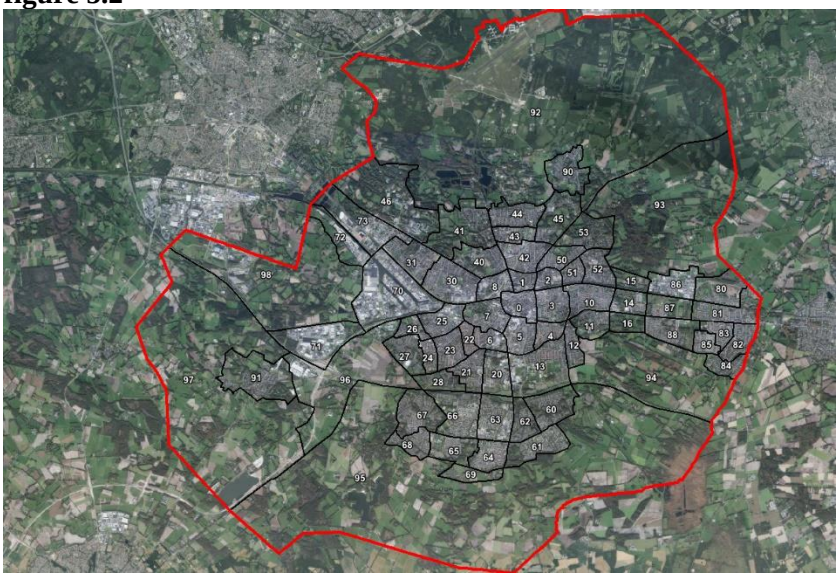


Figure 5.3 discovered hemp plantations between the period 2015-2017

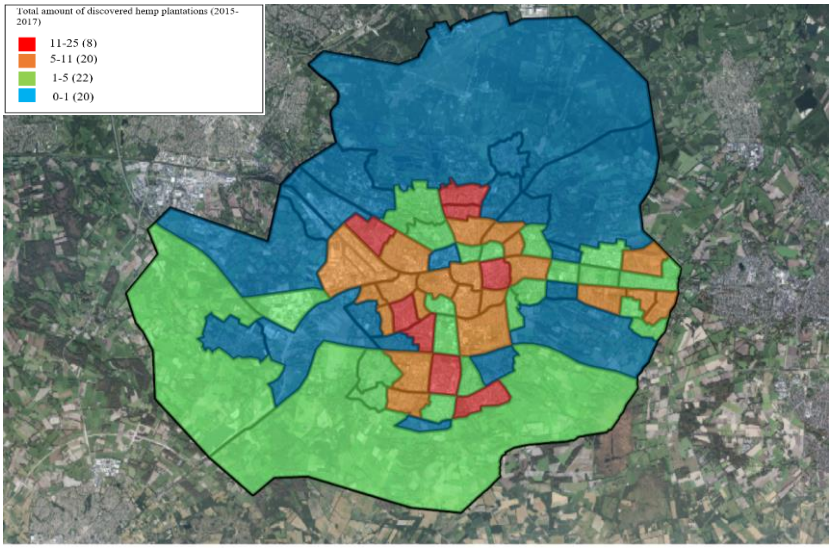
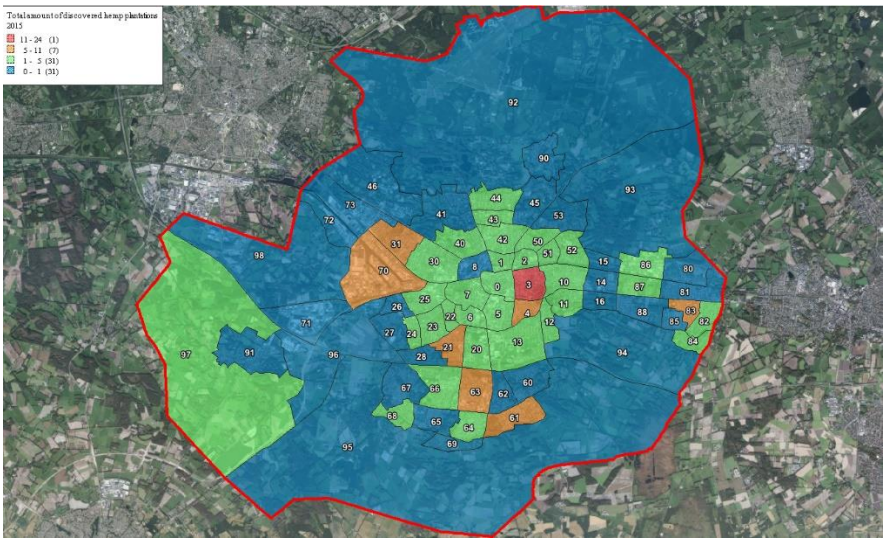
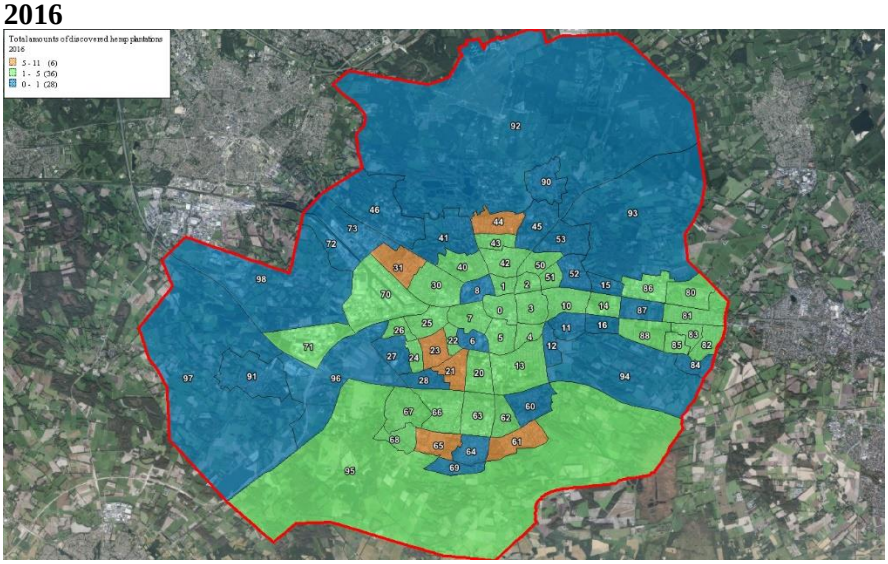


Figure 5.4 Hemp plantations throughout the years

2015



2016



2017

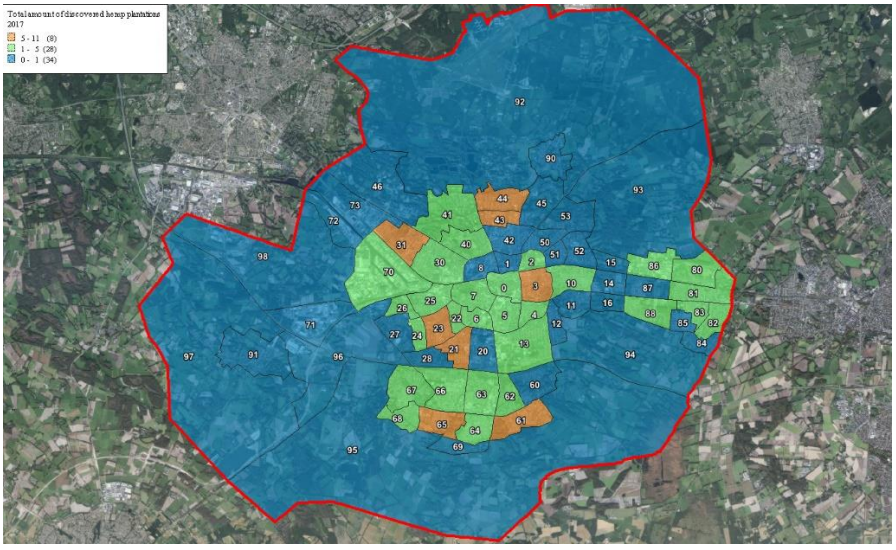
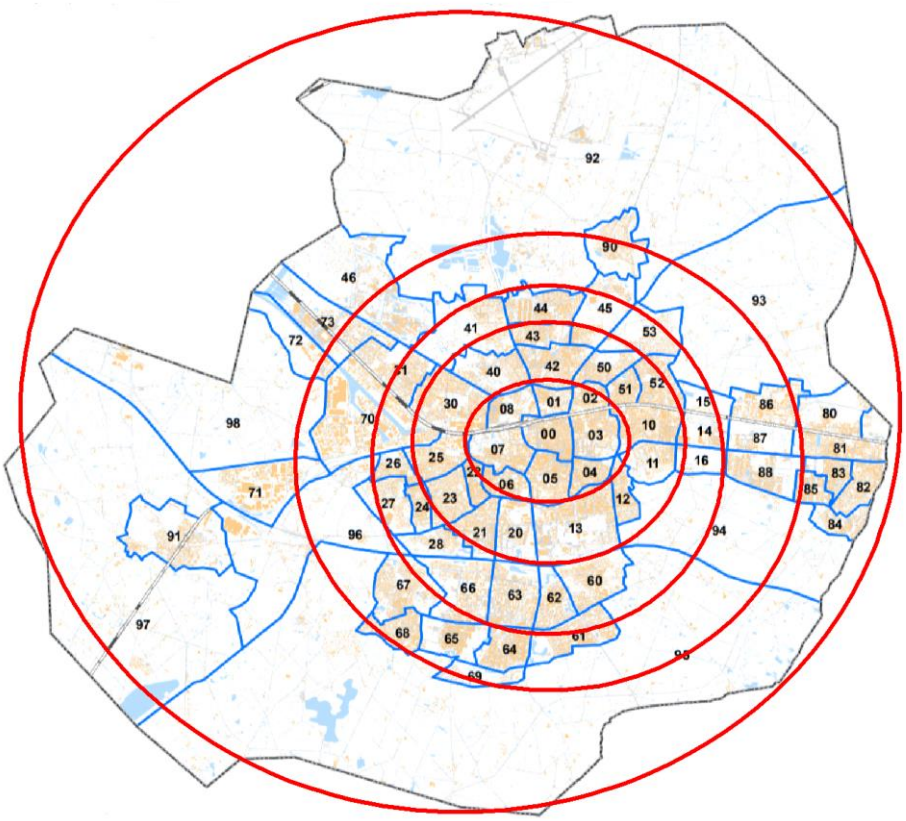


Figure 5.5



Classification of the concentric zones

Zone	Neighbourhood numbers
I	00,01,02,03,04,05,06,07,08
II	10,11,12,13,20,21,22,23,25,30,40,42,43,50,51,52
III	14, 15,16, 24, 26,27, 28, 41, 44, 45,53,60,62,63,66
IV	31,61, 64, 65, 68, 69, 67,70,86,87,88,90,94,96
V	46, 71, 72, 73, 80, 81, 82,83,84,85,91,92,93,95,97,98

Figure 5.6

concentric zones of Burgess

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Zone I	9	12,9	12,9	12,9
	Zone II	16	22,9	22,9	35,7
	Zone III	15	21,4	21,4	57,1
	Zone IV	14	20,0	20,0	77,1
	Zone V	16	22,9	22,9	100,0
	Total	70	100,0	100,0	

Appendix V SPSS Syntax

Descriptive statistics neighbourhood characteristics

```
DATASET ACTIVATE DataSet1.
DESCRIPTIVES VARIABLES=sum_plant uitkering_tot a_soz_ao a_soz_ww a_soz_wb
totaal_rel_perc_mi_achtg gem_ink_inw bvdh_pkm2 perc_huurwon_tot
perc_voor_2000 perc_onbwnd gem_wd_koop perc_koop
    vrn_msdr_oo_in1000 tot_dfst_in1000
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Correlation syntax

```
DATASET NAME DataSet1 WINDOW=FRONT.
CORRELATIONS
  /VARIABLES=sum_plant perc_koop gem_ink_inw_100 gem_wd_koop_100
perc_onbwnd_100 bvdh_pkm2_100
    rel_soz_ww_100 tot_dfst_in1000_100 perc_voor_2000
vrn_msdr_oo_in1000_100 perc_huurwon_tot
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Constructing total social payments variable

```
DATASET ACTIVATE DataSet1.
COMPUTE a_soz_tot=(a_soz_ao+a_soz_ww+a_soz_wb)
EXECUTE.
```

Comstructing the hemp plantations as relative variable

```
DATASET ACTIVATE DataSet1.
COMPUTE
```

Relative amount of social payments

```
DATASET ACTIVATE DataSet1.
COMPUTE rel_soz_tot=(a_soz_tot/aant_inw)
EXECUTE.
COMPUTE rel_soz_ao=(a_soz_ao/aant_inw)
EXECUTE.
COMPUTE rel_soz_ww=(a_soz_ww/aant_inw)
EXECUTE.
COMPUTE rel_soz_wb=(a_soz_wb/aant_inw)
EXECUTE.
```

