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Dependencies and Networking Activities of European Mayors

Bachelor Thesis for the Joint Degree Programme

B.Sc. Public Governance across Borders

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Abstract

This paper aims to analyse factors which determine the networking activities of European Mayors. These factors are in part the setting in which the mayors are acting, their dependency on other actors in regards to their networking activities as well as the influence of their priority issue choice for which they network. For this an existing data set of a large study over 28 countries with a total of 2691 cases, is used for regression analysis to determine significant influences of said factors.

This paper aims to answer the following main research question:

To what extent do networking dependencies, the choice of priority issue as well as factors of the municipal setting influence the extent to which mayors of 29 European countries engage in networking activities concerning the chosen priority issue in the years 2014-16.

This paper hopes to facilitate the understanding of the networking behaviour of local leaders as well as factors that influence said behaviour. In this a contribution to the field of public and local governance research is to be made. Overall it was found that variation in the priority issue setting of European mayors has an effect on their indicated levels of dependencies for some of their indicated issue priorities. Also, variation in terms of the relation between indicated dependency and network activity for the different priority issue choices is present for some issue choices but could not be confirmed for all of them.

Keywords: European mayors, Networking Activity, Networking Dependency, Priority Issue Choice, Institutional Setting, Quantitative Analysis

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1. Introduction

Going with Benjamin Barber, who emphasises the importance of the city in the democratic process and states that "only pragmatic problem solving by mayors […] promises a sustainable *global* future" (Barber, 2013, p. xi), it can be said that especially mayoral networking becomes increasingly important to enable the mayors to fulfil that important role, that Barber attributes to them, in the first place.

There has already be done some research in this field, specifically the question if networking dependencies do have an influence on networking activity was already answered by Denters, Steyvers, Klok and Cermak in 2018. They found significant positive relations and concluded that both mayoral issue priorities and specific types of network dependencies matter in explaining variation of their networking activity (p. 287f).[1]

Using these findings about the effect of issues and dependencies as a starting point, this papers goal is to look closer at the specific interactions for the single different priority issues and how they affect networking activity specifically.

The first part that is to be answered is to which extent variation in the priority issue choice has an effect on the level of dependency. Secondly, the analysis follows on how there might be variation in terms of the relation between dependency and network activity over the different priority issue choice.

Influence of variation in the mayoral priority issue choice on the level and type of dependencies can be expected theoretically, as the mayors indicate dependencies on different actors and institutions. One might expect that this - to a varying degree - depends on the specific issue choice. The severity of the chosen most-important-issue can also influence the dependency on actors as "the larger the aggregate gains from resolving [the problem] the greater the likelihood of a cooperative arrangement to do so" (Feiock, 2007, p. 49).

Another reason might also be the varying level of externalities that different issues inherit as "externalities give local leaders strong incentives to pursue joint goals" (Feiock, 2007, p. 49). In issue-areas concerning challenges which, if left unattended, might not immediately lead to negative consequences or offer no short-term benefits, networking might be more difficult and less frequent. Additional conditions are needed to be fulfilled to make actors consider supporting policies and issues which might offer 'only' long-term benefits while being costly in the short-term (Jacobs, 2011).

Furthering the understanding of networking behaviour, network settings, the extent of networking as well as determining influencing factors seems worthy of pursuit, as it might be

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[1] Issue priority, network dependency and network activity as indicated by mayors in a conducted survey, the same data resulting from this, will be used in this thesis, more about this in part 4.1.

possible to then influence the level and efficiency of networking to achieve the described positive effects (Andrews, 2011). As Agranoff & McGuire (1999) call networks "great laboratories of contemporary management" (p. 19), research in this area can help to further the understanding of local governance - and also further help develop theories of public administration in general. In the words of McGuire (2006) "there is a growing concern for determining the strength and influence of collaborative management instead of simply documenting its existence" (p. 40).

Studies have also found that external networking has a positive impact on the ability of organisations to function and fulfil their goals as they are able to access additional resources and expertise[2] (Andrews et al., 2011; Agranoff & McGuire, 2003; Meier & O'Toole, 2003). Networking means "managing flexible structures toward collective efficiency [with] the potential for rapid adaptation to changing conditions, flexibility of adjustment, and the capacity for innovation" (Agranoff & McGuire, 1999, p. 24-25).

Denters et al. (2018) have established a positive link between overall network activity and the perceived success of mayors regarding said networking activity (p. 290). While this paper is interested in the level of activities more specifically (it being dependent on priority issue variation), factors which influence the level of networking might also translate into networking success, since they seem to be related. This being said, the focus of this paper will be the dependency of *network activity* over varying issue priorities.

Overall, efforts in this field can also be connected to the relevance Barber (2013) accredits to the mayoral institution in general. As the nation state becomes too big to guarantee actual political participation of its inhabitants yet is not big enough to tackle the big problems in a globalised world, "the challenge of democracy in the modern world has been how to join participation, which is local, with power, which is central" (Barber, 2013, p. 5). Looking at the intricacies of local networking is the goal of this paper.

2. Research Question

More specifically, the following question is to be answered:

To what extent do networking dependencies, the choice of priority issue as well as factors of the municipal setting influence the extent to which mayors of 29 European countries engage in networking activities concerning the chosen priority issue in the years 2014-16.

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[2] Though also voices which found networking not being strictly advantageous come up (Huxham, 2003, Teisman and Klijn 2002). Government structures are critically looked at regarding there capability of "operating in collaborative structures" (Keast et al. 2004). McGuire (2006) takes a more cautious stance by stating that the "excitement over the possibilities of collaborative public management should thus be tempered by the realization that such management is difficult and not always beneficial" (p. 40).

Before the sub-questions, which derive from the main research question, are engaged, some descriptive questions are asked first to outline the variables and relationships in the model and to take a first look at emerging patterns:

1. To what extent do European mayors engage in networking activities on the specific issues?

With this first question the variables *networking activity* and *priority issue* are introduced and looked at in greater detail by means of frequency analysis and other tests to discover any significant differences over variations between the studied variables. This is done in part 5.1.

2. To what extent are European mayors' dependent on other actors in their networking activities on the specific issues?

In part 5.2, which is concerned with answering the second question, the four dependency variables *internal*, *intergovernmental*, *civic* and *corporate* dependency are looked at in terms of their frequency and then specifically their connection to the *priority issues*. The same tools as described in the first question are also applied here.

This is then followed by the explanatory questions:

3. How does the chosen issue influence networking dependencies?

Part 6.1 tries to answer question 3, with the use of issue dummy variables. Again, starting with and further testing the significance from findings from the descriptive parts.

4. How do different levels in the types of dependency influence the networking activity of mayors on specific issues?

In part 6.2 regression model I is build. With this the influence of the dependency type variables on networking activity is further analysed, using the findings from the descriptive analysis as a starting point.

5. How does the municipal setting influence the networking activity of mayors?

Finally, in part 6.3, the municipal setting, meaning the control variables *size* and *financial situation* are introduced in model II and then combined with the dependency variables to check their influence on the relationships found in model I. This then forms the final regression model III.

