# Master thesis Public Administration

The effects of structural features of cooperation and regions and cultural features on the costs and benefits of intermunicipal cooperation

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# 1. Introduction

The basis of this master thesis builds on previous research regarding intermunicipal cooperations. Intermunicipal cooperation is part of the debate in regional governance and regional governance structures due to past and current developments in decentralization of government tasks and budget cutbacks (Boogers et al., 2016).<sup>1</sup> As the decentralization transfers tasks towards the municipalities, the question raises how these tasks can be performed in this new setting with limited budget. As grip on this regional governance can be of effect on the costs and effectivity of cooperation, the structure of the regional governance is of interest to policy-makers. In the Netherlands municipalities have many cooperative ties with each other in a structure of regional governance called intermunicipal cooperations. These cooperations provide services in a broad range of topics that municipalities need to supply for their citizens and themselves. As they are wide-spread, not centralized and the tasks concern many different topics, the regional governance structure could be considered somewhat complex. The complexity of the regional structure is an issue to policy-makers as the grip on this regional governance can be of effect on costs and effectivity of cooperation. However, it remains unclear whether there should be focus on less complexity, giving room for a more centralized regional governance, or actually focus on more, establishing a more decentralized one. One way to determine this is to look at the variables costs and effectivity of cooperation, to which several factors lie underneath that could be affecting these variables: not only structural features of cooperations but also cultural factors (Boogers and Klok, 2017). Municipal cooperation can also be put into a regional context as regional network structures are formed as municipalities work together with other municipalities within their geographical scope. Therefore it is interesting to conduct this research with a focus on regions, rather than municipalities, including the possible effects of structural features of regions on costs and effectivity as a factor.

As the unit of research did not consist of the municipality but the regions, a regional division was also required in order to perform an analysis. Different regional divisions already exist, for example the COROP-regions in the Netherlands and the OECD-division. The COROP-regions are an analytic tool of the Dutch government, which involves around a core city with an area of coverage, while the OECD-division depends on inhabitants of big cities and its commuter region. However, the COROP-regions are a somewhat outdated regional division while the OECD division does not cover every municipality within the Netherlands. Since the intermunicipal cooperations involve networking, together with the limitations of the above mentioned divisions, it is interesting to use a different type of approach of setting up regions. Therefore a bottom-up perspective of regional clustering has been used to set up a regional division, based upon relational ties of municipalities in a network analysis.

The content of the thesis consists of several chapters, starting with the theory, introducing the main research question and discussing the theory for the variables. In the following chapter the conceptualisation and operationalisation of the variables and measurements will be discussed. Then the network analysis will be discussed in the fourth chapter, concluding with the final regional division of the municipalities. In the fifth chapter the results of the statistical analysis will be presented and the hypotheses will either be confirmed or disconfirmed. Finally in the sixth chapter the results will be concluded and discussed and the main research question will be answered.

<sup>&</sup>lt;sup>1</sup> A study on governance structure, cooperational relations, democratic quality and governance effectivity was performed by researchers of the University of Twente in 2016, commissioned by the Ministry of the Interior and Kingdom Relations in the Netherlands, studying the intermunicipal cooperations.

# 2. Theory

This first chapter concerns the theory used and applied for this thesis. A small introduction will be held first, introducing the main research question, after which the dependent and independent variables will be discussed. Finally the hypotheses will be shown in a table.

The topic of the master thesis concerns the collaboration that exist between the municipalities. It builds onto previous research studying the intermunicipal collaborations on a municipal level (Booger & Klok, 2017) in which hypotheses were tested based on two, rival, theories, namely a monocentric and a polycentric view<sup>2</sup> on intermunicipal cooperation. The monocentric theoretical view favours on a more centralized structure, consisting of a single authority and an equality in institutional design, offering less room for complexity and independence. Opposed to the monocentric view, the polycentric theoretical view favours a more complex and 'fragmented' structure of collaboration in which municipalities are able to cooperate independently and voluntary. In practice, the policy issue focuses on regional grip, which theoretical position is favourable when applying it to intermunicipal cooperation and what does this mean to the costs and effectivity of cooperation?<sup>3</sup> Especially in the case of the Netherlands, which seems to have a rather polycentric collaborative system with various intermunicipal cooperations between many different municipalities, it is of interest to study the effects of more or less complexity of regional governance.

The intermunicipal cooperations itself are structures of regional governance that offer a solution to regional problems such as the economies of scale, where smaller municipalities are lesser able to provide products as efficient as larger or regional effects concerning economic growth, wealth and prosperity. These merits of cooperation can be put into a regional context, since the municipalities will usually work together with other municipalities close to them, considering the geographical scope of cooperation mentioned by Feiock (2007). The underlying question is about how the structural features of the region and the structural features of cooperation have effect on the transaction costs and effectiveness of cooperation. Hence the main research question is:

# 'What are the effect of the structural features of cooperation and structural features of regions on transactions costs and effectivity of cooperation in the Netherlands?'

These regions are drawn from the network relations the municipalities have with each other by means of the intermunicipal cooperations. Groups can be formed of municipalities explaining that cooperation is a regional phenomenon because most municipalities cluster together in groups and have not many ties with other clusters of cooperating municipalities. The network effects themselves however, are studied at the actual (sub)networks of cooperation, rather than region -based on other criteria. Thus the structural networks that exist within the network region, between the municipalities inside that region, will still be studied instead of applying a non-existing regional structure over the existing (sub)networks.

<sup>&</sup>lt;sup>2</sup> The authors of this study note that the terms for these rival theories are different in various studies, they apply the terms 'monocentric' and 'polycentric' for these two theoretical positions to avoid confusion, for this thesis the same terms will be applied.

<sup>&</sup>lt;sup>3</sup> In the original study not only costs and effectivity were subjected to research, but also democratic accountability and transparency were positioned in these theories. This thesis only focuses on the costs and effectivity of intermunicipal cooperation.

# 2.1 Dependent variable

For this thesis the interest lies to study the effects on the dependent variables of costs and effects. More specifically the costs consisting of the transaction costs that are necessary in order to cooperate and effectivity consisting of local and regional benefits.

### Transaction costs

One of the dependent variables consists of the transaction costs, which are being defined by Feiock (2007) as the costs that are being made in order to negotiate agreements, coordinate, monitor and control, which can be applied as the transaction costs for the cooperations. First the negotiation costs can be viewed as the costs that come with the division of the mutual gains for the participating municipalities. Secondly, coordination costs consists of the costs that come with shared knowledge of information in regard of the preferences of the municipalities over possible outcomes and their resources. Thirdly, monitoring costs consist of the costs that come with monitoring and enforcing the cooperation the municipalities agreed upon. Fourthly the agency costs are a cost that comes with the usage of agents, in this case civil servants who, as administrators for their own municipalities' interests, might not take into account the preferences of the citizens which they represent or have preference towards local benefits over regional benefits.

# Effectivity

The effectiveness of cooperation concerns for this thesis the benefits the cooperation may produce, such as infrastructure leading to economic growth or supplying certain ICT services for multiple municipalities. The idea behind this lies in the theory of the economies of scale, as the larger scale of productivity lowers the costs and as such provides more production benefits, as a reduction of production costs. In such a way smaller municipalities will be able to produce as efficient as larger ones or establish regional effects concerning economic growth, wealth and prosperity more effectively. Cooperating then increases the capacity with which participating municipalities can provide services for its citizens, on a basis of contribution leading to benefits. These benefits can be distinguished as local benefits. Local benefits are less relevant for this thesis because the unit of research does not regard the municipality but the region, but will be taken into account nonetheless. Another type of benefit that can be distinguished are the regional benefits, which are more of interest due to the nature of cooperation being established within a certain regional boundary. A collaborative investment in local structure can lead to e.g. economic growth, establishing a certain regional effect. But whereas the municipalities will need to participate in order to get access to local benefits, non-participants (regionally) will take advantage from region benefits. A so called 'freerider' effect may then occur as municipalities who are not contributing to the costs of the cooperation will take benefit from the cooperation, lessening effectiveness (Olson 1971).

# 2.2 Independent variable

# Structural features of cooperation

The interest to capture the impact of governmental arrangements can be considered through the importance of a certain number of structural features of cooperation. These factors can give an indication what kind of factors can influence costs and effectivity, namely: the complexity of governance network and the regulatory regime of cooperations (Klok & Boogers, 2017).

# Complexity

The features of cooperation can have a certain degree of complexity to them. It can be seen that the more complex the structural system of the cooperation is, the higher the transaction costs would be and the lower the effectiveness. The thought behind this idea lies within the argument that "when power is unified and directed from a single center the more responsible it becomes" (Ostrom, 1989). A more complex system will then provide less clarity of responsibilities, resulting in more ineffectiveness and inefficiencies. Having more complexity inside the network structure will increase the transaction costs due to the necessary relational maintenance in negotiating, coordinating, monitor and control between many different partners. In addition, a more complex structure will also have a negative effect on effectiveness due to more competition and/or rivalries, establishing a less decisive and effective collective action as a result.

Complexity consists of several indicators, one of which is the amount of partners within the network structure, perhaps not only within the regional network, but also the partners established outside that region. Another indicator is fragmentation, which is the amount of many different or unique cooperations between municipalities the regional network contains. The more different/unique cooperations within the network will indicate the degree of complexity.

Also incongruence plays a role, is the cooperation existing between many different municipalities inside the regional network or not? This degree of overlap of members between different intermunicipal cooperations gives an indication how complex the structure of the cooperation is as a large overlap indicates a smaller network. Finally, the singularity of the cooperations are of importance. This is the establishment of a single purpose as a cooperation and/or the singularity of the cooperation's goals in the regional network, or in other words the degree of how the goals of the cooperations are intended for 1 or multiple purposes. Cooperation can be considered more complex when there is a lesser degree of singularity, or in other words the more purposes/goals, the more complex the network structure. However, when considering that a region consists of many different cooperations aiming for the same single goal or purpose, it may be less efficient for a region having several cooperations aiming for the same goal, as such increasing complexity. Combining these four indicators, the hypothesis is then that the more complex the cooperation structure is, the more the cost and lesser the effectivity (Hypothesis 1.1a+1.2a).