Constructing the variabels in uniform manner

```
DATASET ACTIVATE DataSet1.
COMPUTE rel_soz_tot_niet_100=(100-rel_soz_tot).
EXECUTE.
COMPUTE rel_soz_ao_niet_100=(100-rel_soz_ao-100).
EXECUTE.
COMPUTE rel_soz_wb_niet_100=(100-rel_soz_wb).
EXECUTE.
COMPUTE rel_soz_ao_niet_100=(100-rel_soz_wb).
EXECUTE.
COMPUTE totaal_niet_rel_perc_mi_achtg=( 100-totaal_rel_perc_mi_achtg).
```

Standardizing the variables

```
DATASET ACTIVATE DataSet1.
COMPUTE rel_soz_ao_niet_100=(rel_soz_ao*100).
EXECUTE.
COMPUTE rel_soz_wb_niet_100=(rel_soz_wb*100).
EXECUTE.
COMPUTE rel_soz_ao_niet_100=(rel_soz_wb *100).
```

```
EXECUTE.
COMPUTE gem_ink_inw_100=(gem_ink_inw/500).
EXECUTE.
COMPUTE gem_wd_koop_100=(gem_wd_koop/5000).
EXECUTE.
COMPUTE bvdh_pkm2_100=bvdh_pkm2/100.
EXECUTE.
```

Principal Component Analysis

```
FACTOR
  /VARIABLES totaal_rel_perc_mi_achtg gem_ink_inw rel_soz_tot rel_soz_ao
rel_soz_ww rel_soz_wb gem_wd_koop bvdh_pkm2 perc_huurwon_tot perc_voor_2000
perc_koop perc_onbwnd tot_dfst_in1000 vrn_msdr_oo_in1000
  /MISSING LISTWISE
  /ANALYSIS totaal_rel_perc_mi_achtg gem_ink_inw rel_soz_tot rel_soz_ao
rel_soz_ww rel_soz_wb gem_wd_koop bvdh_pkm2 perc_huurwon_tot perc_voor_2000
perc_koop perc_onbwnd tot_dfst_in1000 vrn_msdr_oo_in1000
  /PRINT INITIAL CORRELATION EXTRACTION ROTATION
  /FORMAT SORT
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

Constructing the 4 dimensions as new variables

```
COMPUTE Component_SES=MEAN (perc_huur_niet, rel_soz_wb_niet_100,
rel_soz_tot_niet_100,totaal_niet_rel_perc_mi_achtg, rel_soz_ao_niet_100,
perc_koop, gem_ink_inw_100, gem_wd_koop_100).
EXECUTE.

COMPUTE Component_Less_Social_Control=MEAN(perc_onbwnd, bvdh_pkm2_100).
EXECUTE.

COMPUTE Component_Poorer_Neighbourhoods=MEAN(vrn_msdr_oo_in1000,
rel_soz_ww_100).
EXECUTE.

COMPUTE Component_Older_Criminal_Neighbourhoods=MEAN(tot_dfst_in1000,
perc_voor_2000).
EXECUTE.
```

Multiple Regression

```
DATASET ACTIVATE DataSet1.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT plant_rel_standardized
  /METHOD=ENTER Component_Social_Control_Standardized
    Component_Older_Criminal_Neighbourhoods_Standardized
Component_Poor_Neighbourhoods_Standardized
    Standardized_SES.
```

Multicollinearity

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
```

```
  /NOORIGIN
  /DEPENDENT sum_plant
  /METHOD=ENTER Component_Social_Control_Standardized
    Component_Older_Criminal_Neighbourhoods_Standardized
Component_Poor_Neighbourhoods_Standardized
    Standardized_SES.
```

Appendix VI hemp plantation information

Table 7.1

Jaar	Percentage
2015	35,03%
2016	33,23%
2017	31,74%

Appendix VII SPSS Factor analysis output

Table 8.1 Correlation Matrix

Correlation Matrix

		percentage leegstand	relatief percentage personen met een migratieachtergrond	gemiddeld inkomen per inwoner per buurt	rel_soz_tot	rel_soz_ao	rel_soz_ww	rel_soz_wb	gemiddelde waarde koophuizen	bevolkingsdichtheid	percentage huurwoningen van het totaal aantal woningen	percentage woningen bouwjaar voor 2000	percentage koopwoningen	percentage onbewoonde panden	totaal aantal diefstallen uit woning, schuur, garage per 1000 inwoners	v mi o ord
Correlation	percentage leegstand	1,000	-,267	,103	-,104	-,026	-,132	-,128	,319	-,464	-,038	,121	-,007	,971	,230	
	relatief percentage personen met een migratieachtergrond	-,267	1,000	-,646	,624	,364	,157	,735	-,555	,580	,724	,050	-,726	-,261	,209	
	gemiddeld inkomen per inwoner per buurt	,103	-,646	1,000	-,636	-,450	-,176	-,674	,649	-,457	-,748	-,150	,743	,078	-,118	
	rel_soz_tot	-,104	,624	-,636	1,000	,842	,445	,900	-,647	,401	,667	,081	-,664	-,110	,142	
	rel_soz_ao	-,026	,364	-,450	,842	1,000	,165	,546	-,422	,233	,454	,079	-,454	-,029	,144	
	rel_soz_ww	-,132	,157	-,176	,445	,165	1,000	,397	-,437	,262	,106	-,107	-,088	-,152	-,196	
	rel_soz_wb	-,128	,735	-,674	,900	,546	,397	1,000	-,657	,435	,741	,097	-,741	-,132	,167	
	gemiddelde waarde koophuizen	,319	-,555	,649	-,647	-,422	-,437	-,657	1,000	-,678	-,528	-,165	,520	,355	-,225	
	bevolkingsdichtheid	-,464	,580	-,457	,401	,233	,262	,435	-,678	1,000	,395	-,027	-,385	-,474	,127	
	percentage huurwoningen van het totaal aantal woningen	-,038	,724	-,748	,667	,454	,106	,741	-,528	,395	1,000	,049	-,992	,009	,324	
	percentage woningen bouwjaar voor 2000	,121	,050	-,150	,081	,079	-,107	,097	-,165	-,027	,049	1,000	-,052	,116	,169	
	percentage koopwoningen	-,007	-,726	,743	-,664	-,454	-,088	-,741	,520	-,385	-,992	-,052	1,000	-,057	-,358	
	percentage onbewoonde panden	,971	-,261	,078	-,110	-,029	-,152	-,132	,355	-,474	,009	,116	-,057	1,000	,236	
	totaal aantal diefstallen uit woning, schuur, garage per 1000 inwoners	,230	,209	-,118	,142	,144	-,196	,167	-,225	,127	,324	,169	-,358	,236	1,000	
	vernieling, misdrijf tegen openbare orde per 1000 inwoners	,341	,126	-,246	,283	,132	,295	,310	-,273	,009	,284	,132	-,303	,350	,340	

Table 8.2 communalities

Communalities

	Initial	Extraction
perc_huur_niet	1,000	,888
rel_soz_wb_niet_100	1,000	,841
rel_soz_tot_niet_100	1,000	,898
totaal_niet_rel_perc_mi_achtg	1,000	,758
rel_soz_ao_niet_100	1,000	,543
percentage koopwoningen	1,000	,905
gem_ink_inw_100	1,000	,691
gem_wd_koop_100	1,000	,844
perc_onbwnd_100	1,000	,792
bvdh_pkm2_100	1,000	,755
rel_soz_ww_100	1,000	,834
tot_dfst_in1000_100	1,000	,619
percentage woningen bouwjaar voor 2000	1,000	,439
vrn_msdr_oo_in1000_100	1,000	,732

Extraction Method: Principal Component Analysis.

Table 8.3 Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6,207	44,334	44,334	6,207	44,334	44,334
2	1,929	13,778	58,112	1,929	13,778	58,112
3	1,326	9,470	67,581	1,326	9,470	67,581
4	1,078	7,699	75,280	1,078	7,699	75,280
5	,984	7,026	82,306			
6	,764	5,454	87,760			
7	,444	3,169	90,929			
8	,379	2,708	93,637			
9	,327	2,339	95,976			
10	,235	1,679	97,655			
11	,187	1,336	98,991			
12	,136	,969	99,959			
13	,006	,041	100,000			
14	6,939E-17	4,956E-16	100,000			

Extraction Method: Principal Component Analysis.

Table 8.4 Principal Component Matrix

Component Matrix[a]

	Component			
	1	2	3	4
perc_huur_niet	,865	-,226	,229	,193
rel_soz_wb_niet_100	,902	,014	-,133	,100
rel_soz_tot_niet_100	,886	,028	-,269	,201
totaal_niet_rel_perc_mi_achtg	,813	,114	,288	,030
rel_soz_ao_niet_100	,639	-,053	-,178	,317
percentage koopwoningen	,862	-,268	,231	,190
gem_ink_inw_100	,822	-,037	,113	,041
gem_wd_koop_100	,794	,245	-,085	-,383
perc_onbwnd_100	,168	,825	,225	-,179
bvdh_pkm2_100	-,608	-,475	-,216	,337
rel_soz_ww_100	-,358	-,345	,756	,124
tot_dfst_in1000_100	-,290	,570	-,279	,364
percentage woningen bouwjaar voor 2000	-,117	,318	-,069	,565
vrn_msdr_oo_in1000_100	-,348	,524	,494	,303

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Table 8.5 Rotated Component Matrix

Rotated Component Matrix[a]

	Component			
	1	2	3	4
perc_huur_niet	,921	,057	-,066	-,178
rel_soz_wb_niet_100	,830	,178	,340	-,072
rel_soz_tot_niet_100	,833	,094	,442	,036
totaal_niet_rel_perc_mi_achtg	,764	,401	-,041	-,107
rel_soz_ao_niet_100	,679	-,062	,255	,116
percentage koopwoningen	,926	,026	-,075	-,204
gem_ink_inw_100	,778	,223	,095	-,165
gem_wd_koop_100	,520	,560	,411	-,302
perc_onbwnd_100	-,024	,846	,016	,274
bvdh_pkm2_100	-,371	-,766	-,113	,136
rel_soz_ww_100	-,115	-,177	-,879	-,131
tot_dfst_in1000_100	-,260	,107	,202	,707
percentage woningen bouwjaar voor 2000	,042	-,062	-,034	,657
vrn_msdr_oo_in1000_100	-,222	,337	-,523	,543

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 8.6 Component Transformation Matrix

Component Transformation Matrix

Component	1	2	3	4
1	,902	,283	,261	-,195
2	-,170	,780	,172	,577
3	,136	,330	-,925	-,130
4	,373	-,450	-,215	,782

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 8.7 correlations

Correlations

		totale som van het aantal plantages per buurt	percentage koopwoningen	gem_ink_inw_100	gem_wd_koop_100	perc_onbwnd_100	bvdh_pkm2_100	rel_soz_ww_100	tot_dfst_in1000_100	percentage woningen bouwjaar voor 2000	vrn_msdr_oo_in1000_100	percentage huurwoningen van het totaal aantal woningen
totale som van het aantal plantages per buurt	Pearson Correlation	1	-,443**	-,471**	-,531**	-,159	,558**	,249*	,232	,160	,263*	,450**
	Sig. (2-tailed)		,000	,000	,000	,198	,000	,044	,059	,195	,032	,000
	N	70	67	65	64	67	69	66	67	67	67	68
percentage koopwoningen	Pearson Correlation	-,443**	1	,738**	,520**	-,059	-,405**	-,165	-,323**	-,099	-,313**	-,992**
	Sig. (2-tailed)	,000		,000	,000	,634	,001	,185	,008	,426	,010	,000
	N	67	67	65	64	67	67	66	67	67	67	67
gem_ink_inw_100	Pearson Correlation	-,471**	,738**	1	,649**	,078	-,451**	-,171	-,112	-,150	-,246*	-,741**
	Sig. (2-tailed)	,000	,000		,000	,537	,000	,174	,375	,233	,048	,000
	N	65	65	65	64	65	65	65	65	65	65	65
gem_wd_koop_100	Pearson Correlation	-,531**	,520**	,649**	1	,355**	-,678**	-,437**	-,225	-,165	-,273*	-,528**
	Sig. (2-tailed)	,000	,000	,000		,004	,000	,000	,074	,193	,029	,000
	N	64	64	64	64	64	64	64	64	64	64	64
perc_onbwnd_100	Pearson Correlation	-,159	-,059	,078	,355**	1	-,490**	-,164	,147	,129	,231	,010
	Sig. (2-tailed)	,198	,634	,537	,004		,000	,187	,235	,297	,060	,934
	N	67	67	65	64	67	67	66	67	67	67	67
bvdh_pkm2_100	Pearson Correlation	,558**	-,405**	-,451**	-,678**	-,490**	1	,330**	,131	,010	,060	,419**
	Sig. (2-tailed)	,000	,001	,000	,000	,000		,007	,292	,938	,632	,000
	N	69	67	65	64	67	69	66	67	67	67	67
rel_soz_ww_100	Pearson Correlation	,249*	-,165	-,171	-,437**	-,164	,330**	1	-,194	-,029	,311*	,186
	Sig. (2-tailed)	,044	,185	,174	,000	,187	,007		,119	,818	,011	,134
	N	66	66	65	64	66	66	66	66	66	66	66
tot_dfst_in1000_100	Pearson Correlation	,232	-,323**	-,112	-,225	,147	,131	-,194	1	,187	,357**	,287*
	Sig. (2-tailed)	,059	,008	,375	,074	,235	,292	,119		,129	,003	,018
	N	67	67	65	64	67	67	66	67	67	67	67
percentage woningen bouwjaar voor 2000	Pearson Correlation	,160	-,099	-,150	-,165	,129	,010	-,029	,187	1	,154	,094
	Sig. (2-tailed)	,195	,426	,233	,193	,297	,938	,818	,129		,212	,450
	N	67	67	65	64	67	67	66	67	67	67	67
vrn_msdr_oo_in1000_100	Pearson Correlation	,263*	-,313**	-,246*	-,273*	,231	,060	,311*	,357**	,154	1	,296*
	Sig. (2-tailed)	,032	,010	,048	,029	,060	,632	,011	,003	,212		,015
	N	67	67	65	64	67	67	66	67	67	67	67
percentage huurwoningen van het totaal aantal woningen	Pearson Correlation	,450**	-,992**	-,741**	-,528**	,010	,419**	,186	,287*	,094	,296*	1
	Sig. (2-tailed)	,000	,000	,000	,000	,934	,000	,134	,018	,450	,015	
	N	68	67	65	64	67	67	66	67	67	67	68