3. Theory

Networks

O' Toole defines networks as "structures of interdependence involving multiple organizations or parts thereof, where one unit is not merely the formal subordinate of the others in some larger hierarchical arrangement" (O'Toole, 1997, p. 45). As a contrast, the inherent features

of a more hierarchical bureaucracy are a (top-down) command structure and, looking at the organisational environment, actors that are more independent from each other (Mandell, 1988). Networks, on the other hand, do not have as strict a commanding and hierarchical structure but consist of various actors with overlapping goals.

As mentioned, the point of interest in this paper lies in the types and level of dependency and the relation between type of dependency and how network activity can vary per chosen priority issue. For which network type the dependency is described for exactly is influenced by which priority issue is chosen and which dependencies are indicated. These formed networks then lie somewhere on the network continuum as described by Rhodes (2006) which ranges from policy communities (more consistent in values, members and outcomes) to issue networks (less consistent, more fluctuating, less consensus). Issue networks concerning local governance, are in part populated by "officials from government organizations and agencies at federal, state, and local levels [which] operate in structures of exchange and production with representatives from profit making and not-for-profit organizations" (Agranoff et al. 1999, p. 21).

With this different network types come differences in exclusivity, aspects of power and networking strategy, however, reflections about the network types will be less prominent in this paper, as the focus will be in looking at how priority issue choices and different dependencies influence the indicated networking activity of mayors overall (while also considering the influence that the setting of the municipalities might have).

Dependency over Different Issues

Following the grouping of dependency types of Denters et al. (2018), four types of dependencies - internal, intergovernmental, civic and corporate - are distinguished (see operationalisation 4.3 for more detail). These are linked to specific actors, that might play an important role, depending on the specific issue.

Taking the mentioned variations in issue-complexity and wickedness and also the dependency on different actors (which in theory leads to the formation of specific issue networks) and applying this to the topic in question. In terms of this paper, this would mean that the complexity of the stakeholder structure and thus the specific types of resulting dependencies for the mayor, are more (or less) prominent over different issue types. Therefore, the following hypothesis can be constructed:

Hypothesis 1: Issue variation influences the different type of actors involved and thus the level and type of mayoral dependencies.

Looking, for example, at the difficulties in setting environmental protection standards[3] and the clash with economic interests that goes along with that, one might then expect that these leads, due to complexity and wickedness, to increased networking dependencies. In terms of involved actors as well as level of dependency.

Considering specifically the stakeholder structure, if one, for example, takes the stimulation of economic growth and employment (also one the issues in question) one might therefore expect that the mayor might depend more on corporate actors like the business community and professional organisations.

Hypothesis 2: The level of corporate dependency is positively influenced by the issue being of economic nature.

When addressing politico-administrative matters (another issue), dependencies might lie more with other levels of government like county, regional or national.

Hypothesis 3: The level of intergovernmental dependencies is positively influenced by the issue being of politico-administrative nature.

Connecting *intergovernmental* dependency with the issue politico-administrative in the context of hypothesis 3 depends somewhat on the interpretation of the priority issue *politico administrative* and if that includes only the local-administrative situation. The latter is considered in hypothesis 4, but this issue might also be linkable to intergovernmental actors (i.e. dependencies). The exact wording in the questionnaire for the issue choice is: "*To address politico-administrative issues, e. g. in order to improve relations with citizens, better and more efficient services, securing integrity and fighting corruption, etc.*" This of course also depends on how the mayors interpreted this question when filling out the questionnaire. In that sense hypothesis 3 also checks for this assumed separation of the *politico-administrative* issue in a local and non-local interpretation.

Hypothesis 4: The level of internal dependency is positively influenced by the issue being of politico-administrative nature.

The last hypothesis concerning specific issues choices and the resulting influence on dependency is about the influence of the local-social domain on *civic* dependency. Here one might expect a link between issues that especially concern social and community issues and civic dependency, where the mayors express their dependency on actors like neighbourhood organisations, associations, volunteers and the citizens overall. Especially when looking at issues like social policies, local identity (the keeping of traditions) and integration of minorities

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[3] Protecting the environment and resource sustainability are some of the issue priorities which mayors could choose from in their selection of the most important priority.

(think acceptance of refuges and other minority groups) it is to be expected that the dependency on the citizenships and the other named actors will be positively influenced.

Hypothesis 5: The level of civic dependency is positively influenced by the issue being part of the local social domain.

In this sense, this research is exploratory, as it is checked whether there are relevant differences between issues in terms of types of dependencies.

Networking Happens and is Happening More

Though so called "standard-issue bureaucratic hierarchies" (Andrews, Boyne, Meier, O'Toole & Walker, 2011, p. 370) do still exist, it can be observed that public service delivery as well as governing in general, shifts more to a less standardised and less hierarchical management approach and to a wider level of networking and interdependence between actors. (Andrews, et al., 2011; Kettl 1996).

Increasing task complexity lead and still leads to an increase in interdependence between actors and acting bodies in the field of (public) administration (Kettl, 1996).

Meier & O'Toole (2003) find that increased networking happens even in "hierarchical settings [as] interdependence requires that public managers deal regularly with clusters of other units to implement programs, procure resources, and gain support among stakeholders" (p. 689). The general trend seems to be that the "extent of networking with horizontal and vertical actors increase[s] substantially" (Agranoff & McGuire, 1999, p. 24) and that it is the "age of the network and collaboration" (McGuire, 2006, p. 34).

Going with the concept of *resource dependency,* as the mayors might form networks to access further resources (Rhodes, 2016, S. 431), which in this context, would explain networking activities with the mayors being dependent actors, and "constraint by a network of interdependencies with other organisations [or actors]" (Hillman, Withers and Collins, 2009, p. 1404f). Controlling resources (e. g. money, connections or influence) translates into power, and an issue network then becomes an exchange place of said resources for actors which are, to differing extent, dependent on each other (Rhodes, 2006, p. 431). How dependent the mayors are and how much they need to network might depend in turn on their priority issue for which they conduct their network activities.

Hypothesis 6: There will be variation in the relation between specific types of dependency and networking activity over different issues.

The Setting as Influencing Factor on Networking

As Andrews et al. (2011) state, explanations regarding the external networking activities of public organisations, have to take the organisational setting into account as well as the "actors and forces in their environment" (p. 357). Networking is said to happen due to stakeholder

demands, a shifting structural setting which makes it necessary to adapt via connecting to (external) actors, upcoming opportunities, or to limit uncertainty. It is also described how "elements of the setting often help to determine organizational behaviour" (p. 356). These contextual elements might then also help to determine the level of networking of public agents in a managerial role.