At the same time a contrasting view can be distinguished. It is argued that a more complex system can work for reasons of variety and flexibility (Oakerson, 1999). First of all, to be able to provide a various number of public services, facilitations and implementations of a large number of public policies, the larger, more complex, variety of cooperations can provide lower transaction costs due to the competition among these different institutions. Secondly, the more complex system allows for a greater flexibility, establishing a larger effectiveness as a result. The wide variety of approach will also be able to take into account the wide range of interests and services coming from different municipalities. While in addition the greater and more diversified connectivity allows *"local governments to solve collective action dilemmas using horizontal networks"* (Tavares & Feiock, 2014). As such the alternative hypothesis is that a more complex system leads to lower transaction costs and higher effectivity (Hypothesis 1.1b+1.2b).

#### Regulatory regime

The regulatory regime contains to what extent the cooperations have a certain regulatory system. Within municipalities the rules are clear and defined for policy-making, but within cooperations this may not be the case. When starting to cooperate with other municipalities without the establishment of a regulatory system, it will be unclear who is in charge and responsible for which task, creating monitoring and decision-making problems. This may depend on to what extent the municipal cooperating legal framework (WGR), which provides the standards of the legal framework, has been implemented within the cooperation. A regulatory system that is clear and well -defined then increases transparency and creates clear responsibility, thus having a positive effect on costs and effectiveness. On a bigger scale, clarity of responsibilities and transparency can give more efficiency, leading to the hypothesis that a more strict regulatory regime leads to more efficiency. The hypothesis is that a more strict regulatory regime leads also to less costs and more efficiency (Hypothesis 2.1a+2.2a)

However, flexibility can also be applied to the regulatory regime of a cooperation. Contrary to the argument a more strict regulatory system creates more efficiency and less costs, it is also argued that a more rigid system will more likely cause negative effects (Feiock 2007; Tavares & Feiock 2014). The created conformity for a certain standardization would lead to less efficiency and more costs if the regulatory standards are opposite of what is required for the specific task of service, favoring a more flexible regulatory system. In that case the alternative hypothesis is that a stronger regulatory regime will lead to more costs and less efficiency (2.1b+2.2b)

# Structural features of regions

Besides characteristics of the cooperation network, effects of cooperation might also be influenced by structural features of the regions. Meaning that costs and effectivity can also be influenced by the factors such as size of the region, or by difference in size within a region.

#### Size

Size of a region can be a characteristic to take into account when looking at the impact of collaborative arrangements, with size being referred to as capacity in terms of population or as the surface area of a region. On a municipal level, there is evidence that size in terms of population is related to performance. A larger municipality will be able to produce more resources (human or financial) than a smaller municipality, so the capacity increases when the size of a municipality is larger (Denters et al, 2014). This might also be the case for a region, where a larger region can sustain larger capacities than a smaller one. As may count for municipalities, costs of collaboration may be affected due to a larger capacity, establishing an 'economy of scale', in which the larger participation of the municipalities in the region lowers down the production costs, thus increasing the effectivity when it concerns size in terms of population. Which leads to the hypothesis that the larger the size, in terms of population, the higher the effectivity (Hypothesis 3). However, when it concerns size in terms of surface area, transaction costs will be most likely affected and not the effectivity. This in reference to Feiock (2007), who states the importance of the geographical scope in municipal cooperation, leading to assume a more negative effect of transaction costs due to geographical boundaries e.g. traveling time. As such there can be spoken of a 'diseconomies of scale' as the larger scale does not provide less costs. So a second hypothesis is that the larger the size of a region, in terms of surface area, the higher the transaction costs (Hypothesis 4).

# Size difference within a region

Size difference within a region is also a possible feature in the structure of a region. A possible lead organisation for example, can have a power position inside a region (Provan & Kenis, 2008). A large actor can be a centralized figure within the region, having a large portion of the total number of inhabitants. It contains more resources than other municipalities in the region thus possibly giving it a centralized position, coordinating the process and playing a decisive role in decisions. This conditional possibility can arise when, in a region, one of the municipalities is more powerful (larger) than the other municipalities within this region. This core municipality then has the ability to take initiative for cooperation, establishing a more effective collaboration. This will be less likely the case when it concerns a region that consists of only equal municipalities, as it would only lessen effectiveness of cooperation as equal, smaller municipalities will not have the ability to take initiative. When a region contains two or more large municipalities, effectivity and costs will be negatively affected even more, due to power play and competition between larger municipalities, while trying to determine who has the central role. The choice has been made to study whether three different network governance structures show interesting results, while the situation with two structures (single core municipality vs. the rest) will also be taken into account. This leads to the hypothesis that cooperation within a region that is characterised by a single large municipality, will cost less and produces more effectivity, while a region that is equal in size will have more costs and

less effectivity and a region with 2 or more large municipalities will have the highest costs and lowest effectivity (Hypothesis 5).

# Culture

The outcome of networking, in terms of costs and effectiveness, through the intermunicipal cooperations, may also be affected by cultural factors. As such, cultural factors can be of importance when taking a look at the impact on costs and effectiveness. Therefore these factors will be included as a control variable. These factors include firstly the degree of trust and consensus between actors, providing a possibly increased workable situation. Hence a more workable situation lowers down the transaction costs since less investments will be required to achieve a professional working platform for cooperation. The first hypothesis in regard of culture is that the higher the degree of trust and consensus, the lower the transaction costs (Hypothesis 6.1). Secondly the degree of decisiveness within the network is a factor, providing a result-driven goal. A higher degree of decisiveness will add to the effectiveness of cooperation as it the clarity of the goal will add to the benefits of the cooperation. As such the hypothesis is that the higher the degree of decisiveness, the higher the effectivity (Hypothesis 6.2).

The various hypotheses are shown below in the hypothesis table, which shows the different subhypothesis according to whether there is a positive or negative effect on the dependent variables.

Hypothesis Table						
			Local			
	Costs	Hypothesis	Benefits	Hypothesis	<b>Region Benefits</b>	Hypothesis
Complexity:	+	1.1a	-	1.2a	-	1.2a
	-	1.1b	+	1.2b	+	1.2b
<b>Net Partners</b>						
Fragmentation						
Singularity						
Incongruence						
<b>Regulatory Regime</b>	-	2.1a	+	2.2a	+	2.2a
	+	2.1b	-	2.2b	-	2.2b
Size:						
Population		*	+	3	+	3
Surface Area	+	4		*		*
Size Difference**		5		5		5
Culture:						
Consensus/Trust	-	6.1				
Decisiveness	n.v.t.	n.v.t.	+	6.2	+	6.2

Table 1: Hypothesis table

\* No hypothesis

\*\* Hypothesis: Single large = lowest costs, highest benefits/Equalness higher costs, lower benefits/2 or more large = highest costs, lowest

# 3. Conceptualisation & Operationalization

This chapter will discuss the conceptualisation and the operationalization of the variables and their methods of measurement, concerning the dependent and independent variables, including culture.

Some of the variables for the thesis are derived from similar research regarding the intermunicipal cooperations. However since the unit of research is different, namely the region, some of the variables cannot be transferred directly but have to be adjusted or changed. The se derived variables have been aggregated into the network regions. Using the mean of each variable, it can be determined what the average result is of the regions for the individual variables. With the exception of the variable that shows the response of the interviews within a region, for which the sum of the respondents has been used. Due to a low response in one of the regions (1 out of 5), it was decided that this region will not be taken into account when applying statistical tests.

# 3.1 Dependent variables

#### Transaction costs

For transaction costs, the mean variable was aggregated from a constructed variable which specifies the perceived level of transaction costs. This was done based on the answers of chief executive officers (gemeentesecretarissen) on three questions to indicate the level of unnecessary complexity, lengthy and useless consultations, and high negotiation costs.

# Benefits

As for the transaction costs, the benefits (local and regional) are a constructed variable to indicate the perceived benefits, which then have been aggregated into a mean for the regions. For local benefits this scale was constructed by the questions answering the level of contribution to an effective solution of local policy problems, quality of municipal service provision and quality level of local public facilities. For regional benefits this scale was constructed by the questions answering the degree of the IMC network helps to solve regional policy problems effectively, provision of good regional government services and supply of a good level of regional public facilities.

# 3.2 Independent variables

# Net number of unique partners

These are number of all different partners with which a municipality is collaborating in all intermunicipal cooperations, showing the average net partners of the region.

# Fragmentation

A variable with the amount of the total amount of cooperations in which municipalities inside a region cooperate.

# Incongruence

The percentage of all overlapping members of cooperations, which is incongruence. Here calculated first by congruence, which is being calculated by dividing the number of overlapping members (participating in both cooperations) by the total unique number of members of the two cooperations. First the congruence of all pairs was calculated and second the overall average congruence score of one municipality is calculated by taking the mean score of all combinations. These calculations result in a score between 0 and 1, then subtracted from 1 to measure incongruence. As before, a mean variable has been aggregated to establish the incongruence

variable for the regions. The incongruence is used since a cooperation could be considered more complex as it becomes less congruent.

#### Singularity

A cooperation is defined being singular if its activities consist of only one task or goal of government/policy area. The division has been made in previous research to adjust for 11 different policy areas, resulting in a possible range from being active in only 1 up to a total of 11 policy areas. For the original municipalities the mean was taken for an average score on singularity. This variable has been altered to show a high number for the more single -purpose municipalities and a low number to indicate a multi-purpose municipality. Again, this final variable has been taken as a mean to show an average as an indicator for the singularity of a region.

#### **Regulatory Regime**

Information has been collected for this variable based on its legal regime, either private law or public law (WGR), the percentage of WGR-based cooperation is the indicator for the regulatory regime of a municipality. Like-wise, a mean variable has been aggregated to serve as an indicator for the regulatory regime for the regions.