**. Correlation is significant at the 0.01 level (2-tailed).

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

Table 8.8 Correlations of components and hemp plantations

Correlations

		Component_Social_Control_Standardized	Component_Older_Criminal_Neighbourhoods_Standardized	Component_Poor_Neighbourhoods_Standardized	Component_SES_Standardized	totale som van het aantal plantages per buurt
Component_Social_Control_Standardized	Pearson Correlation	1	,097	,221	-,651**	,549**
	Sig. (2-tailed)		,436	,073	,000	,000
	N	69	67	67	69	69
Component_Older_Criminal_Neighbourhoods_Standardized	Pearson Correlation	,097	1	,171	-,202	,186
	Sig. (2-tailed)	,436		,168	,102	,133
	N	67	67	67	67	67
Component_Poor_Neighbourhoods_Standardized	Pearson Correlation	,221	,171	1	-,342**	,290*
	Sig. (2-tailed)	,073	,168		,005	,017
	N	67	67	67	67	67
Component_SES_Standardized	Pearson Correlation	-,651**	-,202	-,342**	1	-,546**
	Sig. (2-tailed)	,000	,102	,005		,000
	N	69	67	67	70	70
totale som van het aantal plantages per buurt	Pearson Correlation	,549**	,186	,290*	-,546**	1
	Sig. (2-tailed)	,000	,133	,017	,000	
	N	69	67	67	70	70

**. Correlation is significant at the 0.01 level (2-tailed).

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

Table 8.9 Multicollinearity

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Standardized_SES, Component_Older_Criminal_Neighbourhoods_Standardized, Component_Poor_Neighbourhoods_Standardized, Component_Social_Control_Standardized[b]	.	Enter

a. Dependent Variable: totale som van het aantal plantages per buurt

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,627[a]	,393	,354	4,823

a. Predictors: (Constant), Standardized_SES, Component_Older_Criminal_Neighbourhoods_Standardized, Component_Poor_Neighbourhoods_Standardized, Component_Social_Control_Standardized

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	935,558	4	233,889	10,055	,000[b]
	Residual	1442,204	62	23,261		
	Total	2377,761	66			

a. Dependent Variable: totale som van het aantal plantages per buurt

b. Predictors: (Constant), Standardized_SES, Component_Older_Criminal_Neighbourhoods_Standardized, Component_Poor_Neighbourhoods_Standardized, Component_Social_Control_Standardized

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	9,722	6,779		1,434	,157		
	Component_Social_Control_Standardized	,105	,039	,332	2,705	,009	,651	1,537
	Component_Older_Criminal_Neighbourhoods_Standardized	,025	,034	,076	,744	,460	,948	1,055
	Component_Poor_Neighbourhoods_Standardized	,044	,049	,095	,894	,375	,866	1,155
	Standardized_SES	-,170	,071	-,310	-2,404	,019	,588	1,699

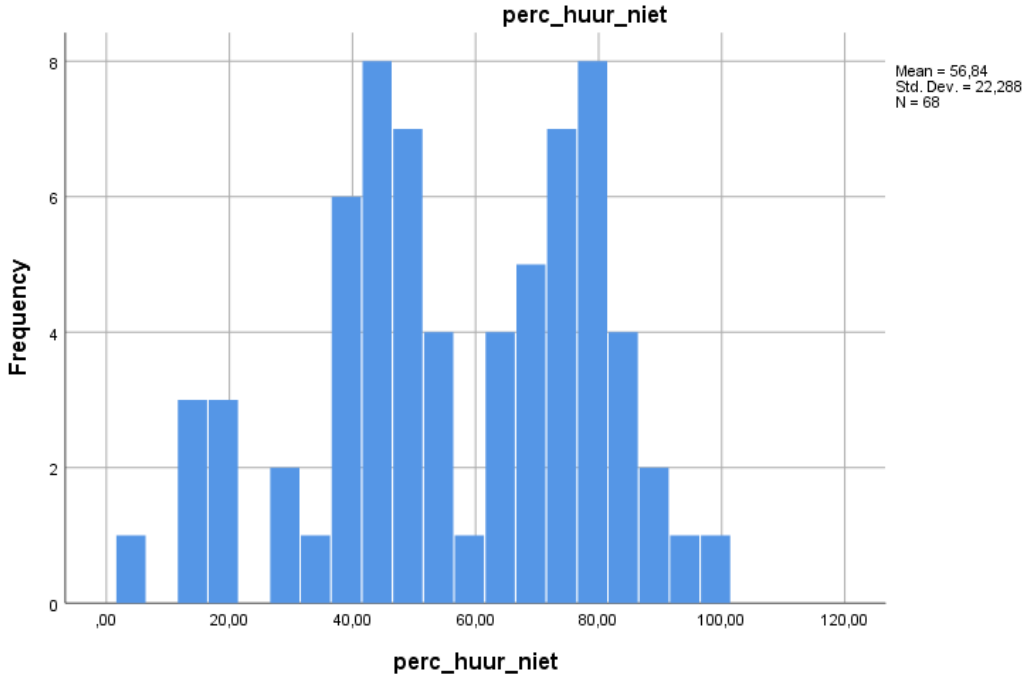
a. Dependent Variable: totale som van het aantal plantages per buurt

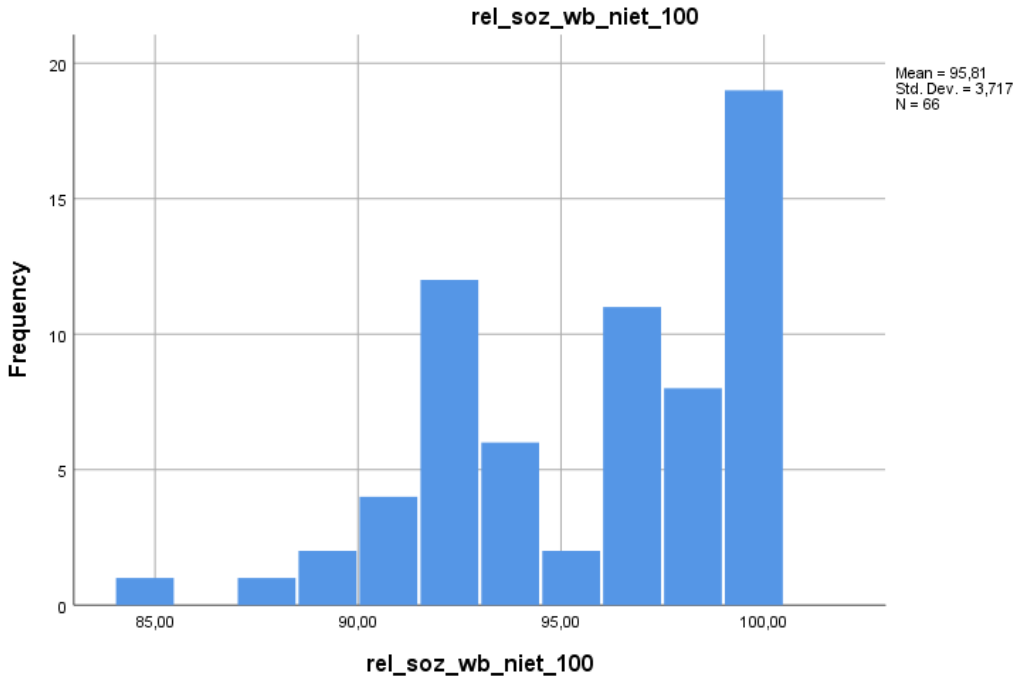
Collinearity Diagnostics[a]

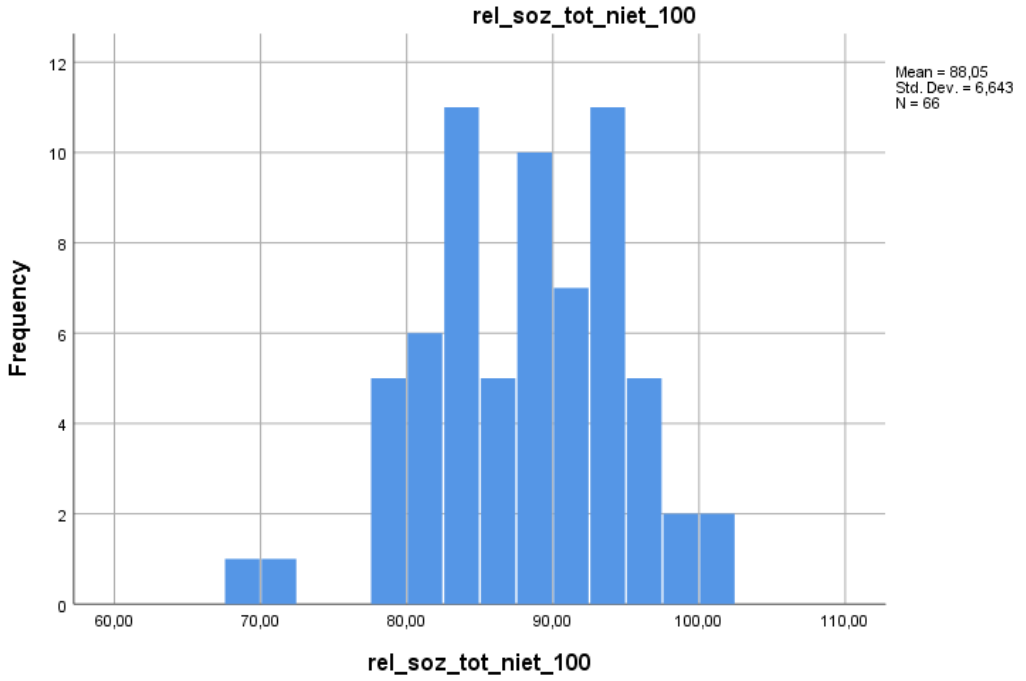
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	Component_ Social_Control_Standardized	Component_ Older_Criminal_Neighbourhoods_Standardized	Component_ Poor_Neighbourhoods_Standardized	Standardized_SES
1	1	4,518	1,000	,00	,00	,00	,01	,00
	2	,273	4,069	,00	,00	,01	,81	,01
	3	,149	5,503	,00	,57	,01	,08	,01
	4	,055	9,033	,01	,02	,86	,03	,05
	5	,005	30,114	,99	,41	,12	,07	,92