In this paper, the setting is taken into account by hypothesising that the size of the municipality as wells as a favourable financial situation have an impact on the networking activity of mayors. Another factor that links up with this, is that societal changes and the information age have "given rise to permeable structures in which people can link across organizational functions and boundaries" (McGuire, 2006, p. 34). The complexity and wickedness of problems is brought up as a reason for increased network collaboration, as "more flexible, more inclusive, and more adaptable [mechanisms]" (McGuire, 2006, p. 34) are needed to solve those problems (Alter and Hage 1993; Feiock, 2007). This then would also explain the direction of the hypothesis concerning the population of the mayors' municipalities (variable *size*). Bigger cities can arguably be seen as a more complex setting in which the mentioned societal changes also tend to set in first or are first enabled due to the possibilities of innovation there (Dvir & Pasher 2004). The hypothesis derived from this would be

Hypothesis 7: The higher the population of the mayoral municipalities, the higher the level of networking activity of mayors.

Regarding the second setting-variable *financial situation* the theoretical mechanism could be twofold: One option could be that - if the municipality is better off in terms of financial resources - it might be enabled to engage or conduct activities more independently on its own. Thus, one would expect the level of networking to be comparatively lower.

Hypothesis 8a: The better the financial situation of the mayoral municipalities, the lower the level of networking activity of mayors.

The other possible direction could be that a better financial situation can give one the ability or the incentive to do it in the first place. The municipalities might first be able to benefit from networking when there are resources available that can be shared. Networking might then make tasks more efficient and profitable, even more so when there are more resources with which to network with.

Hypothesis 8b: The better the financial situation of the mayoral municipalities, the higher the level of networking activity of mayors.

Figure 1: Causal Modell
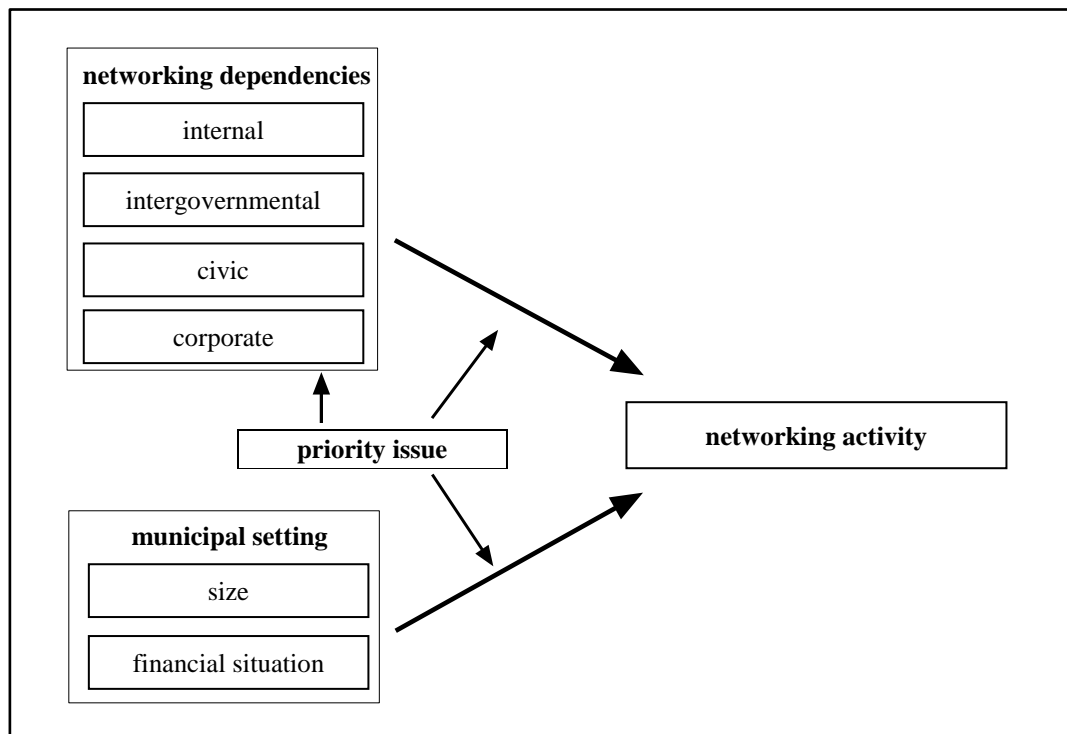
4. Methods

4.1 Research Design

In using data provided by the POLLEADER II project, which collected survey data from a large number of subjects, a cross-sectional analysis is performed. The mentioned project gathered data between 2014 and 2016 (Heinelt, Reynaert, Magnier and Cabria, 2018, p. 2). For matters of analysis the assumption seems reasonable that the data in question are of cross-sectional nature. It is assumed that (at least) the parts that are used for this thesis paper do not change over the time period of data collection, meaning they are not influenced by time. The latter would require time-series analysis which is not conducted in this case.

To answer the sub-questions (and measure the relationships between the variables) which derive from the main research question, multiple linear regression analyses is conducted. This method of analysis seems to be practical and the best choice, as the existing data can be operationalised and analysed statistically - also in ways others have done before (see Heinelt et al., 2018).

Potential threats to the validity of this research approach can be looked at from two angles: threats to internal and external validity.

Consideration of Threats to Internal Validity

Following Campbell and Stanley (1963, p. 5f) and Cook and Campbell (1979, p. 51–55), Babbie (2011) describes various sources of - or rather threats to - internal validity:

Historic events or *maturation* of the surveyed persons can be one of those dangers. But as mentioned earlier, due to the cross-sectional nature of the used data, it should be possible to exclude this as a validity threat.

Potential consequences of *testing* and *re-testing* do not seem to be an issue as well - even if you would consider the POLLEADER II survey being, so to speak, a re-test of the earlier conducted POLLEADER I study in 2003 and 2004. Since no sensitive questions regarding, for instance, prejudices were asked, changes in answering behaviour are not to be expected. Also, a lot of the questions differ between the two surveys (p. 256f).

Additionally, to the so far evaluated potential threats, there are also "three main criteria for nomothetic causal relationships in social research" (Babbie, 2011, p. 97). These need to be considered as they are needed for the research to possess internal validity in the first place. They mean 1) that there is no correlation between the stated variables 2) that the effect precedes the cause in time 3) that the effect is caused by a third variable which is not in the model but explains the measured effect. (p. 97f)

The validity threat of the effect preceding the cause in time can be dangerous especially in cross-sectional data gathering, as there is no real way of telling what caused what (Contrary to this being possible when conducting a time series analysis). Since it is not possible to test the direction of the constructed relationship in a controlled experimental setting, the time ordering has to be argued for theoretically.

To remedy the threat regarding the exclusion of relevant third variables to an extent, the *setting* variables are included into the model as control variables. Theoretically, there will be most likely a relationship between those controls, networking dependencies and networking activity. By doing this, their influence on the model can be controlled for.

External Validity

Regarding external validity the data source has to be considered. As the data gathering focus was on doing a survey of European mayors, research findings might only be generalizable to European countries as a whole and only to larger municipalities. When looking at specific countries and drawing conclusions about the mayoral population in them, also the number of existing cases has to be considered: The total number, but also the rate of mayors per country who responded to the questionnaire in the first place.

4.2 Case Selection and Sampling

The data used for this research were collected with a survey being conducted on an individual level. The units of analysis are European mayors in municipalities over 10.000 inhabitants.