#### Size

To identify the size of a region, 2 indicators can be used. First of all by the size through the population of the region, which is measured by its amount of inhabitants. This can be acquired by simply adding up the total amount of population within the particular regions from the national statistics bureau (CBS). The second consists of the size through surface area. Like population, this indicator can be determined from information by the CBS.

#### Size difference

The other variable that needed to be constructed is the size difference within a region. When a region consists of one large municipality and several smaller municipalities, it seems obvious the larger will have a dominant position over the smaller ones since a larger municipality in size will usually have a larger amount of resources such as budget and civil servant system. As such, having an equal size of municipalities will provide less effectivity and more costs and/or having multiple 'competing' municipalities will provide even less effective and even more costs. This size difference can also be measured by its amount of inhabitants in comparison to the rest of the region. The rule of thumb that has been applied here is that when the largest municipality in a region is twice as large as the second highest one, that region will be considered a region with a single large municipality. When this is not the case, and the second municipality is twice as large as the average of the lower rest of the region, the region will be considered having multiple 'competing' municipalities. Finally, when both these terms have not been met, the region will be considered having 'equal' municipalities. The final division of these network structures can be found in the appendix.

# Culture

#### Trust and consensus

Has been altered into one variable due to factor analysis showing a close connection between the original two variables. It has been determined based on questions in the survey in regard of trust and consensus between municipalities and cooperations and municipalities. Also here a mean variable has been aggregated in order to indicate the trust/consensus of regions.

#### Decisiveness

The degree of decisiveness was measured by questions of the extent of which the municipal cooperational network could be described by compliance to agreements, swift/decisive actions,

binding obligations, agreements with tangible goals and transparency. A scale was constructed to show the final indicator, from which the mean variable was derived to show decisiveness of regions.

The validity of the operationalization seems to be somewhat high at first sight since the required data is derived from existing research and the statistical institute. The size of a municipality (and thus the region) is easily acquired through databases, which are built upon demographic research by the CBS. The same can be said for the relations of the municipalities, the amount of intermunicipal cooperations can be checked in municipal lists (and has been done so). This also counts for the construct validity, other variables (structure e.g. size of regions) count on population numbers. Reliability should also be high for the same reason mentioned above, the acquired data is statistical, and retrieved from demographic statistical research, making random factors not that important because of the scale of the population for the structural variables. For the dependent variables this somewhat different due to the data concerning the perceived costs and benefits from the chief executive officers, while the data from the cultural variables was also derived from the same persons. While this may give room for common method bias, these civil servants are highest-ranked policy advisors in the municipality, having enough knowledge to give reliable information. Finally, a few mistakes in the retrieval of documented births or deaths will not influence the outcome mu ch. The amount of relations of municipalities are also documented.

# 4. Network region analysis

This chapter will discuss the network regions, which will be based on an analysis with the assistance of a network analysis program. The municipalities in the Netherlands will be put into their respective network region and will be done so based on the cooperational ties they have with the other municipalities. First of a number of different resolution results will be discussed, after which issue areas will be discussed for the chosen resolution and a more in-depth look will be given for one of the issue areas, resulting in a distribution of the municipalities into network regions.

# 4.1 Resolution analysis

As been mentioned above, the network analysis was done with the assistance of a network analysis program.<sup>4</sup> The input for this program consists of all the Dutch municipalities and their cooperations, linking the municipalities together based on the ties they have with one another in the cooperations. The resolution pictures are created based on the modularity of the network groups. The modularity considers the strength of the division of the individual nodes of these network groups, in other words: the analysis of the network regions depends on the strength of the relational ties of the municipalities, through the cooperations, with each other. This means that a calculation is done based on the amount of ties the cooperations, in which one municipality participates, have with other municipalities, which is done for every municipality. Groups are formed depending on how many ties the municipalities then have with the others. The resolution setting is a graphical representation that shows how strongly related the municipalities must be to form a group: the higher the resolution setting, the larger the network groups. Displaying a lower resolution setting will decrease the strength of the relation, but also increase the amount of groups. It also increases the instability of the groups, making it harder to determine to which groups certain municipalities may belong as less ties are required to relate to one group or form an own group.



# Figure 1: Resolution pictures

<sup>&</sup>lt;sup>4</sup> The used program is Gephi, see: https://gephi.org/

#### **Resolution 1.0**

Using the pre-determined resolution for the modularity calculation (the strength of the network groups) the above pictured image shows the Dutch municipalities relations in regard of the intermunicipal cooperations. Quite a number of stable regions can already be distinguished, e.g. the Friesland (upper light blue) region does not change with several calculations. The more interesting area is around the Overijssel/Flevoland region that, together with Drenthe, gets mixed up in different groups in several calculations (the modularity changes around from 0.856-0.862). In this above shown picture Drenthe and Groningen municipalities are a group (which is somewhat stable, but can change), Twente and the Zwolle area get put into a group while Flevoland municipalities are put inside a group with Gelderland municipalities. On a few occasions Noord -Holland gets put into one region, while the (now grey) area around Den Haag gets put with northern Zuid -Holland municipalities. Here there are 14-16 different groups/regions to be distinguished depending on the modularity of the random number.

#### **Resolution 0.75**

Here the resolution has been set lower to 0.75 (giving more groups of less municipalities). Quite some of the stable groups are the same in this setting, but some of the unstable groups remain. The Drenthe/Overijssel region still gets mixed in several calculations, while the Flevoland municipalities tend to stay more with the some Utrecht municipalities in the higher modularity (0.86). With this resolution around 17 or 18 different regions can be distinguished. Between the (here) green and pink regions, between Utrecht and Gelderland, outer light green municipalities (e.g. Ede and Wageningen) tend to switch around.

#### **Resolution 0.5**

The resolution being put on 0.5, now identifies some changes even though other group switches keep reoccurring. First of all the Zuid-Holland area now has been divided into 3 separate stable groups. The two red circled areas however keep on switching between two groups (in Noord-Brabant and Gelderland/Utrecht regions). Also, Twente now is now stable as a group, not being placed with for example Zwolle area or another. But Drenthe, Zwolle area and Flevoland keep switching around between groups. Either Drenthe is its own region or being placed alongside Groningen and Zwolle, while Flevoland is either with Zwolle/Drenthe or with the brown Utrecht municipality group. 19 different groups are distinguished in this setting.

# **Resolution 0.3**

Overall, the groups seem to become rather stable with this resolution setting. On almost every calculation the Flevoland municipalities decide to pair up with the Zwolle area group, while the unstable area (with Tilburg) between the (here green and brown) Zuid-Holland groups are now part of the brown region. However the area between Gelderland (light blue) and Utrecht (dark orange) is still switching. Also, some groups are still quite large such as Limburg, even though there are 20 different groups, so perhaps a smaller resolution setting may identify new (but maybe more unstable) regions.

#### **Resolution 0.2**

With the settings being put onto 0.2, a larger amount of groups (31 groups) seem to be distinguishable. Limburg has been divided into 2 regions, while the Tilburg area now is a separate group. The southern Noord-Holland group has been divided into 3 while Zuid-Holland now consists of 6 different groups. But there the light-green area around Culemborg and its right-sided darker green group can get combined depending on the randomness of the calculation. Where there were distinction issues in the east earlier, now there are 4 stable groups of Twente, Zwolle and 2 Gelderland groups even though the fifth (Flevoland) is as well a stable group, but rather small. However, the issue of the red-circled area still remains. An extra group can be found every so often

with this setting, depending on a random factor whether the that area will be placed with either of the 3 surrounding groups.

### **Resolution 0.10**

For a quick look into an even lower setting, being 0.1, it shows that many more small groups are being distinguished. Many of these new groups are too small to be useful for research, consisting of only 4, 3 or even 2 municipalities. Dividing very stable (larger) groups in almost every higher setting, such as in Friesland.

### Conclusion: Resolution 0.25?

Figure 2: Resolution 0.25



Based upon the different resolution settings some conclusion can be drawn. While both the setting of 0.3 and 0.2 give for the most part stable groups, some groups in the 0.3 setting are too large and some in the 0.2 setting could be considered somewhat small and unstable. A 0.25 setting has been run a couple of times to see how the groups would be affected with that, but it appears to give more unstable groups (as shown below in the example with red circles). However, it also gives more specified regions around Den Haag, and in Noord-Holland, which are useful due to the quantity of municipalities. On the other hand, the smaller group of 5 municipalities in the orange region (which can be a separate group depending on the randomness) should be put in the region that is being distinguished in the below shown picture due to its small amount of municipalities. However the largest issue, which distinguished itself the most, can be localised in the middle. Deeper analysis must be done in order to check whether some of the edges (cooperations) are more important (e.g. distinguishing voluntary/involuntary cooperations). Therefore a more in-depth look will be done in regard of the 0.25 setting and the unstable regions.

# 4.2 In-depth look

Figure 3: In-depth Resolution 0.25



As can be observed from the above picture, the groups have been clustered together by how strongly they are tied together. The areas circled in red are the remaining issue areas as their division in the current shown groups are still unstable. This means that the municipalities in these areas are randomly being put into either one group or the other, because of the amount equal ties between them. De dark green area in the down middle is somewhat spread apart, mainly due to different connections between other areas (e.g. 'Mook en middelaar' circled in red<sup>5</sup>), but since they are quite a stable group, it does not seem necessary to take a closer look at them and let them remain in one region. The issue of the clustered 5 orange municipalities (The 'Hoekse waard' municipalities) is somewhat different to the question whether they can be their own region or not. Due to the size of only five municipalities it is easy to disregard them as their own region, especially since they are not always stable in the 0.25 running. But since their size indicates a fair amount of cooperations with one another and another group of only five (the more earlier stable Polder region, here in pink), there are enough arguments to put them into their own region.

The issue area in the middle is more difficult to distinguish: these municipalities are now more separated from one another which is because they do not tie as closely together, despite being grouped inside their own (unstable) region. For that reason a closer look must be taken into the municipalities of this region to decide whether these municipalities should be brought into their own region, or separated into other regions.