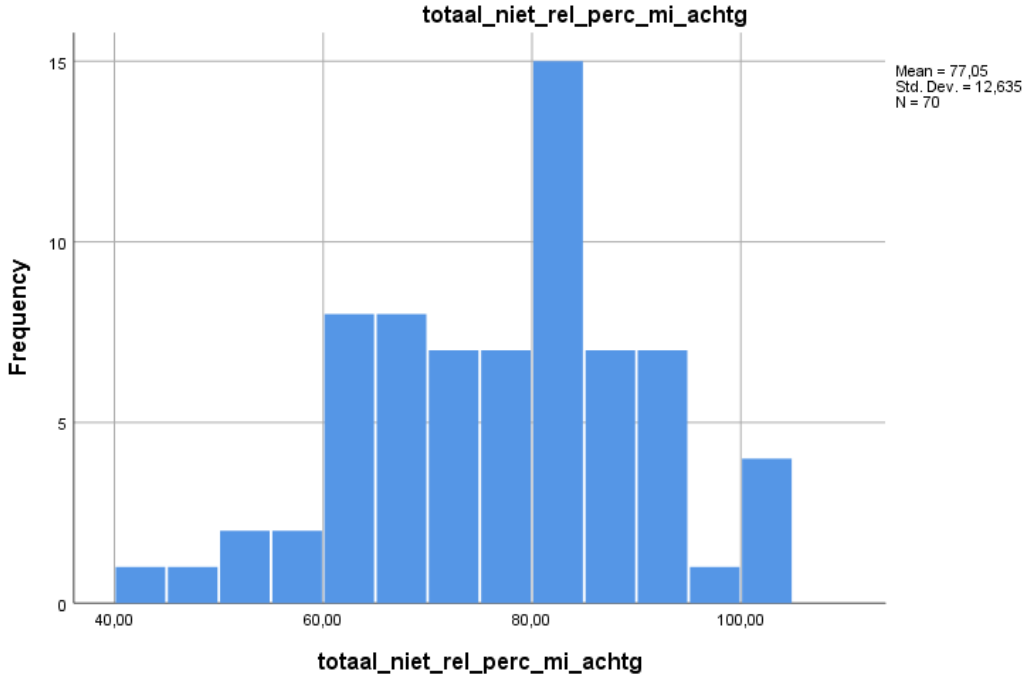
a. Dependent Variable: totale som van het aantal plantages per buurt

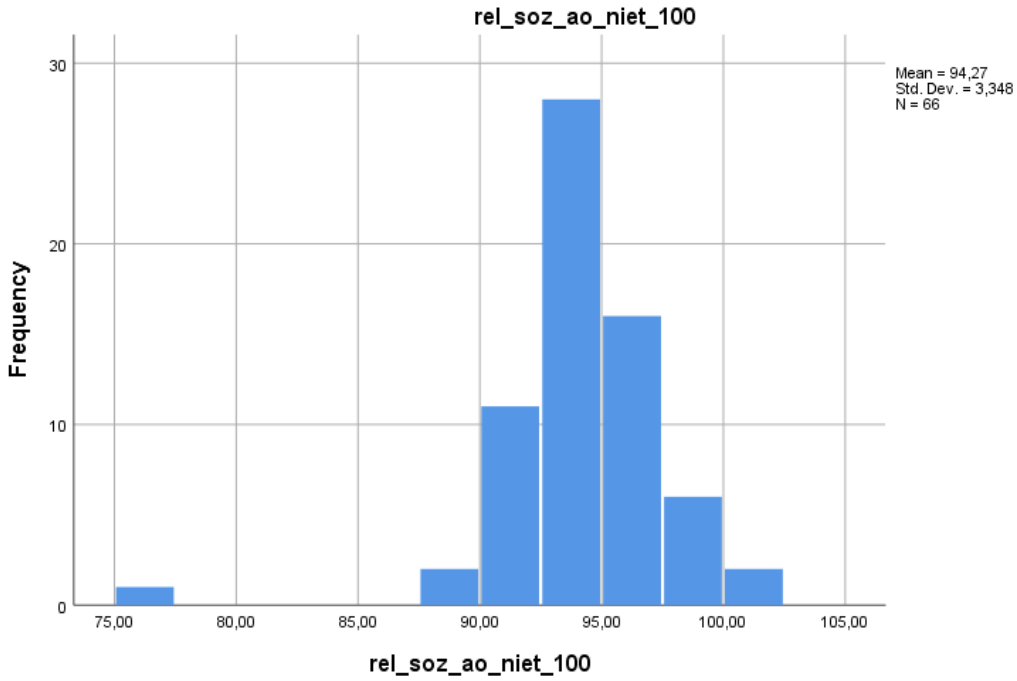
Appendix VIII frequencies
Histograms output

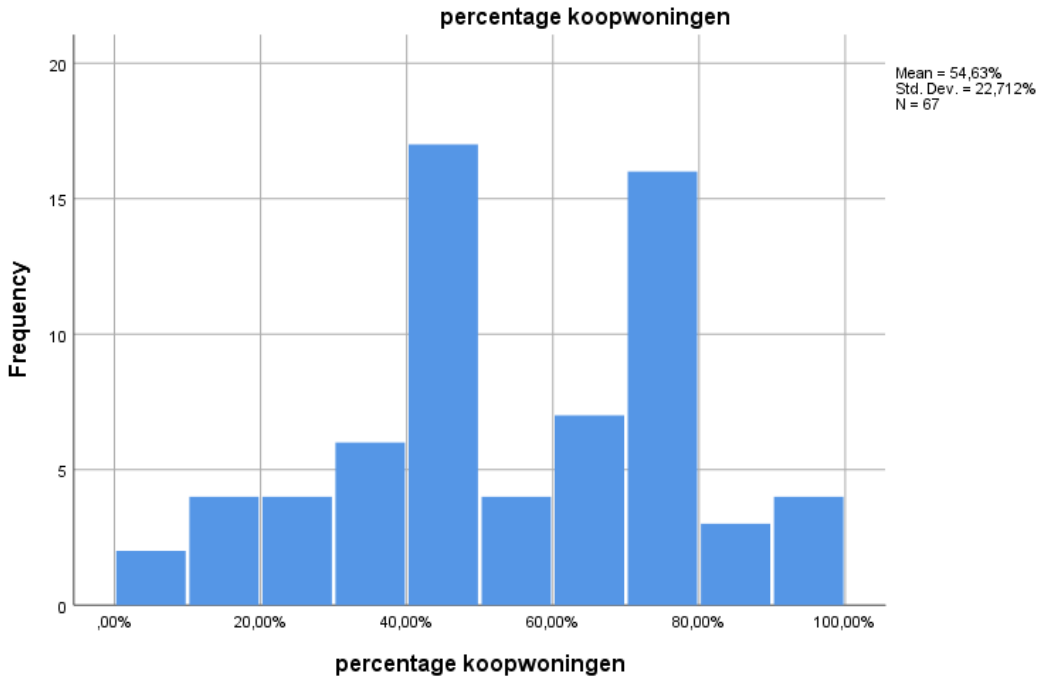


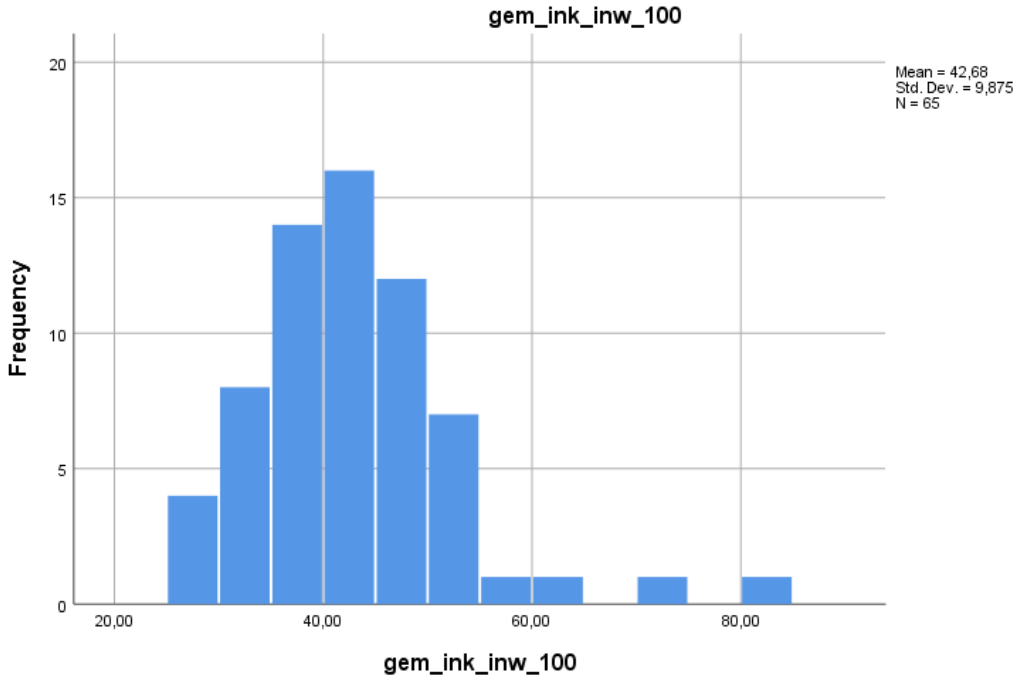


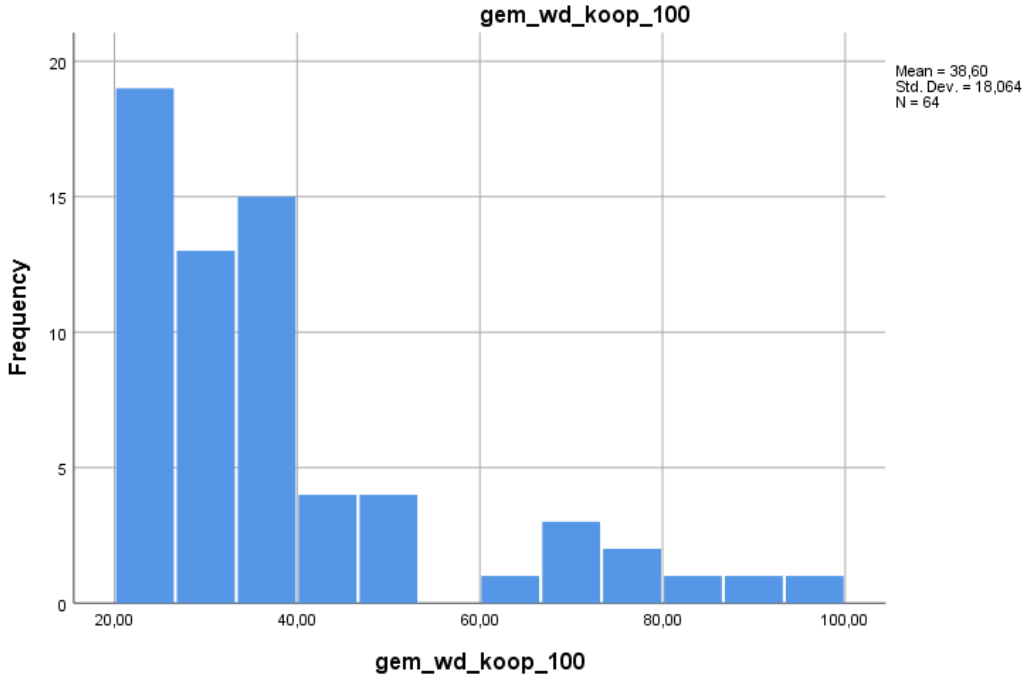

rel_soz_tot_niet_100
Mean = 88,05
Std. Dev. = 6,643
N = 66
Frequency
0
2
4
6
8
10
12
60,00
70,00
80,00
90,00
100,00
110,00
rel_soz_tot_niet_100

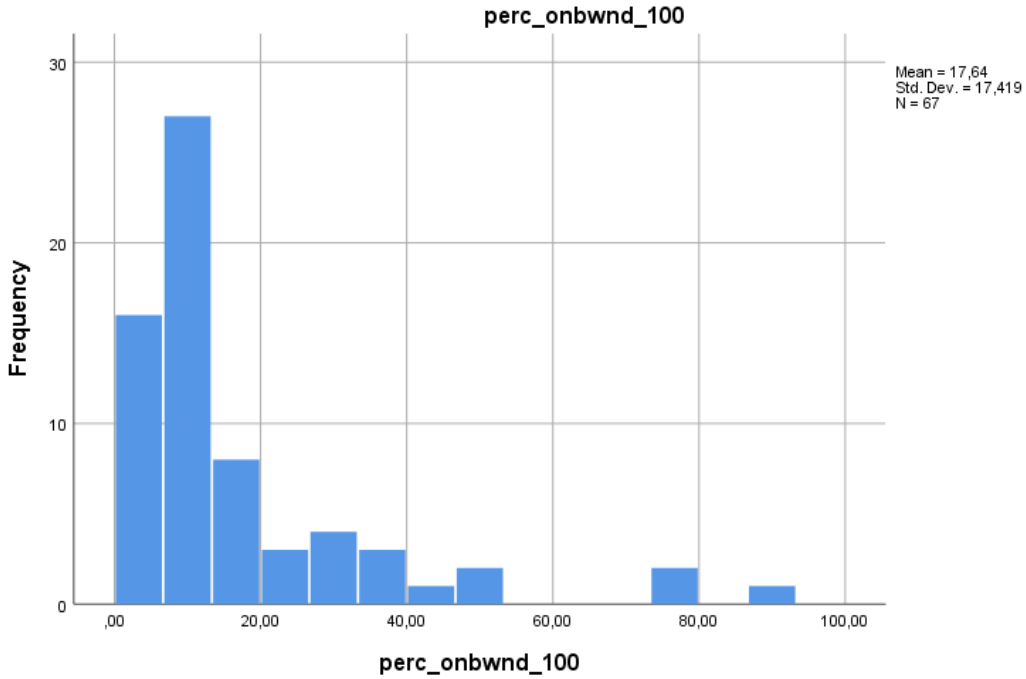

totaal_niet_rel_perc_mi_achtg
Mean = 77,05
Std. Dev. = 12,635
N = 70
Frequency
0
5
10
15
40,00
60,00
80,00
100,00
totaal_niet_rel_perc_mi_achtg