The collected data consist of 2.623 cases and covers 30.7 % of all the cities that fit the criteria in the 30 countries[4] in which the survey was conducted. (Heinelt et al., 2018, p. 9)

Mayors, in this case, were more broadly conceptualized as local leaders. Local leadership in this sense is defined as being in a top position in a municipal administrations or similar governing bodies with command over resources and having influence and functions in a public role (Magnier & Bäck, 2006, p. 10). In this paper only the term "mayor" will be used, but with the mentioned conceptualization in mind.

Using the data gathered from the POLLEADER network enables one to work with recent and representative data about networking behaviour of European mayors. In the scope of a bachelor thesis this available data are the best to work with which engage the laid out area of study. Apart from during the operationalisation of the variables and looking out for systematically missing data, countries will not be an object of investigation, as dependencies are looked at over priority issues. Due to this, it is possible to work with the maximum amount of available cases over the whole thesis.

4.3 Operationalisation

All of the used data come from the quantitative POLLEADER II data set. As described above, four main concepts are making up the model: *municipal setting*, *networking dependencies*, *networking activity* and *priority issue*. They are measured over the different choices of priority issue. See appendix 9.1 for a detailed description of the variables, which will be introduced in the following.

The *priority issue* variable, whose impact on dependency and also the relationship between dependency and networking activity is assessed in the analysis, bases on a selection from nine given challenges in the questionnaire. The mayors were asked: "*What would you consider as the single most important challenge on the above list?*". The nine challenges which could be chosen from are: *attractiveness of the municipality, social policies, natural environment, public safety, politico-administrative issues, local identity, economic growth and employment, infrastructure* and *integration of minorities* (shortened) (Heinelt et al., 2018, p. 459).

4.3.1 Independent Variables

Networking Dependencies

Following Denters et al. (2018) and their grouping of networking dependencies, the different dependencies are grouped into four type-variables: *civic*, *intergovernmental, internal*, and *corporate*. These scale variables are made up of survey-question items in which the mayors indicated the level of dependency on different actors regarding the most important issue:

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[4] Albania, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, England, Finland, France, Germany, Greece, Hungary, Iceland, Israel, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland and Turkey (Heinelt et al., 2018, p. 2).

If you consider the most important challenge (issue, K. M.): to what extent would you say that your administration depends on the cooperation and support of the different actors below in addressing this problem? (Heinelt et al., 2018, p. 459)

The four constructed dependency scales (based on Likert-scale ordinal values from the question items) are treated as numeric interval-level variables. The given indication for the level of dependency, expressed from having 'no dependency' to being 'highly dependent', can be seen as continuous increasing. This can then be expressed numerical from values 1 to 5.

The specific grouping of the actors, on which the mayors indicated their dependency on, into the four index variables follows theoretical assumptions, as well as statistical reliability- and factor-analysis. The pattern matrix (see table 19 in appendix 9.1), resulting of a conducted factor analysis, clearly indicates four components in which the factor loadings of the items are highest. Only the question item o*ther municipalities in the region* was finally not considered for any of the four variables, as its highest loading barely makes the set threshold, and if it were included into any of the constructed variables it would strictly worsen their Cronbach's Alpha value. See these values in the following table. As the variables were constructed by grouping multiple question items together, the Cronbach's Alpha values are used to check their internal consistency.

Table 1: Internal Consistency Dependency Variables

Dependency Types	Civic	Inter-governmental	Internal	Corporate
Cronbach's Alpha	.75	.77	.51	.79

Range 0 to 1, the closer to 1, the higher the level of internal consistency

While one generally looks for an alpha above .7 (DeVillis, 2003), the .51 value for the *internal* dependency grouping, while a bit low, seems acceptable as it can be theoretical argued for the grouping to be relevant. Also, the pattern matrix calls for a fourth group and the removal of any item would again, strictly worsen the alpha value (see item total statistics in appendix 9.1). These considerations lead to the following grouping of items into index variables:

Table 2: Index Variables for the Dependency Scores for Different Actors

Civic	Intergovernmental	Internal	Corporate
▪ Neighbourhood organisations ▪ Voluntary Organisations and associations ▪ Individual citizens	▪ Regional government ▪ National government ▪ EU and other supranational organisations ▪ County government	▪ Majority party / coalition in the council ▪ Opposition in the council ▪ Municipal civil service	▪ Local business community ▪ Professional institutions ▪ Knowledge institutions

See Denters et al., 2018, p. 284 for the dependency types, different dependencies on actors were indicated with a 'no dependency' to 'highly dependent' scale ranging from 1 to 5 (Heinelt et al., 2018, p. 459)

The variables were computed by taking the mean of the items, while allowing for one missing item per case and grouping. The item *county government* is systematically missing for all of the Slovenian cases and the item *regional government* for all Slovenian as well as for the Swedish ones. In the variable computation this was taken into account by removing the respective item(s) for these countries. The cut-off for the mean calculation of the *intergovernmental* dependency score was lowered by one for the Swedish cases and by two for the Slovenian ones.

Municipal Setting

The variables *size* and *financial situation* make up the municipal setting.

Size indicates the population size of the mayoral municipality. For further analysis a logarithm of the population number is used to limit the influence of the larger cities in the regression (Kahane, 2008). For all countries the exact population number is given in the data-set, with the exception of the Dutch cases. They had to be treated special as for the purpose of anonymisation, the exact number is not available, only a grouping of the municipalities into three size groups (*0 - 24.999, 25.000 - 49.999* and *50.000 +*). Aside from this, a simple size-ranking is available. With this given information, using the cut-off points of the three size-groups and the ranking of the cases, it is possible to assign to each case (municipality) an approximate number of inhabitants based on the actual population distribution of Dutch municipalities in that period and absolute range. The actual population statistics are taken from Dutch CBS statistics (Statistics Netherlands, 2018).

For the city's *financial situation*, it was asked for directly in the questionnaire: "*How would you describe the financial situation of your municipality*?". The answer possibilities are expressed by a five-point Likert-scale of expressions ranging from *very poor, poor, neither good nor poor, good* and *very good.* (Heinelt et al., 2018, p. 463). These values being ordinal are but treated as continuous numeric values ranging from 1 to 5 in the following analysis.

This perspective allows for a wider and more understandable analysis. However, it requires the assumption that 1) the Likert-scale values are sequenced in a way that they can also be expressed numerical as well as 2) that the distances between the Likert-scale expressions are equal (Grace-Martin, 2008).

In this particular case it can be argued that the indication for *financial situation*, expressed from being *very poor* up to *very good*, can be seen as continuous increasing, which can also be expressed numerical with values 1 to 5. Concerning the second part of the argument, that the distance between e. g. 1 and 2 is the same as between 3 and 4 – this is somewhat more difficult to argue for. The upside though, that it allows for a greater analysis of the data, is seen to outweigh the possible downside of results possibly being somewhat blurred and only an approximation of the expressed values.

The effects that treatment of ordinal data as continuous can have on the analysis and interpretation of results has to be kept in mind in the following parts of this paper.