<sup>&</sup>lt;sup>5</sup> The Mook en Middelaar municipality is particularly separated from the other municipalities in this region due to its geographical placement in another province (Limburg) than the other municipalities in this region, as such participating in a certain amount of provincial-oriented cooperations and creating a larger distance in the picture in the process.

# 4.3 Analysis per Municipality

The analysis per municipality in the possible region of Food valley e.a. concerns the following municipalities:

-Renswoude -Veenendaal -Rhenen -Nijkerk -Barneveld -Scherpenzeel -Ede -Wageningen

Each of the intermunicipal cooperations in which these municipalities participate has certain ties to other municipalities, either inside its own region or in another. A fully detailed analysis of the ties of these cooperations of each of the municipalities, as well to which region the municipalities have the most ties, can be found in the appendix.

The analysis shows a divided picture for the municipalities: first of all, some of the municipalities have around the same amount of ties between the own region and another, meaning that amount of the cooperations they participate in are equally spread amongst municipalities in three regions. Renswoude, Veenendaal and Rhenen have slightly higher amount of Utrecht-leaning cooperations than cooperations leaning towards an own region, while also several cooperations are equal between these two regions. Furthermore, despite that these three municipalities have a large amount of ties within the Utrecht region, they also show to be established cooperating partners with each other concerning they all participate in an own cooperation alongside the 'own-region' cooperation. In addition, the larger cooperations, including the more 'involuntary' ones like the Veiligheidsregio, seem to be more present within the Utrecht region, while the smaller, perhaps more, 'voluntary' ones show to be in the own region.

Secondly, the rest of the municipalities show to be spread amongst three or even four regions, either leaning towards one region or equally spread between two. It also shows that the largest amount of cooperations are leaning towards the own region. For a couple of these municipalities most ties to the Gelderse region come from the provincial 'involuntary' cooperations, while the more 'voluntary' cooperations all show to be within the own region.

Considering that most of these municipalities have the largest amount of ties with their own region, or have their own partnership alongside the stronger ties with both regions, it seems logical to place all the municipalities within an own region. The larger 'involuntary' provincial-based cooperations, like the Veiligheidsregio's, also play a role as they affect the extent to which one region is really more favourable in their own. When taking these types of cooperations less into consideration, leaving the more 'voluntary' ones visible, it makes even more sense to divide these municipalities within an own region.

# 4.4 Conclusion

After looking at the unstable municipalities that were still left within the network analysis tool, a few conclusions can be drawn. First of all, as suspected, the municipalities all have (some to a larger degree than others) quite some relations with municipalitie s/cooperations in the different bordering regions, which also leads to suggest some regions showing themselves more isolated than others. Second, taking a more in-depth look, two of the three issue areas have been resolved due to the arguments of general stability (due to the spread of one), and due to large cooperational basis between municipalities despite the low amount of municipalities. For the third issue region, a more in-depth look was done and one thing that could be distinguished there was that the larger, more involuntary cooperations such as the Veiligheidsregio, GGD, etc. and therefore are either put within a Utrecht region or the Arnhem-Gelderland region. In contrast, they all are part in one or more of the Food Valley cooperations, and that is probably the reason why these municipalities were unstably put within an own region.

It is also found that, for all the municipalities, the amount of cooperations within their own possible region, is larger than the amount of cooperations in the other corresponding region(s), or at least a large part of the whole amount of cooperations (like in Renswoude/Rhenen, 8 over 6, and Veenendaal, 8 versus 8). What also needs to be taken into account is that some cooperations are based equally in an existing and the possible own region, so it can be said there is a solid base for an own region. For that reason the choice has been made to not divide the municipalities individually in another corresponding region, as some of the municipalities would still strongly belong to an own region, making it too small to be interesting, but not belonging strongly enough to another region to be solid. The region would then only consist of 8 municipalities, which is, while being one of the smaller regions, still larger than a solid small region (even in higher resolutions) like the Polder region.

This results in 29 different network regions, which are shown below in figure 3 in a map of the Dutch municipalities. The fully detailed region-list with municipalities can be found in the appendix. The result of the network analysis shows that most of the regions follow the provincial borders with a couple of exceptions. The region of Noord-Gelderland not only including municipalities inside the Gelderland province, but also a municipality in the Flevoland province, while the Food Valley e.a. region is split between both the Utrecht and Gelderland province and a municipality in the Limburg province is being placed with Gelderlandse municipalities (see Mook en Middelaar). The size of the regions also differs in this result as regions of a whole province can be distinguished (mostly in the North), possibly showing a strong cooperative cohesion amongst the municipalities inside these provinces, but also regions that consist only of parts of provinces can be distinguished. While the size difference is even more noticeable when counting the amount of municipalities per region <sup>6</sup>, this is less of a concern to the network analysis as the relational strength of the cooperating region is more important than the equality of the size.

<sup>&</sup>lt;sup>6</sup> Friesland is the largest region, containing 24 municipalities, while the smallest regions - Flevoland and Hoekse Waard - both contain only 5 municipalities

#### Figure 4: Network regions



#### Regions:

- Friesland
- 2. Groningen
- Drenthe
- West Overijssel
- 5. Twente
- 6. Noord-Gelderland
- Oost-Gelderland
- 8. Regio Arnhem
- 9. Rivierenland
- 10. Flevoland
- 11. Gooi -en Vechtstreek 26. Zuidoost Brabant
- 12. Utrecht
- 13. Food Valley e.a.
- 14. Kop Noord-Holland

- 16. Kennemerland 17. Regio Amsterdam
- 18. Zuid-Holland Noord
- 19. Haagland/Delftland
  - 20. Rotterdam/Rijnmond
  - 21. Zuid-Holland Oost
  - 22. Zeeland
  - 23. West Brabant
  - 24. Midden Brabant
- 25. Noordoost Brabant
- 27. Noord Limburg
- 28. Zuid Limburg
- 29. Hoekse Waard
- 15. Zaanstreek

(Source: Regioatlas.nl)

# 5. Results

In this chapter the numbers of individual variables and cases will be presented, after which the results of the statistical tests and their respective hypotheses will be discussed. The 29<sup>th</sup> region, Hoekse Waard, has not been taken into account during the statistical applications in SPSS due to that region having a rather low response count (1 out of 5). It means that in this case one respondent would determine the results for a whole region.

# 5.1 Individual results

# Costs and benefits of cooperation

On a scale from 1 to 10, the average transaction costs of cooperation shows a mean of 5.26 with a std. dev. of 1,036 with the lowest average value being 3,00 and the highest 7,18. This indicates that 50% of the regions are above the average medium value of transaction costs.

For the local benefits, the average local benefits shows a mean of 5,99 on a scale from 1 to 10 with a std. dev. of 0,562 with the lowest average value being 4,92 and the highest 7,13. Also, there is a general positivity about local benefits, 75% of the regions indicating a 5,5 or higher.

The regional benefits show the average regional benefits has a mean of 6,55 with a std. dev. of 0,581 with the lowest average value being 5,42 and the highest 7,50. This indicates an overall rather high positivity towards the regional benefits, namely 94,4% of the regions showing a 5,5 or higher.

# Structural features of cooperation

### Complexity

The average net number of partners of the regions has a mean of 49,31 partners with a rather large std. dev. of 17,261. The lowest average value being 29,97 partners and the highest 100,42. There is a large spread, due to two outliers (the Oost Zuid-Holland and Flevoland regions) have a rather high net number of partners.

The average cooperation count per region, showing the cooperative intensity, is 16,12 with a std. dev. of 2,441. The lowest average value being 11,33 and the highest 22,10. Showing no further irregularities.

The average singularity shows a mean number of 9,60 on a scale from 1 to 10, with a std. dev. of 0,203, having a lowest average value of 9,13 and the highest of 9,95. While this number is quite high, a lower number on this theoretical scale can only be accomplished when all cooperations have multi-purpose goals, meaning they depict a broad range of different policy areas.

The average incongruence shows a mean number of 0,56 (on a scale from 0 to 1) with a std. dev. of 0,084, indicating an average overlap of 44% of members in all the cooperations that the municipalities in the regions are members of. The lowest average value being 0,40 (60% overlap) and the highest 0,70 (showing only 30% overlap).

The regulatory regime of the cooperations is measured by the average percentage of WGR-based cooperations of a region, which has a mean of 0,59 (59% of the cooperations are WGR-based) with a std. dev. of 0,097. The lowest average value being 0,45 and the highest 0,82.

# Structural features of regions

The total population per region shows a mean number of 600.558 with a std. dev. of 27.050,331. There seems to be a large spread of the number of population across the regions with the lowest value being 255.304 inhabitants and the highest value being 1.278.525 inhabitants. The reason for the large spread is due to four regions having over 1 million inhabitants while the rest has below 800.000. This is not surprising as those four regions consist all of a major Dutch city with a large amount of inhabitants (Amsterdam, Rotterdam, Den Haag) without or with a large number of cities in their region (Utrecht). Naturally, the regions are not equal when it comes to population size, as they have been divided according to relational ties.

The total surface area shows a mean number of 143.580km<sup>2</sup> with a std. dev. of 66.716,094. The lowest value being 38.066 and the highest value being 291.625. Despite the large spread (the highest value being almost 10 times as large as the lowest value), there is more consistency in the histogram without major gaps, showing the highest frequency in regions with a surface area between 50.000 and 100.00 and regions between 150.000 and 200.000.

#### **Cultural factors**

The average score on trust/consensus shows a mean number of 6,01 (on a scale from 1 to 10) with a std. dev. of 1,04. 64,3% of the regions have a score of a 5,5 or higher. The lowest average value being 4,25 and the highest 8,13.

The average score on decisiveness shows a mean number of 5,69 (on a scale from 1 to 10) with a std. dev. of 0,633. The lowest average value being 4,20 and the highest being 7,56. Three regions are outliers in the score on decisiveness, showing a gap between the lowest (Gooi –en Vechtstreek) and the rest and the two highest (Food Valley e.a./ Rotterdam/Rijnmond) and the rest.