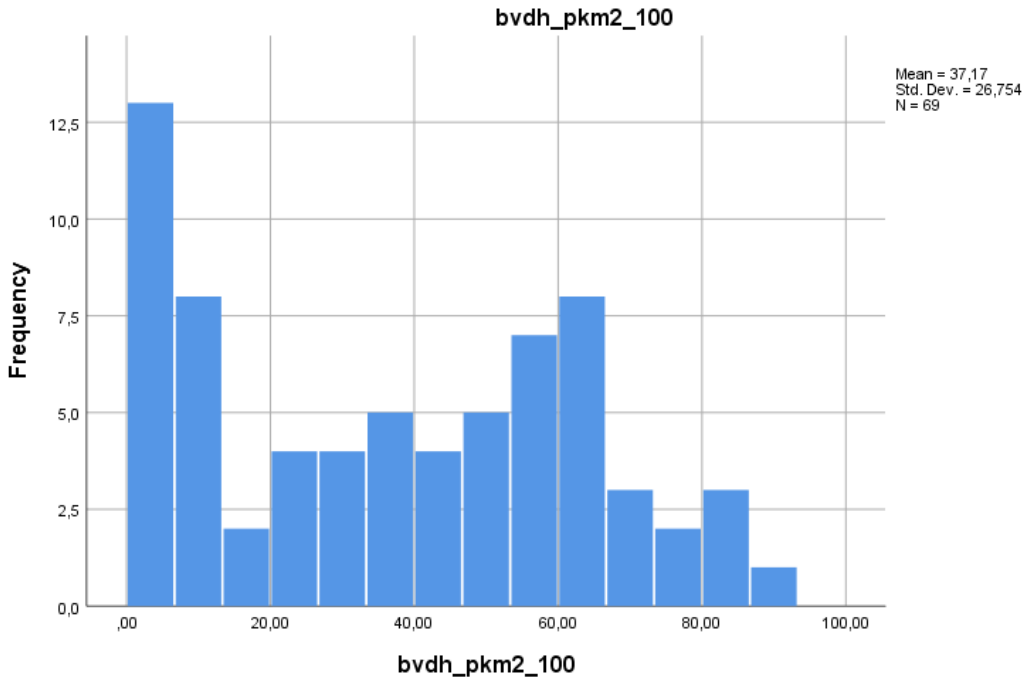
<

rel_soz_ao_niet_100
Mean = 94,27
Std. Dev. = 3,348
N = 66
Frequency
30
20
10
0
75,00
80,00
85,00
90,00
95,00
100,00
105,00
rel_soz_ao_niet_100

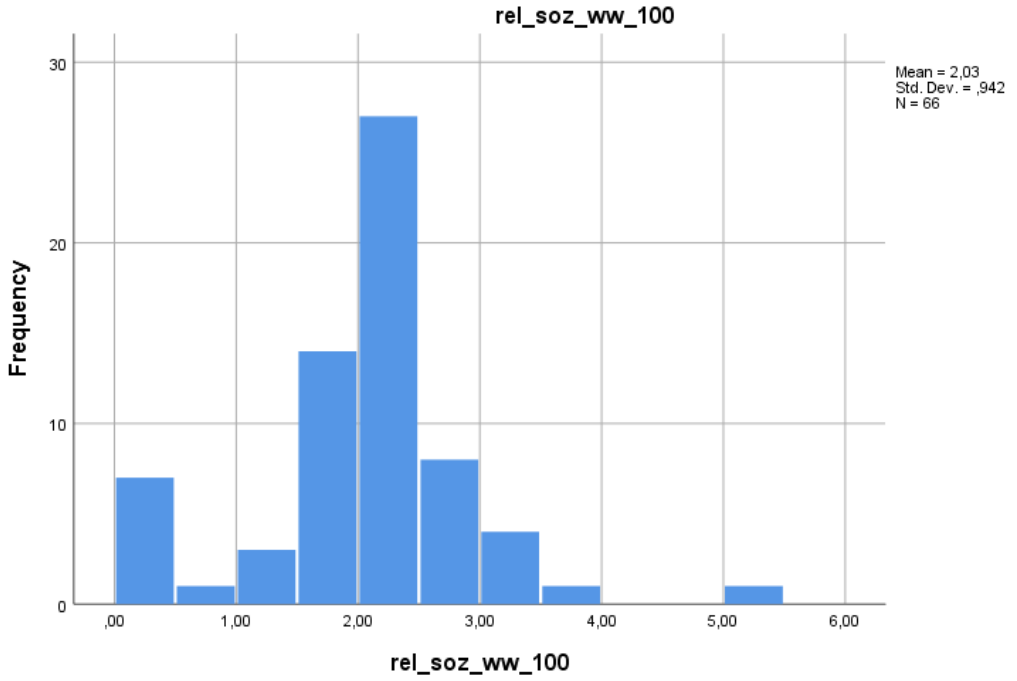

percentage koopwoningen
Mean = 54,63%
Std. Dev. = 22,712%
N = 67
Frequency
20
15
10
5
0
,00%
20,00%
40,00%
60,00%
80,00%
100,00%
percentage koopwoningen

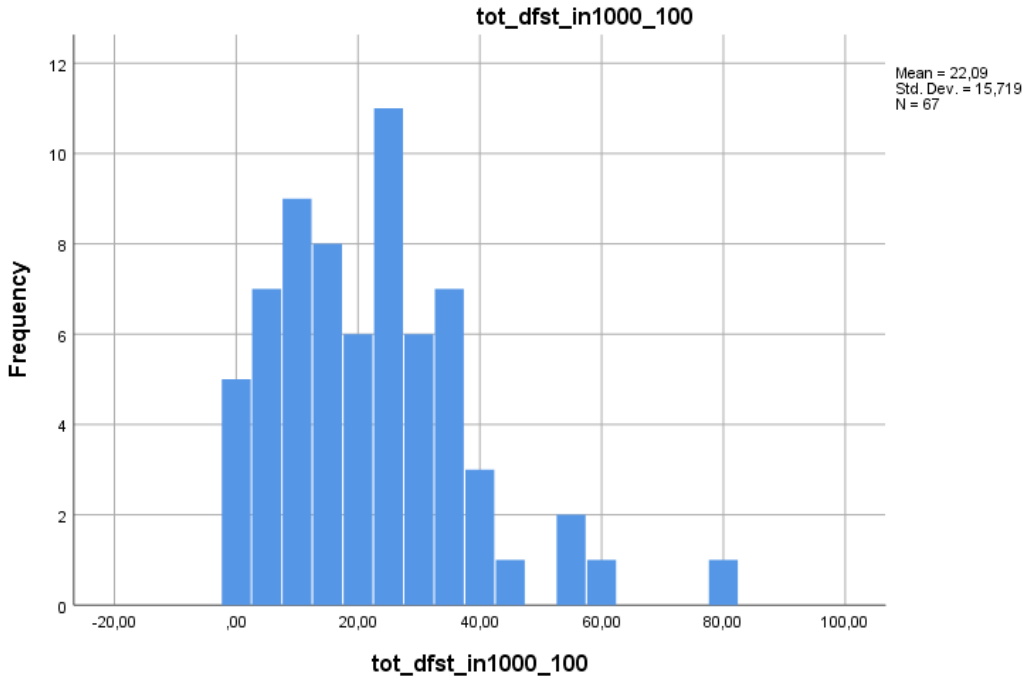

gem_ink_inw_100
Mean = 42,68
Std. Dev. = 9,875
N = 65
Frequency
20
15
10
5
0
20,00
40,00
60,00
80,00
gem_ink_inw_100

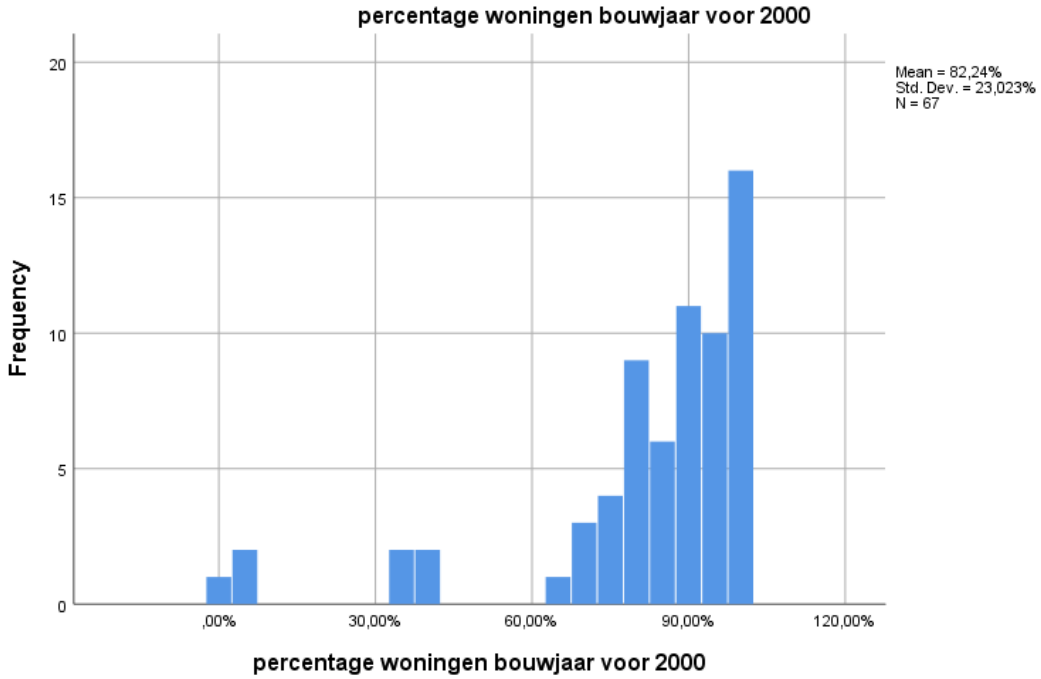

gem_wd_koop_100
Mean = 38,60
Std. Dev. = 18,064
N = 64
Frequency
20
15
10
5
0
20,00
40,00
60,00
80,00
100,00
gem_wd_koop_100

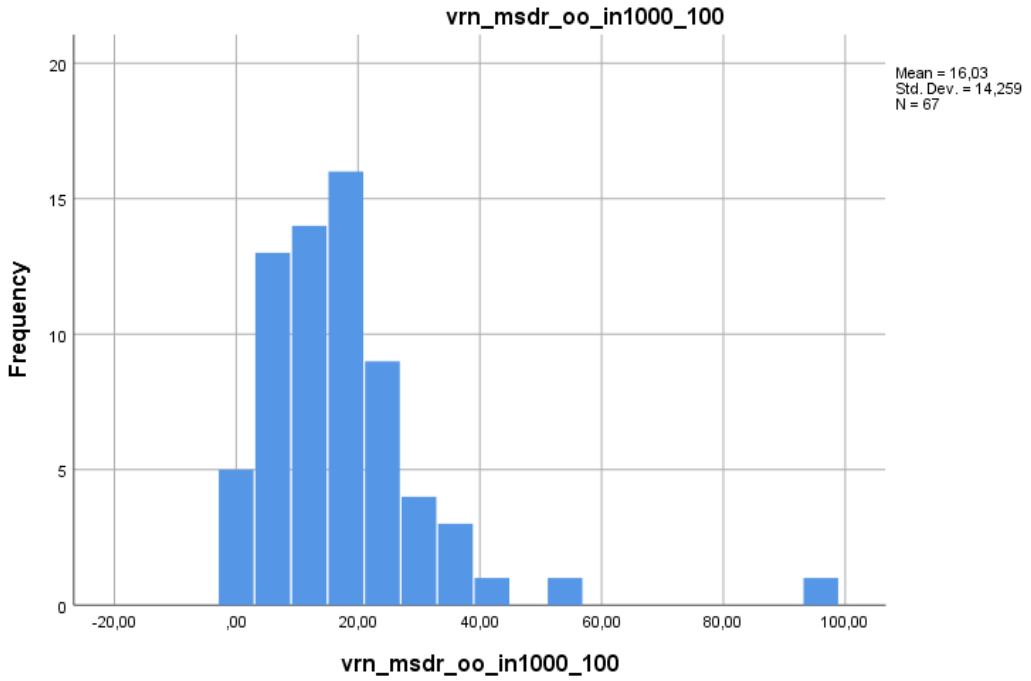

perc_onbwnd_100
Mean = 17,64
Std. Dev. = 17,419
N = 67
Frequency
30
20
10
0
,00
20,00
40,00
60,00
80,00
100,00
perc_onbwnd_100


bvdh_pkm2_100
Mean = 37,17
Std. Dev. = 26,754
N = 69
Frequency
12,5
10,0
7,5
5,0
2,5
0,0
,00
20,00
40,00
60,00
80,00
100,00
bvdh_pkm2_100