4.3.2 Dependent Variable

The measurement for *networking activity* is based on a question with five Likert-scale items where the mayors indicated: "*To what extent did you actively engage in the activities below to bring together different actors and stimulate their cooperation in addressing this problem?*" (Heinelt et al., 2018, p. 460). The scale was from '*Not at all*' to '*Very much*' with a range from 1 to 5. The five items for which the mayors indicated the networking extent were: *Organized a platform, acted as a mediator and facilitator, use of formal powers, prestige and political influence, linking societal stakeholders with (inter)governmental networks* and *linking local networks with inter-municipal, regional and (inter)national networks*. (p. 460) Following factor analysis, the generated component matrix groups the items into the expected single component. The item *use of formal powers, prestige and political influence* has a low item total correlation of .30 the exclusion of this item increased the Cronbach's Alpha value from .68 to .70. The variable is constructed with the four remaining items.

This index variable is also treated as a continuous score and it also was computed by taking the mean of the items while allowing for one missing item per case.

5. Descriptive Analysis

Conclusions regarding the research questions and the derived hypothesis are drawn by statistical inference using regression analysis. With that, significant relationships between the independent and dependent variables can be estimated. Regression analysis is conducted for measuring the effect that different levels in dependency type have on the networking activity of mayors over differently chosen priority issues. In addition, the effect that the different issues have on networking dependency is also looked at. Lastly also the influence of the municipal setting is included into the regression model. The cases consist of all the individual mayors that made statements in the relevant survey questions.

5.1 Networking Activities by European Mayors on Specific Issues

To answer the first descriptive question; "*To what extent do European mayors engage in networking activities on the specific issues?",* the variations in frequencies of *networking activity* over differences in *priority issue* are analysed.
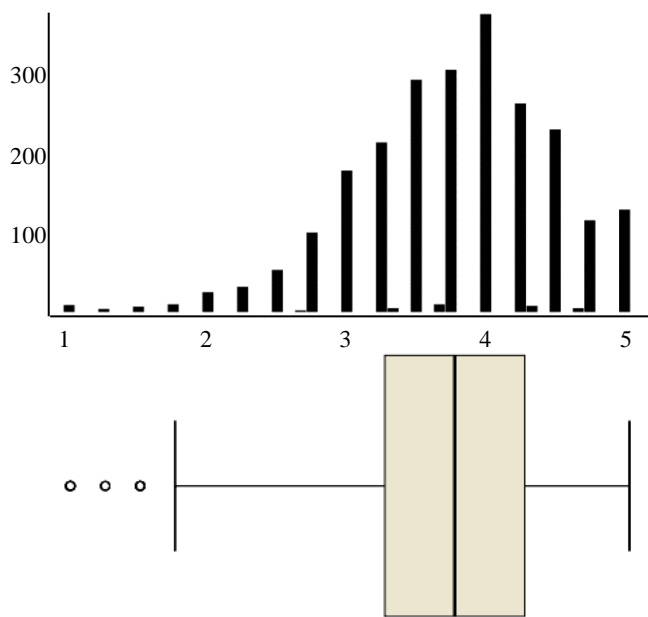
Figure 2: Networking Activity

Table 3: Frequencies Networking Activities

Frequency	Frequency	Valid Percent
1.00 – 1.99	30	1.2
2.00 - 2.99	220	8.9
3.00 – 3.99	1.043	42.4
4.00 – 5.00	1.169	47.5

N = 2.462, mean if not grouped 3.8, if grouped 3.4

Looking first at networking activity in general and independently of the chosen priority issue, the mean activity for the average European mayors lies at a score of 3.8. It follows that the average mayor leans into the direction of being more active in regards to networking than less (three being the middle score between 'not at all' and 'very much', regarding the activity of the single items). This is also shown in detail in table 3. About 10 percent are leaning more into the direction of 'not at all", while the majority of nearly 90 percent is placed on the side that leans to having a higher networking activity (7.5 percent being right in the middle).

Looking at the edges, it is also rather uncommon to be below a level of networking activity of 2. Only 1.2 percent of cases are placed there. Looking at the other end of the spectrum, whole 47.5 percent of the cases are equal or above an activity value of 4.

As also shown by the histogram and the boxplot, the data is slightly skewed to the left and values below 1.75 are, as the boxplot shows, becoming outliers.

Table 4: Frequencies priority Issues

Chosen Priority Issue	Frequency	Valid Percent
Local attractiveness	1.036	41.5
Economic growth	513	20.6
social policies	465	18.6
Infrastructure	133	5.3
Politico-administrative	122	4.9
Public safety	86	3.4
Integration of minorities	56	2.2
Natural environment	49	2.0
Local identity	35	1.4

N = 2.495

Focussing on the priority issues, the choice of issue is somewhat clustered around a few issues. Table 4 shows that *increasing the attractiveness of the municipality* was chosen 41.5 percent of the time. S*timulating economic growth* and *developing social policies* are hovering around 20 percent each. These three items out of the nine options in total make up over 80 percent of all priority choices by the mayors. The rest of the choices drop of in number starting with 5.3 percent for *improving the infrastructure* and falling so far as to *preserving the local identity* being chosen only 35 times out of all 2.495 cases.

In figure 3 and table 5 it is shown how the *networking activity* differs over variation in *priority issue* choice:

Figure 3: Mean of Networking Activity over Different Issue Priorities

Error Bars: 95% CI
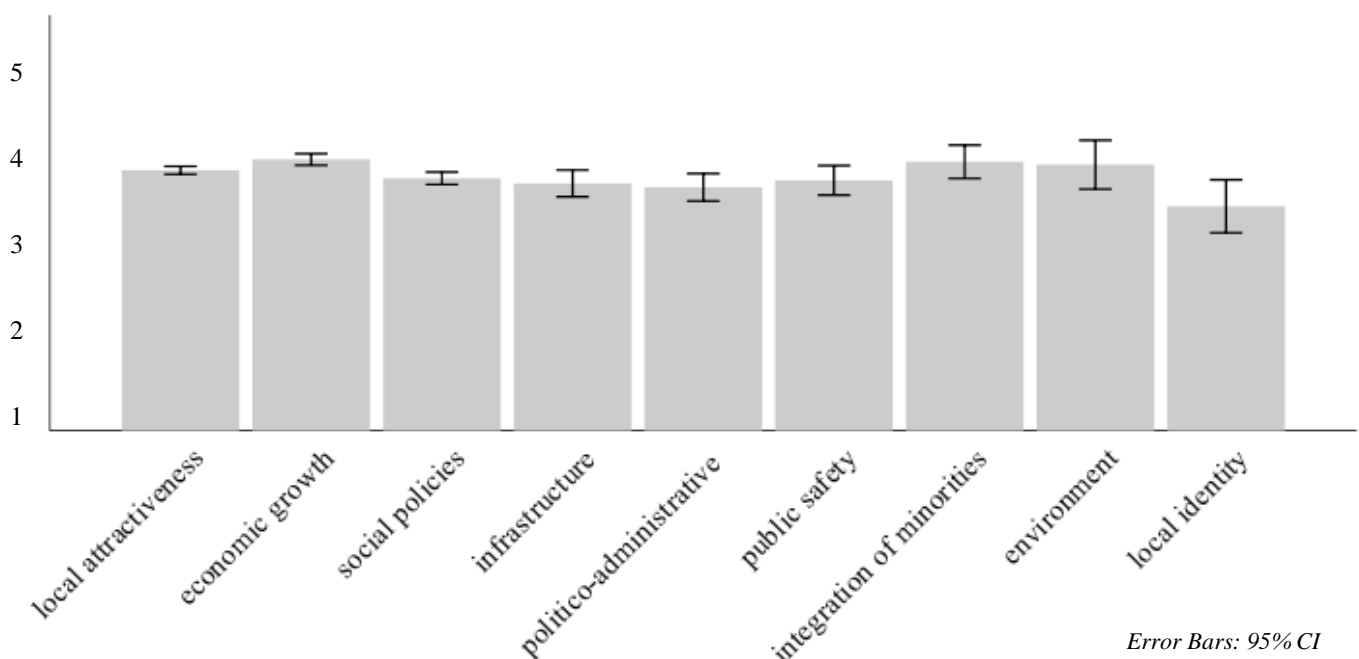
See individual histograms for network activity over different priority issues in appendix 9.2