#### Specific cases

The results of the variables on the specific regions show a couple of interesting cases. There seems to be a couple of cases where the costs have a lower value value and local and regional benefits have a higher value, which is the case for the regions Kennemerland, Rotterdam/Rijnmond and Midden Brabant. On the other hand some specific regions also show to have higher costs and lower values, such as the regions of Twente, Groningen and Zaanstreek. Alternatively, a specific case of high costs and higher local and regional benefits also appears such as the region of Arnhem and Zeeland.

A look has also been taken at specific cases, whether certain geographical results can be distinguished by the data from the variables. The regulatory regime seems to show a noticeable lower value of average percentage (<=0,50) in the northern/north-eastern regions namely Friesland, Groningen, Drenthe, West-Overijssel and Twente. While a number of other, non-bordering, regions also have a value of 0,50, it is surprising to find all the regions in the north/north-east have a lower value.

Somewhat isolated region are perhaps also distinguishable, isolated meaning that the amount of cooperational ties between the municipalities in the isolated regions and the municipality in other regions are low. Considering the amount of net partners is low (<=33) in certain regions that appear to be having a somewhat isolated position on the network-region map (Figure 1), it could be due to their isolated position. The regions of Friesland (1), Zuidoost Brabant (26), Zuid Limburg (28), Rivierenland (10) and Arnhem (9) all have a low(er) number of net partners while they can, to some extent, be distinguished as isolated regions. Some objections must be noted as this of course is only an estimate based on a figure, whereas a systematic approach would need to use data to prove the actual isolation positions of these regions, based on the difference of internal relations versus external relations. Moreover, while Friesland and Zuidoost Brabant are the most clearly distinguishable regions on this figure, Arnhem and Rivierenland are already less visible as isolated

regions and Zuid Limburg in itself cannot be defined as an isolated region in this case as only a region containing both the current North and Zuid Limburg regions is visibly isolated.

Figure 5: Isolated regions?



# 5.2 Hypothesis testing

Table 2 shows the results of the statistical tests and the significance of the statistical results with the Pearson correlations per variable and their respective significance. The significance has been determined at 0,10 due to the lower sample size of the dataset. For the size difference there is no correlation to be discussed, but rather the compared means, which will be shown in table 3.

Dependent variables:	Costs	Local Benefits	<b>Regional Benefits</b>
Independent variables:			
Complexity:			
NetPartners	-0,346*	0,185	-0,143
Cooperative intensity	0,097	-0,11	0,129
Singularity	0,071	0,043	-0,033
Incongruence	-0,676*	0,255	0,123
Regulatory Regime	,043	,175	,024
Size:			
Population	-,320*	0,122	0,206
Surface Area	0,175	,024	-,229
Culture:			
Consensus/Trust	-0,632***	0,05	0,392**
Decisiveness	-0,680***	0,516***	0,390**

Table 2: Hypothesis table results (N=28, results shown are Pearson correlations)

Significant at 0,10\*/0,05\*\*/0,01\*\*\*

#### Complexity

When it comes to transaction costs there seems to be somewhat of a spread result over the different complexity variables. First of all the amount of net partners shows to have a significant result towards a negative correlation between the amount of net partners and the transaction costs, disconfirming hypothesis 1.1a (more complexity leads to higher costs) and confirming hypothesis 1.1b (more complexity leads to lower costs. This is in line with the argument of the economy of scale, where a larger number of partners (increase in scale) leads to lower costs. Secondly, the cooperative

intensity variable shows no significant correlation between cooperative intensity and transaction costs, disconfirming both hypothesis 1.1a and 1.1b. Thirdly singularity shows no significant result either, disconfirming both hypothesis 1.1a and 1.1b. Finally, there seems to be a significant result of a major negative correlation between incongruence and transaction costs, disconfirming hypothesis 1.1a and confirming the alternative hypothesis 1.1b that a higher degree of incongruence leads to lower transaction costs.

In regard of complexity there is no statistical significant result whatsoever of both the local and the regional benefits. As such the hypothesis 1.2a (more complexity leads to lower benefits) as hypothesis 1.2b (more complexity leads to higher benefits) can both be disconfirmed as there is no significant result in any of the corresponding complexity variables.

# Regulatory regime

The results show no evidence of any correlation between the regulatory regime and transactions costs and local/regional benefits as the tests show no statistical significance. As such disconfirming the hypotheses 2.1a/2.1b and 2.2a/2.2b

# Size

When looking at size in terms of population, there seems to be no statistical significant result between population size and local/regional benefits, disconfirming hypothesis 3. Surprisingly, there does seem to be a statistical significant negative correlation between population size and transaction costs without a hypothesis being formulated in the theory. So apparently the larger the population size, the lower the transaction costs.

For the size in terms of surface area there seems to be no statistical significant result between the population size and the transaction costs, disconfirming hypothesis 4. Also there is no significant result between the surface area and local/regional benefits.

# Size difference

3 Region values	Number	Mean costs	Mean local benefits	Mean regional benefits
Single large municipality	15	5,12	6,07	6,73
Equal municipalities	3	5,68	6,05	6,20
Two or more large municipalities	10	5,40	5,84	6,37
2 Region values				
Single large municipality	15	5,12	6,07	6,73*
Rest	13	5,47	5,89	6,33*

#### Table 3: Size difference means comparison (N=28, numbers below are the mean values)

Significant at 0,10\*/0,05\*\*/0,01\*\*\*

On the basis of results for the original hypothesis (5) the results in the table 2 show that the hypothesis is disconfirmed as there seems to be no statistical significant result when comparing means of the different types of network governance structures. In other words, there is no evidence that suggests that a region, that has a single core municipality, has lower costs of and gets more benefits from cooperation than a region that has equal municipalities or even lower costs and even more benefits than a region that has 2 or more large municipalities. Despite that, the question has also been raised about the results of a variable with two values: a single core municipality versus a region that does not have a single core municipality. When testing a situation with two values, there seems to be no statistical significant result when comparing the respective costs and local benefits.

However, a statistical significant result can be seen when comparing the regional benefits. It shows that a region defined by a single core municipality has more regional benefits than other regions.

### Culture

When looking at trust/consensus a statistical significant negative correlation can be distinguished with the transaction costs. Meaning that the higher the degree of trust/consensus, the lower the costs. As such confirming hypothesis 6.1. At the same time there is no statistical significant result for local benefits, but on the other hand a significant result for regional benefits, despite the lack of a hypothesis for this case. Apparently showing that the higher the degree of trust/consensus, the higher the regional benefits.

In regard of decisiveness, a statistical significant results can be found for all the correlations. Between decisiveness and the transaction costs there is a strong negative correlation, as such showing that, despite again the lack of a hypothesis, the higher the degree of decisiveness, the lower the transaction costs. However the last hypothesis (6.2) is confirmed as the correlation between decisiveness and both local and regional benefits is statistically significant, meaning that the higher the degree of decisiveness, the higher the local and regional benefits.

#### Combined effects

The combined effect of the significant independent variables was also checked, to account for the effects that independent variables may have on other independent variables that show a significant correlation on the same dependent variable. With the use of a multivariate regression analysis the betas of the adjusted correlation can be shown. For the dependent variable of transaction costs the betas of the independent variables Incongruence, Consensus/Trust and Decisiveness (I), with and without Net partners (II) are shown below. The population size variable will not be taken into account for this analysis due it not being part of the hypothesis, but also to limit the amount of variables since the sample size is somewhat low. The betas of the regional benefits are shown for the independent variables of Consensus/Trust and Decisiveness as well.

	Betas for Transaction costs	Betas for Regional Benefits	
	1	П	
Netpartners		-0,214	
Incongruence	-0,348**	-0,238	
Consensus/Trust	-0,304**	-0,401**	0,261
Decisiveness	-0,323*	-0,27**	0,256
Adjusted R <sup>2</sup>	0,621	0,602	0,138

Table 4: Adjusted results (N=28, numbers below are the standardized beta coefficients)

Significant at 0,10\*/0,05\*\*/0,01\*\*\*

The first betas (I) in regard of the transaction costs all still show a significant result in table 3, with a rather large adjusted R square, showing a large explained variance. The second betas (II), with net partners included, show a somewhat different result as only the cultural variables show to be significant and both net partners and incongruence failing to show a significant beta. As net partners and incongruence have similar backgrounds, with net partners showing the amount of net partners in a region and incongruence the overlap of members in a region, it is not surprising the combined effect drops down the adjusted R square in the second model. Since the inclusion of the amount of net partners does not improve the model, the choice for the first model seems the most logical choice. Thirdly, the betas for the regional benefits in regard of consensus/trust and decisiveness are

both not significant and also have a rather low adjust R square. This shows a difference in comparison to the individual results, where both cultural variables showed a significant correlation.

# 6. Discussion and conclusions

This master thesis has been conducted on the main research question:

# 'What are the effects of the structural features of cooperation and structural features of regions on transactions costs and effectivity of cooperation in the Netherlands?'

This research question builds on the basis of a study that focused on municipal cooperation on a municipal level, using the data of a survey in 2015 that collected data from all Dutch municipalities. The underlying policy-issue of this topic focuses on the question whether more or less complexity is preferred in the structuring of regional governance. Since municipal cooperation tends to structure itself within a certain regional geographical scope, this thesis aimed to take a further look onto a regional unit of research. To make use of the available data, a network analysis was done in order to create a regional division of the municipalities in the Netherlands. Using different sets of resolutions in the network analysis tool, to show the modularity calculations (the strength of the network groups based on the relational ties between the nodes), different divisions of regions could be created. In the process of creating the most stable groups, the final resolution setting showed three issue areas, of which the first could be resolved by the general stability and the second by the cooperational ties between the municipalities despite its small size. The last was resolved with a more in-depth look into the area, showing enough relational ties for its own region. With this analysis the data from the survey could be put into 29 different regions of various sizes, who showed to be all within their near geographical scope (such as provinces), establishing more proof of the assumption that municipalities cooperate with their close neighbours. The data of only 28 of these regions were used, as the 29th only had results of 1 respondent for a whole region. In hindsight the statistical results were checked to account for a situation starting with only 28 regions, without the exclusion of 1, but these did not differ much from the results of the original regional division.