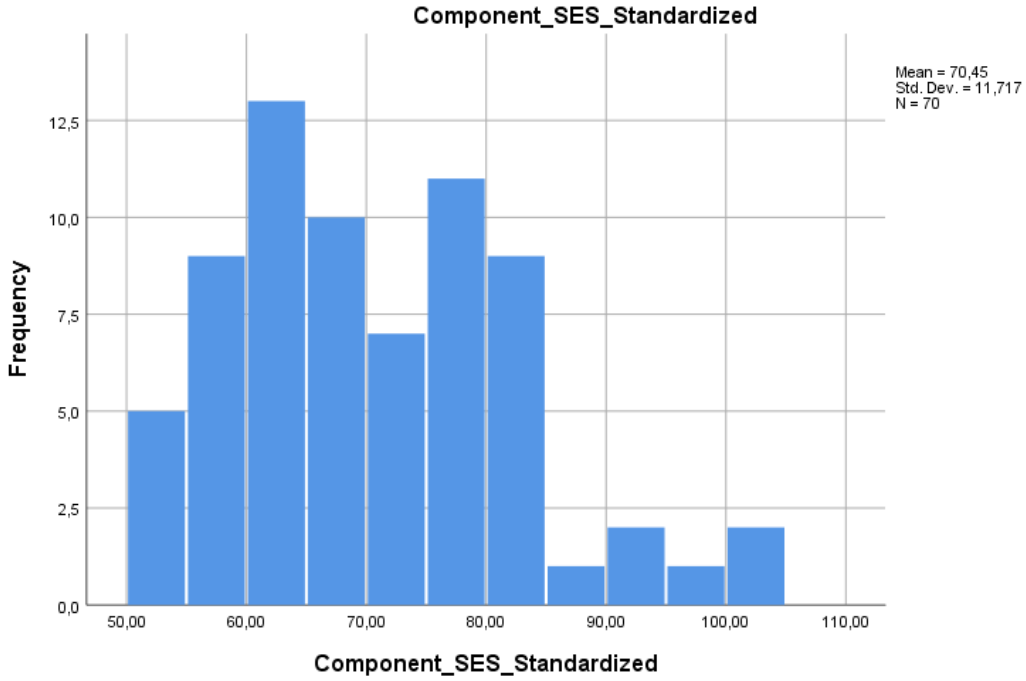

rel_soz_ww_100
Mean = 2,03
Std. Dev. = ,942
N = 66
Frequency
30
20
10
0
,00
1,00
2,00
3,00
4,00
5,00
6,00
rel_soz_ww_100

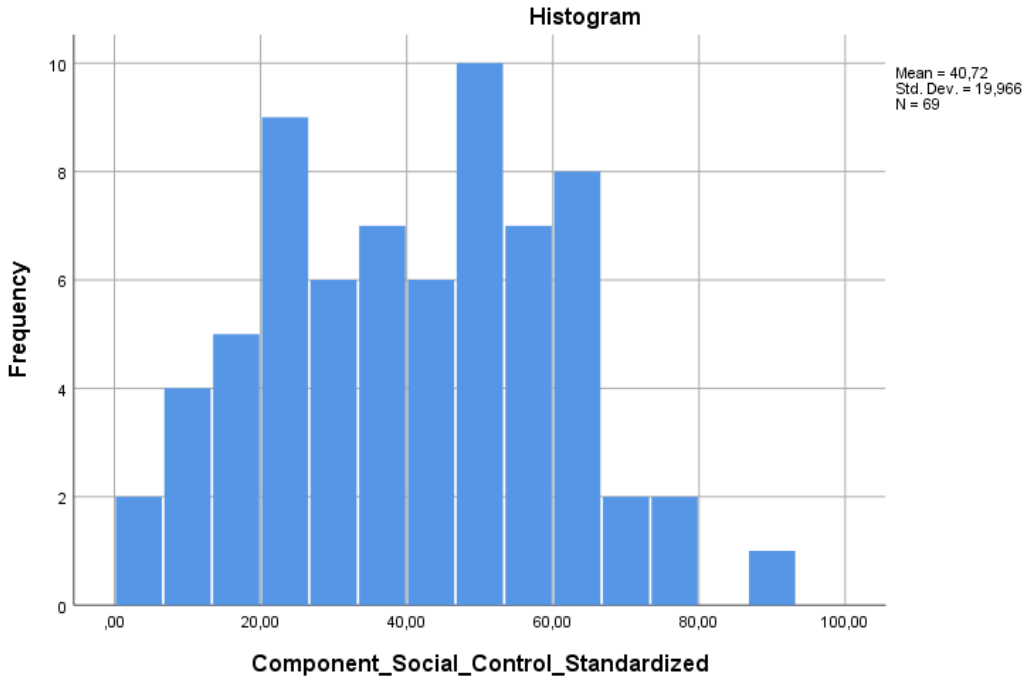

tot_dfst_in1000_100
Mean = 22,09
Std. Dev. = 15,719
N = 67
Frequency
12
10
8
6
4
2
0
-20,00
,00
20,00
40,00
60,00
80,00
100,00
tot_dfst_in1000_100

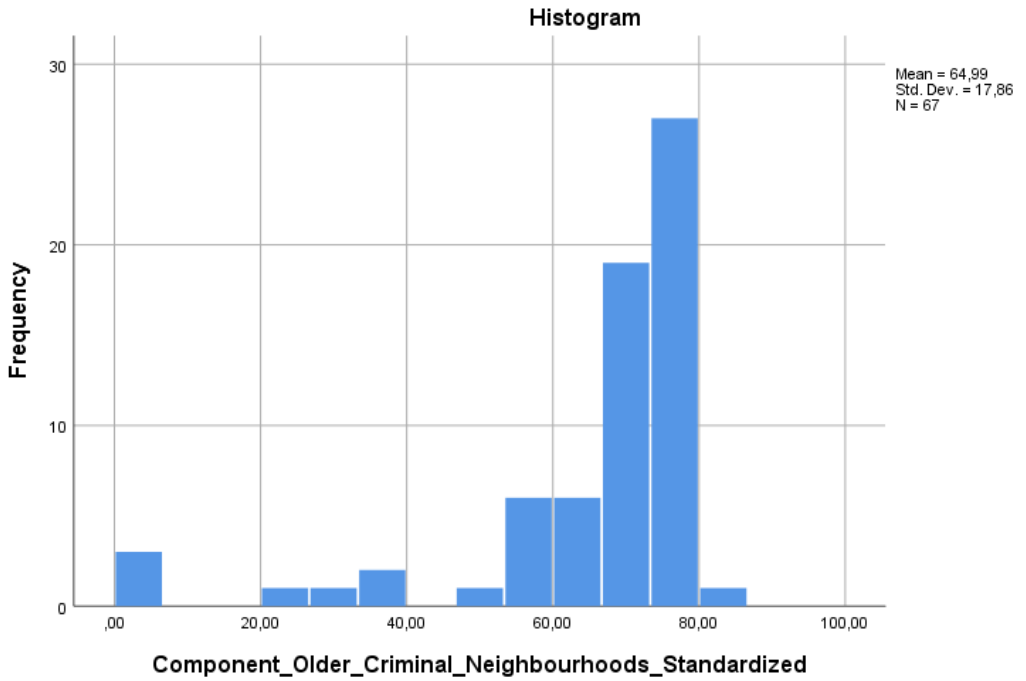

percentage woningen bouwjaar voor 2000
Mean = 82,24%
Std. Dev. = 23,023%
N = 67
Frequency
20
15
10
5
0
,00%
30,00%
60,00%
90,00%
120,00%
percentage woningen bouwjaar voor 2000

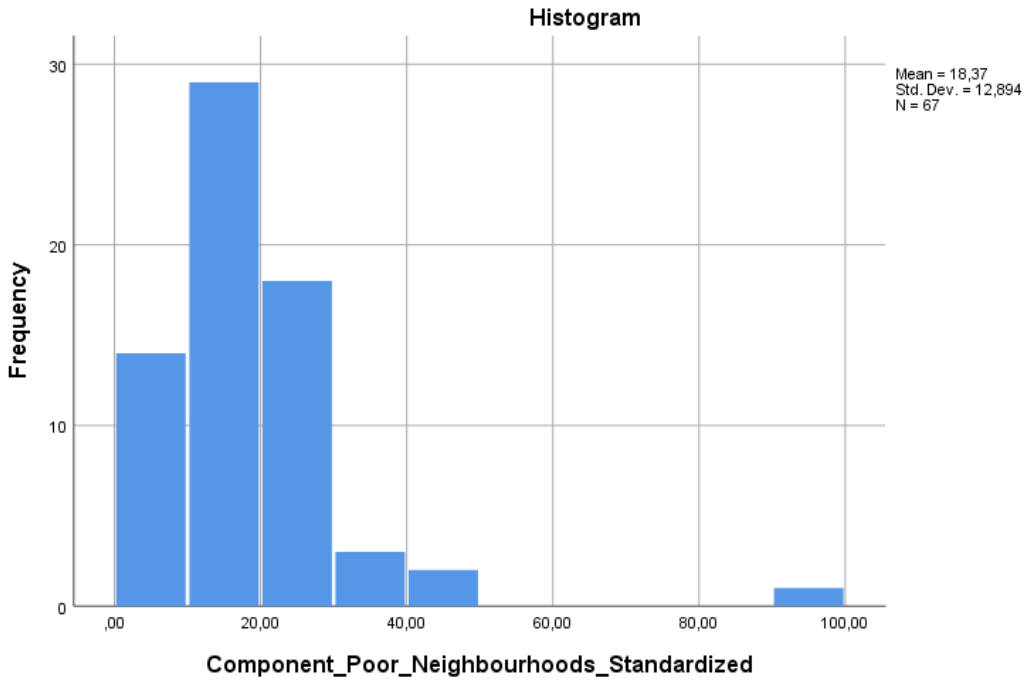

vrn_msdr_oo_in1000_100
Mean = 16,03
Std. Dev. = 14,259
N = 67
Frequency
20
15
10
5
0
-20,00
,00
20,00
40,00
60,00
80,00
100,00
vrn_msdr_oo_in1000_100