To check if there are significant statistical differences between the means of networking activity over different priority issues, a one-way analysis of variance - test (ANOVA) is conducted. For this test being applicable, certain assumptions have to be met. See appendix 9.2 for the underlying checks and decisions that led to this specific test being used. The test shows that the level of networking activity is statistically and significantly different for (some) chosen priority issues, $F(8, 2371)$ 5.473, $p < .001$.

The former test does not indicate between which priority issues the statistically significantly differences occur. To find that out, a Tukey-Kramer post hoc test follows. The statistically significant differences in means that are found are between *local attractiveness* and *local identity*. Furthermore, between *economic growth* and all of these four issues: *social policies*, *politico-administrative issues*, *local identity* and *infrastructure*.

More specifically, looking for example at the first mentioned significant difference, there is a mean network activity of 3.8 ± .7, when the priority issue is *local attractiveness*. When the priority issue is *local identity* however, the network activity is 3.4 ± .8., a difference between the two issues of .4 (95% CI, .0022 to .7675), which is statistically significant ($p = .047$).

Table 5: Networking Activity over Different Priority Issues

Priority Issue	Networking Activity				Mean	Std. Deviation
	1.00 – 1.99	2.00 – 2.99	3.00 - 3.99	4.00 – 5.00		
Local attractiveness	0.7	8.9	41.2	49.2	3.8	0.7
Economic growth	0.2	7.9	36.9	55.1	3.9	0.7
Social policies	1.4	9.1	48.2	41.3	3.7	0.7
Infrastructure	3.1	10.9	42.6	43.4	3.6	0.8
Politico-administrative	4.4	11.4	43.9	40.4	3.6	0.8
Public safety	2.7	9.5	47.3	40.5	3.7	0.7
Integration of minorities	0.0	7.7	42.3	50.0	3.9	0.6
Environment	2.5	5.0	42.5	50.0	3.8	0.8
Local identity	5.9	11.8	55.9	26.5	3.4	0.8
Total	1.2	8.9	42.4	47.5	31.8	0.7

In percent, mean not grouped

In conclusion, regarding the first sub-question, "*To what extent do European mayors engage in networking activities on the specific issues?*", it can be said that, on average, European mayors tend to indicate a relatively high level of networking. While there is some variation and high clustering in regards to the choice of priority issue, there is not that much variation in the level of network activity over the chosen priority issue (though, as mentioned, some differences being significant). These results confirm what Denters et al. (2018) also have

established already: Namely that one "can conclude that no major differences occur in network management activities across different issue areas" (p. 283).

5.2 Networking Dependencies of European Mayors on Specific Issues

Regarding the second descriptive question, "*To what extent are European mayors' dependent on other actors in their networking activities on the specific issues?*", further analysis of the dependency scores as well as their variation over different issue priorities is conducted.

Table 6 shows the spread of the dependency scores. The mean dependency scores for each variable is over the mid-point of 3 (that being the middle score of 3 between 1 'No dependency' and 5 'Highly dependent'). Regarding the dependency of the single variables: *Internal* dependency has the highest mean of 3.55, close to three out of four mayors chose a level to the right of the mid-point with only 15.1 percent being to the left – being closer to 'No dependency' (11.8 percent right in the middle). *Civic* dependency has the lowest mean with 3.17.

Table 6: Frequencies Dependency Types

Dependency Types	Valid Percent Score Distribution				Mean	SD
	1.00 – 1.99	2.00 - 2.99	3.00 – 3.99	4.00 - 5.00		
Civic	6.5	25.9	44.4	23.2	3.17	.85
Intergovernmental	4.2	19.0	39.2	37.6	3.50	.90
Internal	2.1	13.1	48.6	36.3	3.55	.74
Corporate	5.9	24.9	42.5	26.7	3.23	.89

The *civic* dependency variable has, next to having the lowest mean, also the lowest number of mayors who put their dependency to the right of the mid-point (48.9 percent), with 32.4 percent to the left and 18.7 percent to the middle. When focusing on the edges, one can see that values under 2 are again quite rare, with the highest amount being *civic* dependency with 6.5 percent of mayors indicating dependency below 2 (*internal* dependency has the lowest amount of only 2.1 percent of mayors below a score of 2). On the other end of the scale comparatively more mayors indicated high dependency scores. *Intergovernmental* dependency overtaking *internal* dependency slightly with 37.6 percent of mayors, against 36.3 percent who indicated dependency equal or above a value 4.

Concluding the sole analysis of the dependency variables, it can be said that the average European mayor seems to indicate a somewhat high level of dependency which is more to the right of the dependency scale, over all of the four index variables.

Now to move on and to combine these findings with the variations in dependency over different priority issues: In table 7 one can see all of the mean scores for the four introduced dependency variables over the different priority issue the mayors chose.

Table 7: Mean Dependency Score over Different Priority Issues

Priority Issue	Mean Dependency Score			
	Civic	Inter-governmental	Internal	Corporate
Local attractiveness	3.11	3.35	3.59	3.21
Economic growth	2.99	3.88	3.48	3.77
Social policies	3.39	3.67	3.60	3.07
Infrastructure	2.72	3.59	3.44	2.59
Politico-administrative	3.61	2.94	3.63	2.98
Public safety	3.23	3.16	3.38	2.99
Integration of minorities	3.72	3.38	3.59	3.15
Natural environment	3.30	3.75	3.20	2.98
Local identity	3.71	2.77	3.41	3.04
Independent from issue	3.17	3.50	3.55	3.23

To check if there are significant statistical differences between the means of the dependency scores over the different issue choice, for the dependency variable *civic*, a one-way ANOVA test followed by a Tukey-Kramer post hoc test is conducted. Welch-ANOVA as well as Games-Howell post hoc tests are run for the dependency variables *intergovernmental*, *internal* and *corporate.*[5]

The result is that the means of all four dependency scores are statistically significantly different over different priority issue choices.