The results of the statistical analysis itself have shown to be somewhat diverse when looking at different effects from structural features of cooperation and regions and culture onto the transaction costs and the effectivity (divided into local and regional benefits).

The first part of effectivity consisted of the local benefits, a more efficient use of providing services for citizens based on an increased capacity by the economies of scale. Overall it can be said that local benefits are not much affected by the different variables used in this thesis. First of all for the structural features of cooperation, no evidence was found to support the hypothesis 1.2a and 1.2b that complexity (through the use of the variables: net partners, cooperative intensity, singularity and incongruence) has either a positive or a negative effect on the local benefits. That no evidence was found to support the hypothesis agrees with the results found in previous research, which uses the same data on a municipal level and shows no significant result for these four variables either. The same applies to the regulatory regime as no evidence was found to support that the local benefits were affected positively or negatively by the amount of WGR-based cooperations with both units of research. Second for the structural features of regions, no evidence was found to support the hypothesis that size in terms of population has a positive effect on local benefits, nor was evidence found that surface area has a significant effect. No significant result was found either for size difference, making it seem that a region with a single large municipality has no larger amount of local benefits than an equal region or even a larger amount of local benefits than a region with two or more large municipalities. Thirdly, for culture the results are split: no evidence was found for a significant relation between consensus/trust and local benefits, but in contrast to this and all the other variables, the degree of decisiveness does show to have a significant positive relation with local benefits. While evidence is found to support the hypothesis that a higher degree of decisiveness leads to larger local benefits, showing that culture at least affects effectivity on a regional level, the

rest of the results in regard of local benefits do comply to some degree with the expectation in the theory as the units of research consisted of a different (regional) level.

Regional benefits are the second part of the effectivity, in theory expecting benefits as being part of a region that has certain cooperations, while not necessarily needing to participate in these cooperations themselves. As with local benefits, the degree of complexity shows no significant results, giving no evidence that supports either of the hyp otheses. This is somewhat surprising as one could expect regional benefits to be effected at least to some degree in this regional unit of research. On the other hand it can be explained by the fact that the municipal research, which uses the same data, shows no significant result for the four complexity variables either. Also the regulatory regime shows to be of no significant influence on regional benefits, providing no evidence to support the hypotheses that a higher regulatory regime results in more or less regional benefits.

As with previous variables, size in terms of both population and surface area did not show any significant result towards regional benefits. Apparently the size of a region is not of influence on regional benefits, disconfirming the hypothesis that was established in the theory. The results of the hypothesis in regard of size difference depend somewhat on which situation is used: with three values (consisting of a region with a single large municipality, equal municipalities or two or more large municipalities) or two values (consisting of a region with a single large municipality versus rest). The first situation showed no significant evidence to conclude that a region with a single large municipality has more regional benefits than a region with equal municipalities or even more regional benefits than a region with two or more large municipalities. However, in the second situation there was a significant result, making it seem that a region with a large municipality has more regional benefits than a region that does not, confirming the hypothesis. While the first situation accords more with the theory, the second has more body due to the small sample size being spread of an additional value (the middle value having only 3 units). Considering both the insignificant difference in favour of the hypothesis in the first situation and the small sample size, it can be concluded there is some small evidence for regional benefits being higher in a region with a single large municipality.

Both cultural variables showed to have significant positive relations with regional benefits individually. Firstly showing some evidence for the non-hypothesized theory that the higher the degree of consensus/trust, the higher the regional benefits. Secondly showing evidence to confirm the last hypothesis that the larger the degree of decisiveness, the higher the regional benefits. This result is comparable to the ones found in the municipal study. No significant beta was found on a regional level however with a still large unexplained variance, while one could be found for consensus/trust on the municipal level. Cultural variables may be intertwined to some degree, as culture may not be that easily defined, especially as the survey results consisted of perceived degrees of culture, making it harder to distinguish one from another. As such culture does seem to have an influence on benefits to some degree, but it is hard to define what exactly influences these benefits.

Costs of cooperation were considered transaction costs: the costs that are being made in order to negotiate agreements, coordinate, monitor and control (Feiock, 2007), and the results to which degree they are affected show to be more complex and with more variety than the other dependent variables. The regulatory regime shows no significant result towards these transaction costs, providing no evidence for the hypotheses, which is in contrast to the municipal study where some evidence was found in favour of more regulatory regime. The degree of complexity itself already has some difference within its variables as two out of four variables (cooperative intensity and singularity) show no significant result towards transaction costs, while net partners and singularity do show a significant result towards transaction costs. These two variables show a rather large negative correlation towards transaction costs, which argues in favour of the hypothesis that more complexity leads to lower costs. When comparing towards the previous research, there are somewhat similar

findings in regard to complexity, but also some differences. When applying a multivariate regression analysis two models were tested. The choice was made for the first model as the second model showed no significant beta for both complexity variables. These are somewhat interrelated as one shows the amount of net partners in a region and the other the overlap of members, drawing evidence from the same kind of data. As the combined effect drops down the R square, inclusion of net partners in the model was not needed. This does however mean only incongruence can be compared. The comparison shows that incongruence can be distinguished as statistically significant in both units of research, but has a larger negative correlation with regions (betas= -0.25 vs -0,35). Apparently, when looking from the perspective of a regional network, the net partners and incongruence variables are of more importance on transaction costs. Perhaps regional networks are affected greater by these variables than municipalities. In any case the results lean slightly towards a more polycentric view of intermunicipal cooperation that more complexity leads to lesser costs.

The cultural variables both show to be affecting the transaction costs. It was found consensus/trust has a significant negative effect on the transaction costs, showing evidence to confirm the hypothesis that the higher the degree of consensus/trust, the lower the costs. But for decisiveness there is also a, non-hypothesized, significant correlation with transaction costs. When comparing the cultural factor of consensus/trust with the original municipal findings in regard of betas in the first model, similar findings can be found. As with that study, transaction costs showed to have a significant beta (-0,30 vs -0,54/-0,40 vs -0,54). This would lead to assume that it seems that that a higher degree of cooperative culture results into lower transaction costs, confirming the hypothesis.

# Final conclusions and discussion

Before answering the main question, first the effects of the data and measurement will be discussed. As mentioned at the start of this chapter, the data used for this thesis consisted of a survey, which was transformed to fit the 29 (minus 1) regions of the network analysis. While having enough data compiled within, a research with a larger sample size could provide more significant results for the region-structure variables and also could provide more or larger support for some of the hypotheses. Despite that, all the municipalities in the Netherlands are already included in the current data file, making a larger sample size for this study not possible. Perhaps a way to overcome this for future research, is to extend the geographical area to include other countries.

Some concern can also be raised about the measurement of the dependent variables because the measured costs and benefits are the perceived costs and benefits of the chief executive officers. Furthermore, the data from the cultural variables was also enquired of these same chief executive officers, giving room to possible common method bias. The data can still be considered reliable as these respondents are the heads of the municipal organisation, therefore knowledgeable enough to evaluate the municipal cooperations.

The findings of this thesis itself have shown to be somewhat diverse and the answer to the main question, and in effect towards the debate on regional governance structure, differs with the independent variables. For structural features of cooperations complexity variables show to be only of little effect on costs and not at all on effectivity while the regulatory regime shows to be of no significance whatsoever in a regional context, while the regulatory regime has no effect at all. As such the structural features of cooperation do not seem to be of much importance, but when they do, they seem to be leaning towards a more polycentric perspective on cooperation. The practical consequence is then, since a larger degree of overlap of cooperation between members seems to affect the costs positively, that the choice for a more centralised and simpler cooperative structure is not favourable.

Structural features of regions also are not strongly indicating to either positively or negatively influencing costs and effectiveness, with the exception of region size in terms of population apparently leading to lesser costs. The size difference comparison remains an open question as, from the theoretical perspective of three network structures, no evidence was found to support one structure over the other ones, while some evidence was found in favour of a region with a single large municipality (versus rest) in terms of regional benefits. As those regional benefits at least show to appear in the second situation, a tentative suggestion can be made in favour of a region with a single large municipality. This means that it could be worthwhile for smaller municipalities to cooperate under the flag of a large municipality. A larger sample size could be beneficial here in providing a clearer answer to this question, showing perhaps a more significant result with three values, as that situation showed one of those values consisting of only 3 cases. Yet again, to study the effects in the Netherlands, a larger sample size cannot be found and the research would need to span the regions of other countries too.

Culture does seem to exist as an important variable when looking at the effects of cooperation, agreeing with the expectations in the theory. In one way or the other, evidence w as found to support the influence of trust/consensus and decisiveness on both costs and effectivity, even showing the interrelatedness of both variables in the case of regional benefits. Due to perceived indications in the survey in both costs and effectivity, the question can then be raised what exactly defines the cultural variables, or if they can even be looked at independently, as measurement of data for the variables (both cultural and others) was limited to the subjective perceptions of the chief executive officers. The exact causality of culture only adds to this complexity: culture has an effect on costs and benefits, but whether it does so by a direct or indirect causation, as a dependent variable itself, is still not fully understood as good results in costs effectivity may also affect the cultural climate. Partly for this reason, culture was included as a control variable, to take effects into account despite the unclear causality. Clearly defined and with an exact causal path or not, operational costs and effectivity seem to benefit from a good cultural climate, making an investment in it worthwhile.

The results of the individual cases also showed some noteworthy results. A couple of regions showed to have low costs and high local and regional benefits, showing an effective cooperation that has a low investment in costs. The contrary was also visible: regions with high costs and lower benefits, leading to suggest that these regions cooperate with quite some investment in terms of costs, but do not benefit as much from this investment, making the cooperation less effective. Finally some regions showed to have both high costs and benefits, making it appear these regions invest more into the cooperation, but also gain benefits from this investment.