Appendix VIII Histograms standardized components



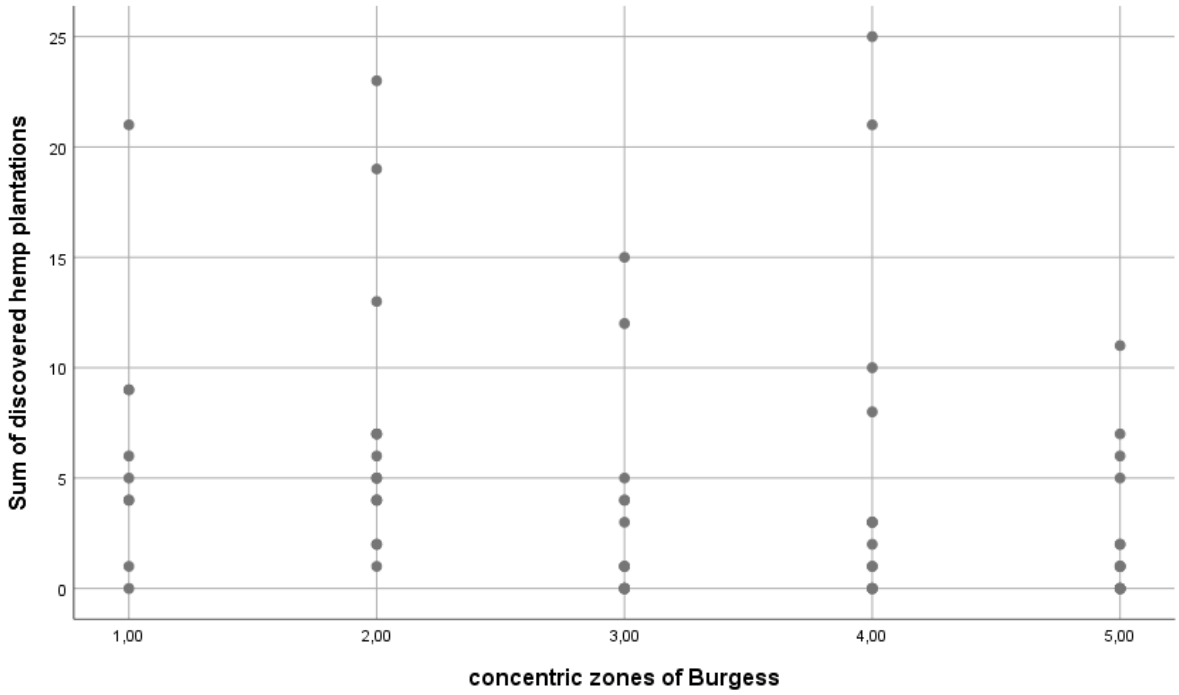


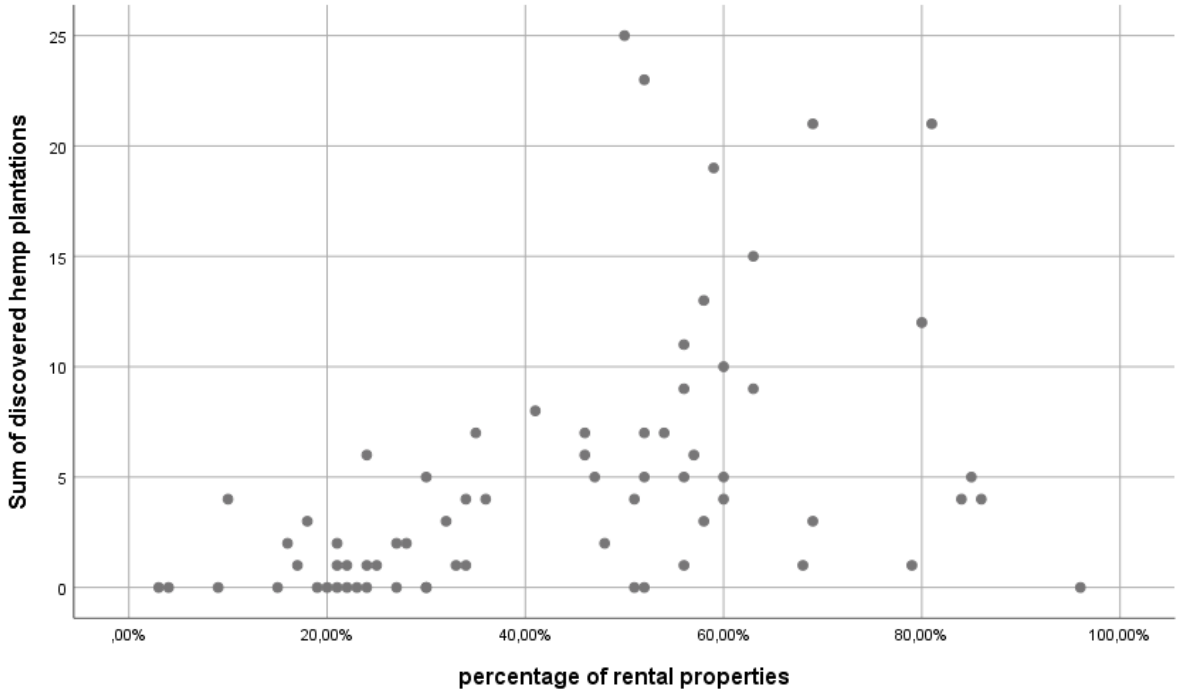

Histogram
Mean = 64,99
Std. Dev. = 17,86
N = 67
Frequency
30
20
10
0
,00
20,00
40,00
60,00
80,00
100,00
Component_Older_Criminal_Neighbourhoods_Standardized

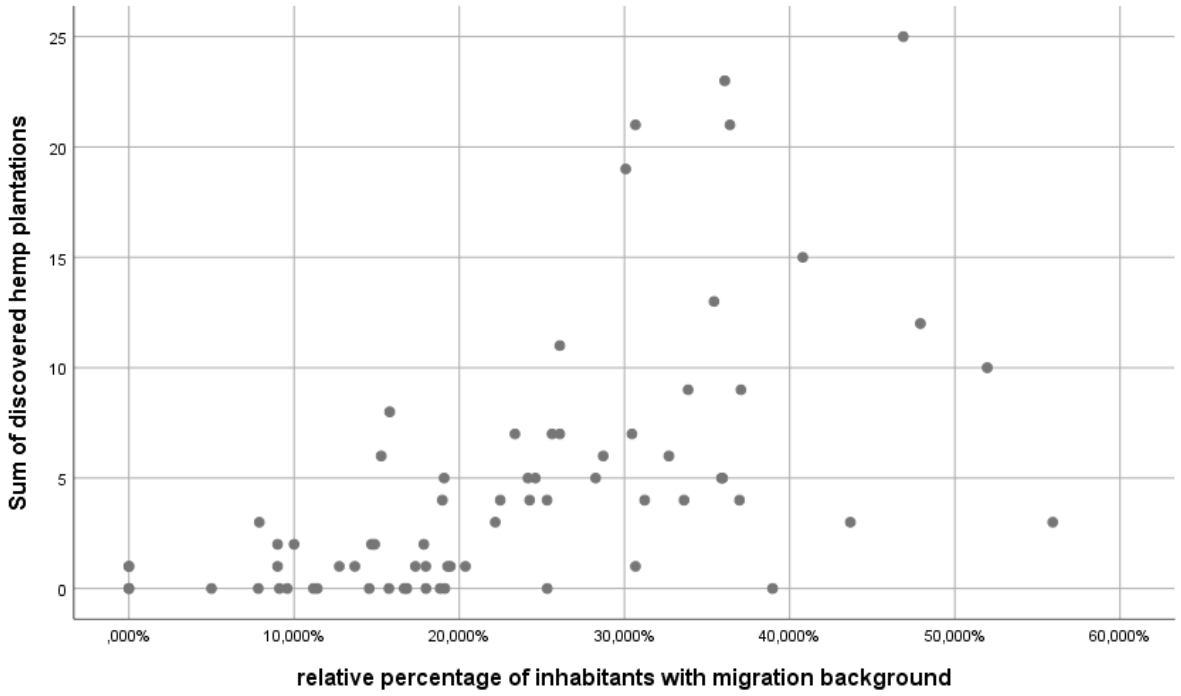

Histogram
Mean = 18,37
Std. Dev. = 12,894
N = 67
Frequency
30
20
10
0
,00
20,00
40,00
60,00
80,00
100,00
Component_Poor_Neighbourhoods_Standardized

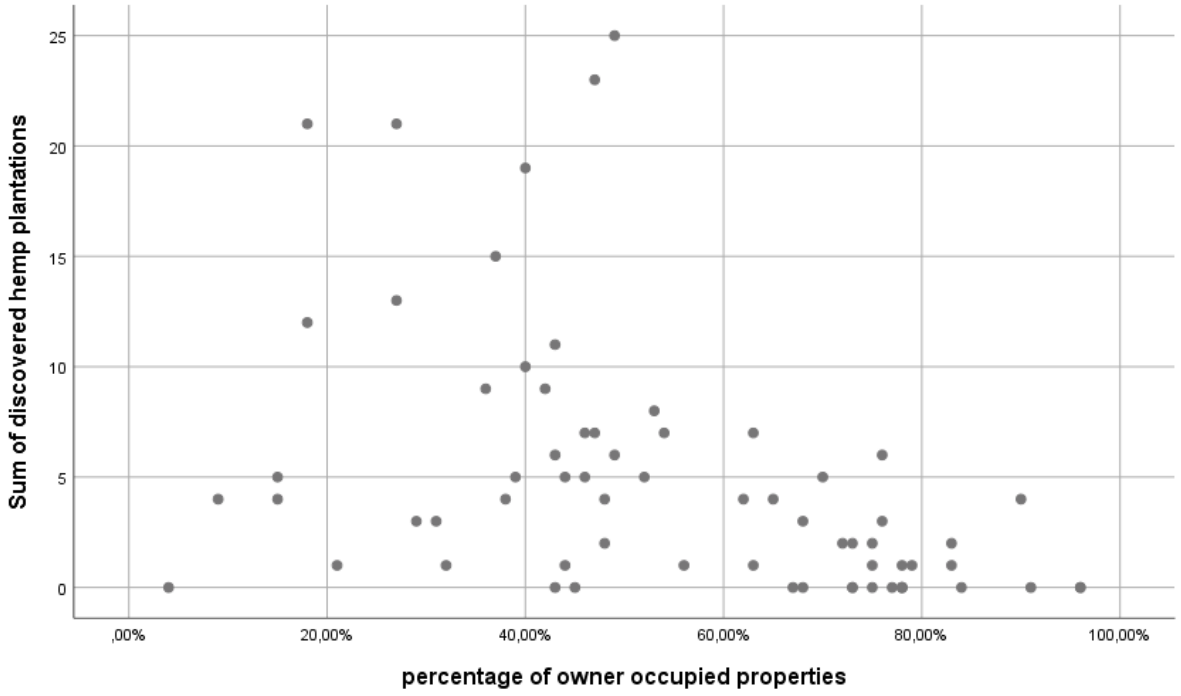
Appendix IX Scatterplots

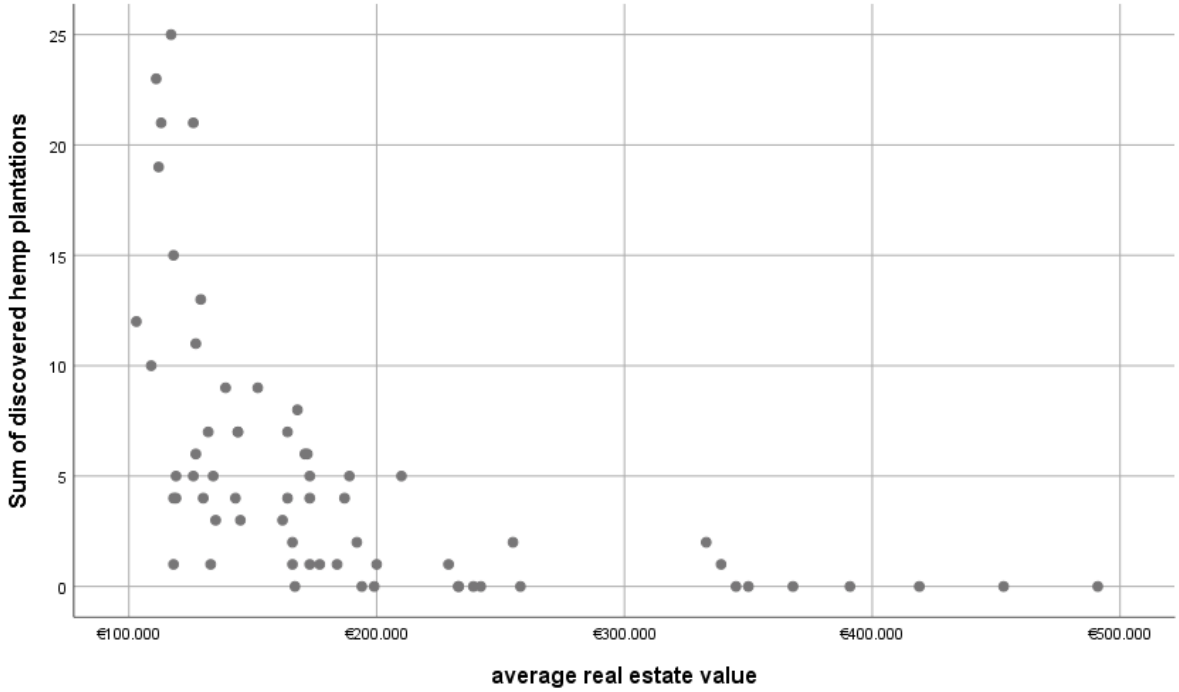
Scatterplots neighbourhood characteristics