Table 8: Robust Tests of Equality of Means

Dependency Variables	ANOVA	Sig.
Civic	$F(8, 2406) = 3.576$	$p < .001$
Intergovernmental	$F(8, 253.473) = 27.072$	$p < .001$
Internal	$F(8, 253.018) = 3.539$	$p = .001$
Corporate	$F(8, 259.078) = 42.915$	$p < .001$

See appendix 9.2 for tables of all significant differences.

Now to conclude part 5.2 and answer the questions "*To what extent are European mayors' dependent on other actors in their networking activities on the specific issues?*". It can be said that the average European mayor does indicate to be dependent on other actors in his or her efforts to reach the prioritised issue. The extent of the dependency, on average moderately high, often differs significantly over different issue priorities though. Further analysis where these differences lie exactly, how they influence networking dependency and ultimately the level of networking activity will be further analysed in the explanatory analysis.

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[5] Welch ANOVA tests are used for the latter three variables instead of a one-way test. This is due to them violating the assumption of homogeneity of variances, see appendix 9.2 for the tests concerning this matter.

6. Explanatory Analysis

Multiple linear regression analysis is performed to find out how much variation in the dependent variable is explained by the independent ones. In this way the influence that each of the single independent variables have, can be assessed. To answer the research question, the overall statistical model will be build up step by step over the explanatory sub-questions. Before running the analysis, the models are checked for the necessary assumptions that have to be met in order to be able to run this specific form of a regression model. Linearity is assessed by looking at partial regression plots and plots of studentized residuals against the predicted values. The independence of errors assumption is assessed by Durbin-Watson statistics. The condition of homoscedasticity is checked by visual inspection of a plot of studentized residuals against unstandardized predicted values. Indications for multicollinearity are checked for with the variance inflation factor test, and lastly the normality assumption with Q-Q plots.[6]

6.1 Influence of Chosen Priority Issue on Networking Dependency

Regarding the sub-question "*How does the chosen issue influence networking dependencies?*", the influence of variation in priority issue on the dependency types (*civic, intergovernmental, internal* and *corporate*) is looked at. Since the choice of issue cannot be recorded as continuous variable and rather constitutes a categorical predictor in this case, the variations in priority issue choice need to be recoded into dummy variables.

Table 9: **Influence of Issue Dummies on Dependency Types**

Independent Issue Dummies	Civic		Inter-governmental		Internal		Corporate	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Constant	3.1	.000***	3.4	.000***	3.6	.000***	3.2	.000***
Economic growth	-.13	.004**	.53	.000***	-.12	.003**	.58	.000***
Social policies	.27	.000***	.31	.000***	.01	.906	-.11	.014*
Infrastructure	-.40	.000***	.24	.003**	-.16	.022*	-.60	.000***
Politico-administrative	.49	.000***	-.42	.000***	.03	.655	-.21	.011*
Public safety	.11	.253	-.20	.062	-.21	.017*	-.20	.045*
Integration	.60	.000***	.02	.860	.00	.974	-.04	.757
Natural environment	.19	.160	.40	.004**	-.40	.001**	-.21	.114
Local identity	.59	.000***	-.59	.000***	-.18	.155	-.15	.298
R^2	.06		.09		.01		0.12	

Local attractiveness dummy as baseline (constant)
B = Unstandardized Coefficient
* = p < .05, ** = p < .01, *** = p < .001

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[6] See all the tests and indicators, for the assumptions being met, detailed in appendix 9.3.

Thus, linear regression models with priority issue dummy variables are set up. These dummies make up the independent variables, whose influence on the dependent dependency variable is looked at. The regression is conducted five times, giving us five sub-models, one per different dependency type as dependent variable and overall dependency each. Initially, the dummy issue local attractiveness is used as a baseline. Which dummy constitutes the baseline changes over the different hypotheses and the specific interest.

Starting point of this analysis will be the finding of significant differences between the dependency scores for changing issues and the mean dependency scores already established in parts 5.1 and 5.2. Now the specific regression coefficients for the individual differences will be looked at further.

As one can see in table 9 (and also previously indicated in descriptive part 5.2) there are differences in level of dependency as well as in the type of dependency, which are affected when the priority issue varies. This analysis part adds to these findings, in the way that one can now determine where the significant positive and negative relationships (i.e. changes) lie specifically. As theorized, variations in issue complexity, wickedness and also the dependency on different actors might influence the relationships between issues and dependency. This leads to the following more general hypothesis:

Hypothesis 1: *Issue variation influences the different type of actors involved and thus the level and type of mayoral dependencies.*

As shown above this seems to be supported by most of the relationships in the regression, as the majority (20 out of 32 relations) has significant coefficients, meaning significant differences from the baseline.

Now to look at the second hypothesis in which it was theorized that, when one considers the stakeholder structure, for example the stimulation of economic growth, one might expect that the average mayor might depend more on corporate actors like the business community and professional organisations:

Hypothesis 2: The level of corporate dependency is positively influenced by the issue being of economic nature

When the chosen issue is *economic growth* the average level of *corporate* dependency, amounts to 3.7 and as already established in the descriptive analysis, this is significantly higher than other mean scores, as it is the second highest mean dependency score overall.

This hypothesis is also confirmed quite strongly by the results of the regression analysis (see table 10). When the priority issue choice *economic growth* is taken as constant, a change in issue choice leads to a significant decrease in *corporate* dependency. This holds true for all other eight issue options. The size of the effect on dependency ranges from .43 for local attractiveness to .1.06 for infrastructure.

The other interesting result is, that the hypothesis could be expanded by intergovernmental dependency. The mean score for intergovernmental dependency (when the chosen priority issue is *economic growth*) comes to 3.8 - this being the highest dependency score overall. The dummy coefficients for the *intergovernmental dependency* regression model are also all negative and with the exception of *natural environment* all statistical significant. Next to corporate dependence being significantly higher for economic issues, the average mayor seems also be more dependent on intergovernmental actors in this case.

Table 10: **Influence of Issue Dummies on Dependency Types**

Per Issue Dummy	Civic		Intergover-nmental		Internal		Corporate	
	B	**Sig.**	**B**	**Sig.**	**B**	**Sig.**	**B**	**Sig.**
Constant	3.0	.000***	3.8	.000***	3.5	.000***	3.7	.000***
Local attractiveness	.08	.078	-.46	.000***	.09	.017*	-.43	.000***
Social policies	.36	.000***	-.15	.007**	.10	.031*	-.57	.000***
Infrastructure	-.31	.000***	-.22	.008**	-.06	.382	-1.06	.000***
Politico-administrative	.57	.000***	-.88	.000***	.13	.092	-.67	.000***
Public safety	.20	.048*	-.66	.000***	-.12	.192	-.66	.000***
Integration	.69	.000***	-.44	.000***	.09	.401	-.49	.000***
Natural environment	.28	.042*	-.07	.638	-.30	.013*	-.67	.000***
Local identity	.68	.000***	-1.05	.000***	-.08	.506	-.61	.000***
R^2	.61		.79		.01		.09	

Economic growth dummy as baseline (constant)
B = unstandardized Coefficient
* = $p < .05$, ** = $p < .01$, *** = $p < .001$

Differences in stakeholder structure also seem to be relevant when addressing politico-administration matters. As theorised, in this case, dependencies might lie more with other levels of government like county, regional or national. The variable *intergovernmental* dependency is used as an expression of these other levels.