The geographical scope has been named a couple of times in this thesis in the explanation that cooperation is formed within a near geographical scope. Therefore it was interesting to also check for certain geographical results of specific cases, which appears to be the case for two independent variables: the regulatory regime and, to some degree, the net partners. A lower regulatory regime was clearly distinguishable in the north/north-eastern regions of the Netherlands. While this accounted for only an average percentage of 45 to 50% of WGR-based cooperations, as the mean was 59%, it was surprising to see such a portion of bordering regions having an lower average.

Finally the net partners also showed a possible interesting result, as the regions' lowest amount of average net partners could be distinguished as being somewhat isolated from other regions in the network analysis figure. This is perhaps not that surprising as when the amount of cooperational ties between the municipalities in the isolated regions and the municipality in other regions are low, the amount of net partners also is lower. To make definite statements however, a systematic approach into the difference of the amount of internal versus external relations would be required, different from the visible estimation of a network analysis figure. Future research might be able to take a closer look into this matter.

# 7. Literature

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# Appendix

A: In-depth analysis municipalities of Food valley e.a.

# Renswoude



Renswoude has 16 intermunicipal cooperations, which are:

The first conclusion that can be based on this information is that the amount of cooperations is split between its own region and between the Utrecht region, with two cooperations having the same amount of ties between municipalities of those regions. There are a little more Utrecht regioncooperations than own region-cooperations (8 over 6). Quantity-wise, the larger cooperations are within the Utrecht region, while the smaller ones are within its own region. Also it could be said that most of the 'involuntary' cooperations are within the Utrecht region, since it contains the larger regional services such as the GGD and safety region, while in its own region the cooperations seem much more voluntary.

# Veenendaal

Bureau Regionale Veiligheidastrategie (RVS)	
Velligheidsregio Utrecht	
and the local design of the set o	( marine )
Afvalverwijdering Utrecht (AVU)	
Stichting Primair Onderwiis GMR	
WMMN Weistand en Monumenten Midden-Nederland	
Omgevingsdienst Regio Utrecht	
GGD Regio Utrecht	
Recreatieschap Utrechtse Heuvelrug, Vallei en Kromme Rijn	
Platform	Vater Vallei en Eem
Openbaar Onderwijs Rijn- en Heuvelland	
Veenendaal	
Bestuurlijk Platform Zuidoost Utrecht (BPZOU) Jeugdzorg	Regio FoodValley
GR Instituterverred in the second state of the	() Food Valley
	Sector contracting (in
Arbeidsmarkt Po	valley
ISEV samenwerking bedrij	venterreinen Ede-Veenendaal
	Afvalcombinatie de Vallei N.V.
Pureau Pagionalo Vailigheidestratogio (PVS) (Utrocht Pagion)	~~~
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Atvalverwijdering Utrecht (AVU) (Utrecht Region)	
Stichting Primair Onderwijs GMR (Utrecht Region)	
WMMN Welstand en Monumenten Midden-Nederland (Utre	cht Region)
Omgevingsdienst Regio Utrecht (Utrecht Region)	
GGD Regio Utrecht (Utrecht Region)	
Recreatieschap Utrechtse Heuvelrug, Valleien Kromme Rijn	Utrecht Region)
Platform Water Vallei en Eem (Utrecht Region/Own Region)	
Openbaar Onderwijs Rijn – en Heuvelland (Utrecht Region)	
Bestuurlijk Platform Zuidoost Utrecht (Utrecht Region/Own F	Region)
Samenwerkingsverband Rhenen, Renswoude en Veenendaal	(Utrecht Region/Own Region)
GR Instituut voor sociale werkvoorziening Zuidoost Utrecht (	Own Region)
Arbeidsmarkt Food Valley (Own Region)	
WMQ Food Valley (Own Region)	
lougdzorg Food Valley (Own Region)	
Desis Food Valley (Own Region)	
Regio rood valley (OWN Region)	
ISEV samenwerking bedrijventerreinen Ede-Veenendaal (Ow	n Region)
Atvalcombinatie de Vallei N.V. (Own Region)	
ACV (Own Region)	

Veenendaal has 20 intermunicipal cooperations, which are:

Like the previous municipality, Veendaal's cooperations also are split between the Utrecht region and its own possible region while some of them here are also equally shared between two regions.

As with Renswoude, the large cooperations are within the Utrecht regions and the smaller are within the own region. In addition, this municipality seems to be part of many of the Food valley cooperations, which are in its own region and are more voluntary

#### Rhenen

Rhenen has 17 intermunicipal cooperations, which are:



Rhenen is much like the previous two municipalities, cooperating in both its 'own' region and the Utrecht region. It has a little more Utrecht region oriented cooperations than own region cooperations, while having a few cooperations with an equal share of both regions. Likewise, the larger cooperations are seemingly more involuntary and part of the Utrecht region, while the smaller (more voluntary) cooperations are part of its own region

# Nijkerk

Nijkerk has 14 intermunicipal cooperations, which are:

Gemeenschannellik Balastinoka	Co. peratie Randmeren	
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		( Charles and Million and articles Plat
	NWO Constitution	
Regio Americon		
Arbeidsmarkt Amersfoort	Inclusief Groep N.V.	
and a second second second		
Eem Vallei Educatief Stichting Nijkerk		
Piatform Water Vallei en Eem		
Jeugdzorg Food Valley Regio FoodValley		
Omgevingsdienst De Vallei		
	RGV Holding B.V. Leisurelar	nds (Recreatiegemeenschap Veluwe)
		(The second s
Veiligheidsregio	Geiderland-Midden	

Cooperatie Randmeren (Harderwijk-Upper Gelderland Region/Polder Region) Gemeenschappelijk Belastingkantoor Locosensus-Tribijn (GBLT) (Harderwijk/Ermelo-Upper Gelderland Region) Regio Amersfoort (Utrecht Region) Arbeidsmarkt Amersfoort (Utrecht Region) WMO Eemland (Utrecht Region) Eem Vallei Educatief Stichting (Utrecht Region) Platform Water Vallei en Eem (Utrecht Region/Own Region) Jeugdzorg Food Valley (Own Region) Regio Food Valley (Own Region) Omgevingsdienst De Vallei (Own Region) Inclusief Groen N.V. (Harderwijk/Ermelo-Upper Gelderland Region) RGV Holding B.V. Leisurelands (Recreatiegemeenschap Veluwe) (Combination of Upper Gelderland/Eastern and Arnhem) Veiligheidsregio Gelderland-Midden (Arnhem-Gelderland Region) Veiligheids -- en Gezondheidsregio Gelderland-Midden (Arnhem-Gelderland Region)

The municipality of Nijkerk is somewhat different in comparison to the previous municipalities as it has quite a spread of cooperation relations. It has some cooperations based in the Utrecht and its

own region. But also in the different Gelderland regions and in combination with other regions (such as the polder and other Gelderland regions. The larger cooperations seem to be based more within the Gelderland region near Arnhem, while most of the smaller ones are based within its own possible region. This municipality is probably one of the hardest to distinguish due to the amount of different relations with other regions, while still taking part in some of the Food Valley cooperations.

# Barneveld

Barneveld has 12 intermunicipal cooperations, which are:



Barneveld is a municipality that takes part in cooperations which are central in three different regions. The amount of cooperations that are central in municipalities in its own possible regions are, however, the largest in comparison to the Utrecht and Arnhem-Gelderland region. Also in this municipality the larger cooperations are within the Arnhem-Gelderland region, whilst it also takes part in some of the Eems/Amersfoort cooperations that are based within Utrecht. Barneveld also

takes part in all of the Food Valley cooperations which are the smaller cooperations, but seemingly more voluntary.

#### Scherpenzeel

Scherpenzeel has 10 intermunicipal cooperations, which are:

Eem Vallei Educatief Stichting	
Platform Water Vallei en Eem	
Jeugdzorg Food Valley	
WMO Food Valley	
Scherpen29Agevingsdienst De Vallei Arbeidsmarkt Food Valley	
nerwerking bedriventerreinen Ede-Veneridaal	
PPCDeLink Afvalcombinetie de Vallevery Overeenkomst ter uitvoering van her be tuit Bijstandsvortening Zelfsta ACV	
Veilighe	eidsregio Gelderland-Midden Veiligheids- en Gezondheidsregio Gelderland-Midden
Eem Vallei Educatief Stichting (Utrecht Regi Platform Water Vallei en Eem (Utrecht Regi	ion) on/Own Region)

Jeugdzorg Food Valley (Own Region) Regio Food Valley (Own Region) Arbeidsmarkt Food Valley (Own Region) WMO Food Valley (Own Region) Omgevingsdienst De Vallei (Own Region) Permar WS (Own Region) Veiligheidsregio Gelderland-Midden (Arnhem-Gelderland Region) Veiligheids – en Gezondheidsregio Gelderland-Midden (Arnhem-Gelderland Region)

Scherpenzeel only takes part in 10 cooperations, but most of them are central within its own possible region. Like Barneveld, the municipality of Scherpenzeel is part of the larger Veiligheidsregion-cooperation within the Arnhem-Gelderland region, but retains mostly within the Food Valley cooperations in its own region. With the exception of a watermanagement and educational cooperation which are shared equally region-wise/part of the Utrecht region

#### Ede

#### Ede has 14 intermunicipal cooperations, which are:

Platform Water Vallei en Eem	
Jeugdzorg Food Valley Regio FoodValley	
Sheron Bernwerte (VRR)	
WMO Food Valley	
Arbeidsmarkt Food Valley Omgevingsdienst De Vallei	
ISEV samenwerking bedrijventerreinen Ede-Veenendaal	
Permar WS	
Ede	
Afvalcombinatie de Vallei N.Y. Overeenkomst ter uitvoering van het Besluit Bijstandsverler	ning Zelfstandigen (BbZ)
ACV	
	Veiligheidsregio Gelderland-Midden
	Veiligheids- en Gezondheidsregio Gelderland-Midden
	And
	Arbaits warfe Middle - Geldentand
	Notwebolleningsschab Presity
	Distance Onderwijsenson regio Armini
	Regionaless Contings
	Nazorg Bodem Holding B.V
Diatform Water Vallei on Fem (Litrecht Pegion (Own P	acient