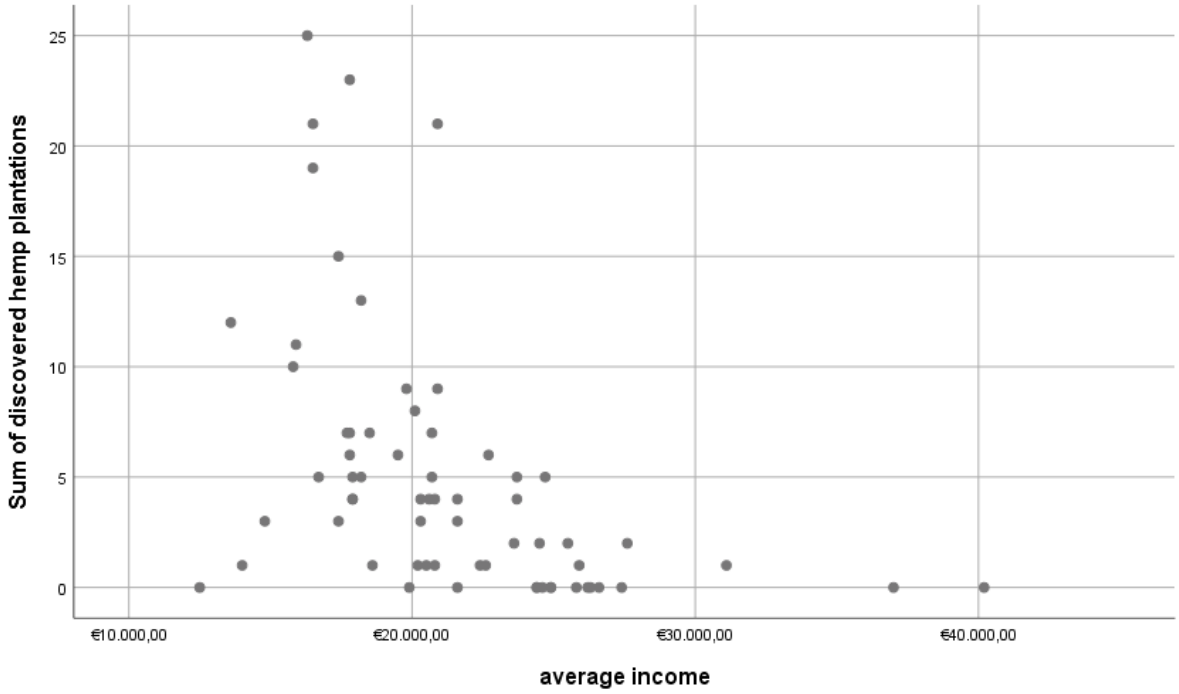


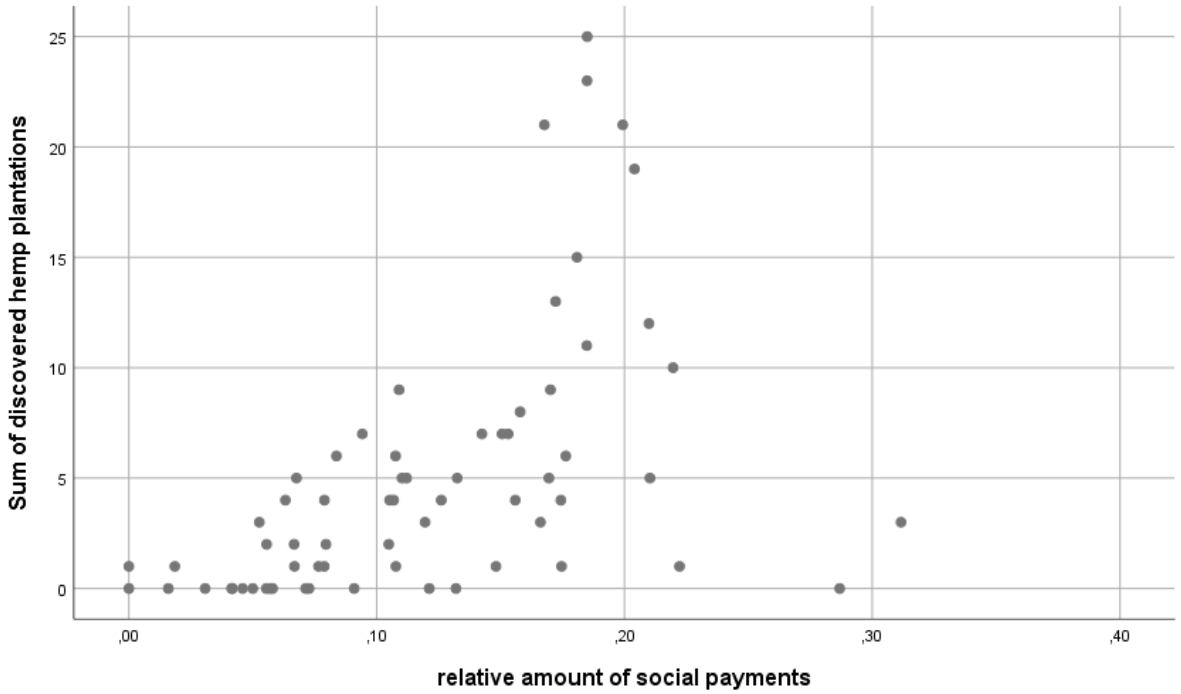


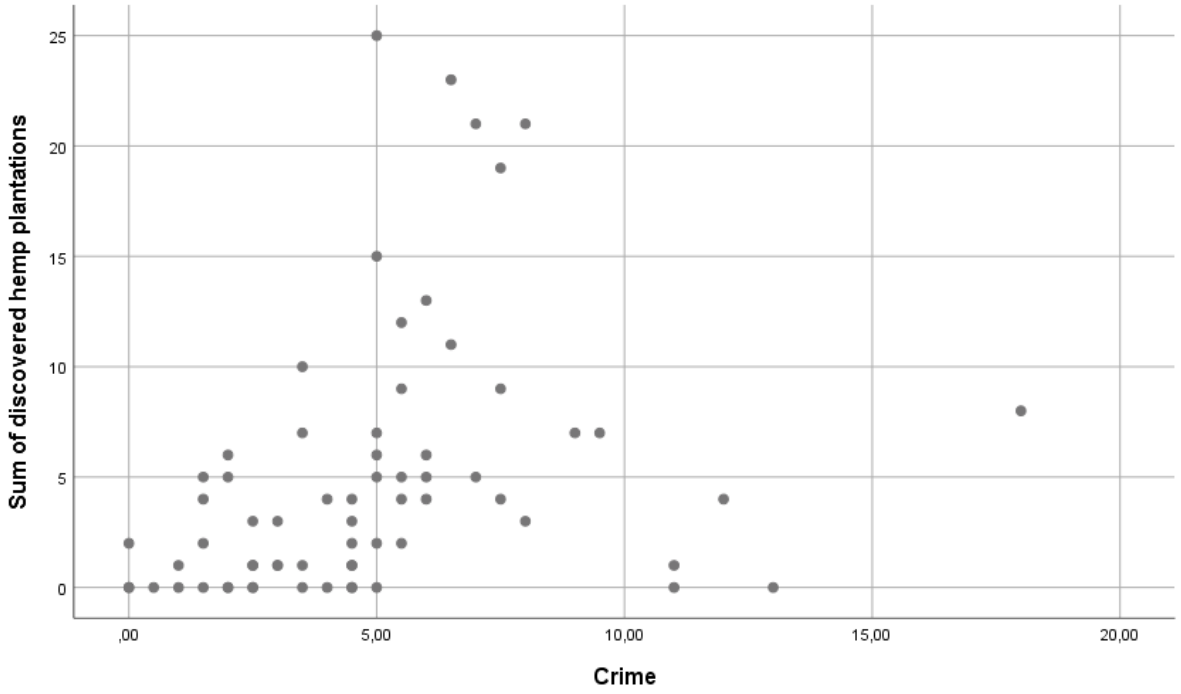

Sum of discovered hemp plantations
25
20
15
10
5
0
,000%
10,000%
20,000%
30,000%
40,000%
50,000%
60,000%
relative percentage of inhabitants with migration background

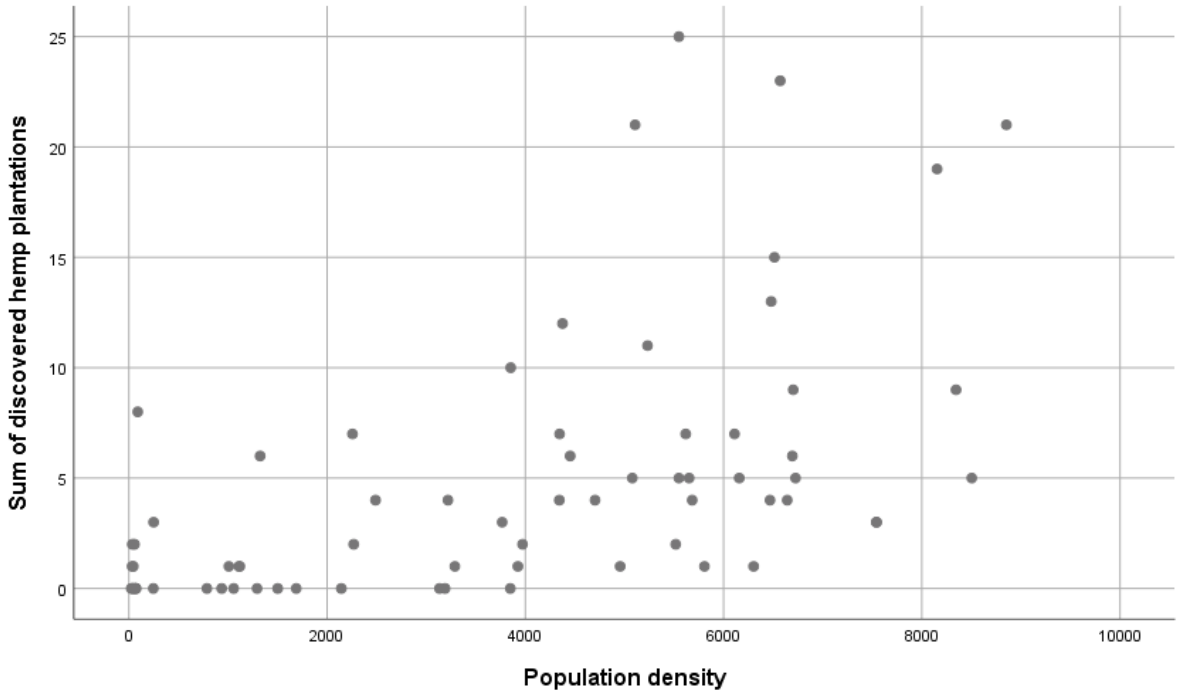

Sum of discovered hemp plantations
25
20
15
10
5
0
,00%
20,00%
40,00%
60,00%
80,00%
100,00%
percentage of owner occupied properties

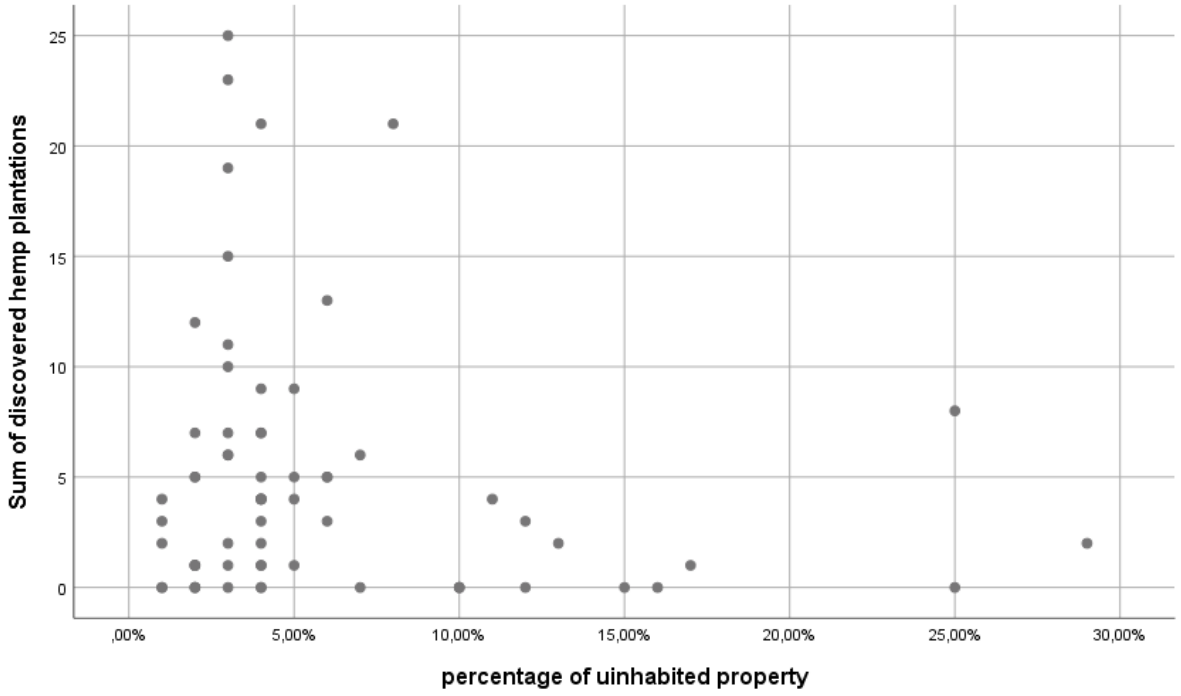

Sum of discovered hemp plantations
25
20
15
10
5
0
€100.000
€200.000
€300.000
€400.000
€500.000
average real estate value


Sum of discovered hemp plantations
25
20
15
10
5
0
€10.000,00
€20.000,00
€30.000,00
€40.000,00
average income


Sum of discovered hemp plantations
25
20
15
10
5
0
,00
,10
,20
,30
,40
relative amount of social payments


Sum of discovered hemp plantations
25
20
15
10
5
0
,00
5,00
10,00
15,00
20,00
Crime


Sum of discovered hemp plantations
25
20
15
10
5
0
0
2000
4000
6000
8000
10000
Population density


Sum of discovered hemp plantations
25
20
15
10
5
0
,00%
5,00%
10,00%
15,00%
20,00%
25,00%
30,00%
percentage of uinhabited property

Scatterplots components