Platform Water Vallei en Eem (Utrecht Region/Own Region) Jeugdzorg Food Valley (Own Region) Regio Food Valley (Own Region) Arbeidsmarkt Food Valley (Own Region) WMO Food Valley (Own Region) Omgevingsdienst De Vallei (Own Region) Permar WS (Own Region) ISEV samenwerking bedrijventerreinen Ede-Veenendaal (Own Region) Afvalcombinatie de Vallei N.V. (Own Region) ACV (Own Region) Overeenkomst ter uitvoering van het Besluit Bijstandsverlening Zelfstandigen (BbZ) (Own Region) Veiligheidsregio Gelderland-Midden (Arnhem-Gelderland Region) Veiligheids – en Gezondheidsregio Gelderland-Midden (Arnhem-Gelderland Region)

Nazorg Bodem Holding (B.V.) (Arnhem-Gelderland Region)

The municipality of Ede consists of cooperations which are mostly central within its own possible region. Only the watermanagement cooperation is equal region-wise between own/Utrecht-region and the Veiligheidsregio-cooperation is also for this municipality within the Arnhem-Gelderland Region, while also taking part in a sanitation cooperation in the same region. Again, most of the cooperations are in relation to the Food Valley and other own region cooperations.

#### Wageningen

Wageningen 15 has intermunicipal cooperations, which are:



Wageningen's cooperations are split between its own possible region and the Arnhem-Gelderland region. The amount of cooperations based in the own region are however much larger than the Arnhem-Gelderland region cooperation. However, it must be said those cooperations are not only the large Veiligheids regio cooperation, like much of the other municipality. The municipality also works together with municipalities in this region in childcare and the social domain.

### B: Municipalities per network region

#### **Region 1: Friesland**

Achtkarspelen Ameland Dantumadiel De Friese Meren Dongeradeel Ferwerderadiel Franekeradeel Harlingen Heerenveen Het Bildt Kollumerland e.o. Leeuwarden Leeuwarderadeel Littenseradiel Menameradiel Ooststellingwerf Opsterland Schiermonnikoog Smallingerland Sudwest-Fryslân Terschelling Tietsjerksteradiel Vlieland Weststellingwerf

#### **Region 2: Groningen**

Appingedam Bedum Bellingwedde De Marne Delfzijl Eemsmond Groningen Grootegast Haren Hoogezand-Sappemeer Leek Loppersum Marum Menterwolde Oldambt Pekela Slochteren Stadskanaal Ten Boer Veendam Vlagtwedde Winsum

#### Zuidhorn

Region 3: Drenthe Aa en Hunze Assen Borger-Odoorn Coevorden De Wolden Emmen Hoogeveen Meppel Midden-Drenthe Noorderveld Tynaarlo Westerveld

#### **Region 4: West-Overijssel**

Dalfsen Deventer Hardenberg Kampen Ommen Olst-Wijhe Raalte Staphorst Steenwijkerland Zwartewaterland Zwolle

#### **Region 5: Twente**

Almelo Borne Dinkelland Enschede Haaksbergen Hellendoorn Hengelo Hof van Twente Losser Oldenzaal Rijssen-Holte Tubbergen Twenterand Wierden

Region 6: Noord-Gelderland Apeldoorn Elburg Epe Ermelo Harderwijk Hattem Heerde Nunspeet Oldebroek Putten Zeewolde

#### **Region 7: Oost-Gelderland**

Aalten Berkelland Bronckhorst Brummen Doetinchem Lochem Montferland Oost-Gelre Oude IJsselstreek Voorst Winterswijk Zutphen

#### **Region 8: Regio Arnhem**

Arnhem Doesburg Duiven Lingewaard Overbetuwe Renkum Rheden Rijnwaarden Rozendaal Westervoort Zevenaar

#### **Region 9: Rivierenland**

Beuningen Buren Culemborg Druten Geldermalsen Groesbeek Heumen Lingewaal Maasdriel Mook en Middelaar Neder-Betuwe Neerijnen Nijmegen Tiel West Maas en Wal Wijchen Zaltbommel

# **Region: 10 Flevoland**

Almere Dronten Lelystad Noordoostpolder Urk

#### Region 11: Gooi – en

Vechtstreek Blaricum Bussum Eemnes Hilversum Huizen Laren Muiden Naarden Weesp Wijdemeren

#### Region 12: Utrecht

Amersfoort Baarn Bunnik Bunschoten De Bilt De Ronde Venen Houten **IJsselstein** Leusden Lopik Montfoort Nieuwegein Oudewater Soest Stichtse Vecht Utrecht Utrechtse Heuvelrug Vianen Wijk bij Duurstede Woerden Woudenberg Zeist

Region 13: Food Valley e.a.

Barneveld Ede Nijkerk Renswoude Rhenen Scherpenzeel Veenendaal Wageningen

# Region 14: Kop Noord-Holland Alkmaar Bergen (N.H) Castricum Den Helder Drechterland Enkhuizen Heerhugowaard Heiloo Hollands Kroon Hoorn Koggenland Langedijk Medenblik Opmeer Schagen Stede Broec Texel

# Region 15: Zaanstreek

Beemster Edam-Volendam Landsmeer Oostzaan Purmerend Waterland Wormerland Zaanstad Zeevang

# **Region 16: Kennemerland** Beverwijk

Bloemendaal Haarlem Haarlemmerliedeen Spaarnwoude Heemskerk Heemstede Uitgeest Velsen Zandvoort Region 17: Regio Amsterdam Aalsmeer Amstelveen Amsterdam Diemen Haarlemmermeer Ouder-Amstel Uithoorn

**Region 18: Zuid-Holland** Noord Alphen aan den Rijn Bodegraven-Reeuwijk Gouda Hillegom Kaag en Braassem Katwijk Krimpenerwaard Leiden Leiderdorp Lisse Nieuwkoop Noordwijk Noordwijkerhout Oegstgeest Teylingen Voorschoten Waddinxveen Zoeterwoude Zuidplas

# Region 19:

Haagland/Delftland 's-Gravenhage Delft Leidschendam-Voorburg Midden-Delfland Pijnacker-Nootdorp Rijswijk Wassenaar Westland Zoetermeer

# Region 20:

Rotterdam/Rijnmond Albrandswaard Barendrecht Brielle Capelle aan den IJssel Goeree-Overflakkee Hellevoetsluis Krimpen aan den IJssel Lansingerland Maassluis Nissewaard Ridderkerk Rotterdam Schiedam Vlaardingen Westvoorne

#### Region 21: Oost Zuid-Holland

Alblasserdam Dordrecht Giessenlanden Gorinchem Hardinxveld-Giessendam Hendrik-Ido-Ambacht Leerdam Molenwaard Papendrecht Sliedrecht Zederik Zwijndrecht

#### Region 22: Zeeland

Borsele Goes Hulst Kapelle Middelburg Noord-Beveland Reimerswaal Schouwen-Duiveland Sluis Terneuzen Tholen Veere Vlissingen

# Region 23: West Brabant

Aalburg Alphen-Chaam Baarle-Nassau Bergen op Zoom Breda Drimmelen Etten-Leur Geertruidenberg Halderberge Moerdijk Oosterhout Roosendaal Rucphen Steenbergen Werkendam Woensdrecht Woudrichem Zundert

# Region 24: Midden Brabant

Dongen Gilze en Rijen Goirle Heusden Hilvarenbeek Loon op Zand Oisterwijk Tilburg Waalwijk

# Region 25: Noordoost

Brabant 's-Hertogenbosch Bernheze Boekel Boxmeer Boxtel Cuijk Grave Haaren Landerd Mill en Sint Hubert Oss Schijndel Sint-Anthonis Sint-Michielsgestel Sint-Oedenrode Uden Veghel Vught

#### Region 26: Zuidoost Brabant Asten

Asten Bergeijk Best Bladel Cranendonck Deurne Eersel Eindhoven Geldrop-Mierlo Gemert-Bakel Helmond Hezen-Leende Laarbeek Nuenen, Gerven en Nederwetten Oirschot Reusel-de Mierden Someren Son en Breugel Valkenswaard Veldhoven Waalre

# Region 27: Noord Limburg

Beesel Bergen (L.) Echt-Susteren Gennep Horst aan de Maas Leudal Maasgouw Nederweert Peel-en-Maas Roerdalen Roermond Venlo Venray Weert

# Region 28: Zuid Limburg

Beek Brunssum Eijsden-Margraten Gulpen-Wittem Heerlen Kerkrade Landgraaf Maastricht Meerssen Nuth Onderbanken Schinnen Simpelveld Sittard-Geleen Stein Vaals Valkenburg aan de Geul Voerendaal

**Region 29: Hoekse Waard** Binnenmaas Cromstrijen Korendijk Oud-Beijerland Strijen

# C: Network region network structures

Regio nr.	Regionaam
1	Friesland
2	Groningen
3	Drenthe
4	West Overijssel
5	Twente
6	Noord-Gelderland
7	Oost-Gelderland
8	Regio Arnhem
9	Rivierenland
10	Flevoland
11	Gooi -en Vechtstreek
12	Utrecht
13	Food Valley e.a.
14	Kop Noord-Holland
15	Zaanstreek
16	Kennemerland
17	Regio Amsterdam
18	Zuid-Holland Noord
19	Haagland/Delftland
20	Rotterdam/Rijnmond
21	Zuid-Holland Oost
22	Zeeland
23	West Brabant
24	Midden Brabant
25	Noordoost Brabant
26	Zuidoost Brabant
27	Noord Limburg
28	ZuidLimburg
29	Hoekse Waard

Colours		Total Number
	Single Large Municipality structure	15
	Equalness of Municipalities	3
	Several Larger Municipalities	11