Hypothesis 3: The level of intergovernmental dependencies is positively influenced by the issue being of politico-administrative nature

As discussed, also the possibility of increasing internal dependency in case of this specific priority issue is looked at:

Hypothesis 4: The level of internal dependencies is positively influenced by the issue being of politico-administrative nature

For this, the issue *politico-administrative* is taken as constant dummy. Table 11 shows that the results do not really confirm either of the theoretical assumptions.

In case of this issue the descriptive analysis already gives us a comparatively low mean score for *intergovernmental* dependency of 2.94 (the second lowest for intergovernmental dependency over all issues. The regression analysis naturally confirms this finding.

If the priority issue changes away from *politico-administrative* (i.e. the baseline in the model), *intergovernmental* dependency will go up for all issues except *local identity* (*public safety* not being significant though). The level of *intergovernmental* dependency thus seems not to be positively influenced by the issue being of *politico-administrative* nature. The opposite seems to be the case, as indicated by six of the other issues having a significantly positive coefficient, that puts their mean dependency score over that of *politico-administrative* as issue choice. As a result, it can be said that hypothesis 3 is not supported by the results. This result strengthens the assumption made in the next hypothesis, that the politico administrative issue is rather confined to internal dependency.

We already know that the mean score of 3.63, for *internal* dependency in case of *politico-administrative* as issue choice, is the highest one for this dependency type over all issues. Thus, the coefficients for all the other dummy issues regarding internal dependency are all negative. This would support hypothesis 4, as this means that internal dependency goes down over the other issue choices. However not all are significant. While the direction seems to be the expected one, statistical significance is given only for some of the issues. Thus, some support is given for some of the issues, but not for all.

Table 11: **Influence of Issue Dummies on Dependency Types**

Per Issue Dummy	Civic		Intergover-nmental		Internal		Corporate	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Constant	3.47	.000	3.11	.000	3.63	.000	2.94	.000
Local attractiveness	-0.36	.000***	0.25	.000***	-0.04	.476	0.27	.000***
Economic growth	-0.48	.000***	0.78	.000***	-0.15	.013*	0.82	.000***
Social policies	-0.08	.239	0.56	.000***	-0.03	.606	0.13	.064
Infrastructure	-0.75	.000***	0.49	.000***	-0.19	.020*	-0.35	.000***
Public safety	-0.24	.037*	0.05	.659	-0.25	.013*	0.05	.687
Integration	0.25	.057	0.27	.046*	-0.04	.726	0.21	.103
Natural environment	-0.16	.260	0.64	.000***	-0.43	.001**	0.03	.812
Local identity	0.24	.119	-0.34	.035*	-0.22	.108	0.10	.524
R^2	.06		.08		.01		.12	

Politico-administrative dummy as baseline (constant)
B = Unstandardized Coefficient
* = $p < .05$, ** = $p < .01$, *** = $p < .001$

Concerning the influence of the local-social domain on *civic* dependency and the resulting hypothesis:

Hypothesis 5: The level of civic dependency is positively influenced by the issue being part of the local-social domain.

The available issues that can be considered part of the local-social domain are *social policies*, *local identity* and *integration*. The descriptive analysis already found that over these three issues comparatively high levels of *civic* dependency were indicated. Under *integration* the highest mean score for *civic* dependency with 3.72 is present, followed by *local identity* with 3.71. Under s*ocial policies* the score is also quite high with 3.39 being the fourth highest score of all issues (3.17 being the indicated dependency independent from priority issue choice).

To further test this hypothesis, each of the three issues is taken as baseline and the significance and the variation of the other dummy coefficients is looked at.

In table 12 we can see the three models (on per different issue as constant, only non-social issues are used in the analysis).

Table 12: **Local-Social Domain and Civic Dependency**

Per Issue Dummy	Civic Dependency					
	B	**Sig.**	**B**	**Sig.**	**B**	**Sig.**
Constant	social policies		local identity		integration	
	3.37	0.000	3.41	0.000	3.45	0.000
Local attractiveness	-0.26	.000***	-0.30	.000***	-0.35	.000***
Economic growth	-0.38	.000***	-0.42	.000***	-0.46	.000***
Infrastructure	-0.66	.000***	-0.70	.000***	-0.74	.000***
Politico-administrative	0.23	.006**	0.19	.077	0.15	.154
Public safety	-0.14	.184	-0.18	.151	-0.22	.068
Natural environment	-0.06	.644	-0.10	.498	-0.15	.330
R^2	.06		.06		.06	

B = Unstandardized Coefficient
* = p < .05, ** = p < .01, *** = p < .001

The results confirm hypothesis 5 over some of the issues. The dummy coefficients are mostly negative, indicating the high mean scores. All of the significant relationships are negative except for the issue *politico-administrative* having a significant higher mean of 3.61, compared to the *social policies* baseline of 3.37. Overall, 10 of the 18 possible relations are significant.

To conclude the sub-question *"How does the chosen issue influence networking dependencies?"*, as the results for hypothesis q indicate: There often can be found a significant effect of the issue choice on the dependencies stated by the average mayor. While some theoretical expectations, like in regards to the impact of *economic growth* as issue choice (hypothesis 2) and the *local-social domain* issues (hypothesis 5) are confirmed, other expectations concerning the issue *politico-administrative* (hypothesis 3 and 4) get some support for some of the issues, but not for all.

6.2 Influence of Dependencies on Networking Activity

To answer the sub-question "*How do different levels in the types of dependency influence the networking activity of mayors on specific issues?*", regression analysis with *networking activity* as dependent variable and *civic-*, *intergovernmental-*, *internal-* and *corporate-dependency* as the four independent variables is carried out to form the first regression model (model I). The regression is carried out nine times to account for variation in chosen priority issue. The results, namely the nine sub-models (each line is a singular regression output), are summarized in table 13.

Table 13: Model I - Network Activity in Relation to Dependency

Per Priority Issue	Civic		Inter-governmental		Internal		Corporate			
	B	Sig.	B	Sig.	B	Sig.	B	Sig.	R^2	N
Local attractiveness	.16	.000***	.10	.000***	.09	.008**	.15	.000***	.17	950
Economic growth	.07	.093	.07	.155	.05	.280	.24	.000***	.12	433
Social policies	.15	.001**	.16	.000***	-.03	.583	.14	.003**	.16	413
Infrastructure	.24	.005**	.18	.011*	.04	.601	.20	.020*	.33	123
Politico-administrative	.31	.001**	.10	.189	.12	.191	.16	.127	.30	112
Public safety	.30	.001**	-.07	.477	.19	.072	.21	.038*	.34	70
Integration of minorities	.02	.849	.07	.502	-.04	.758	.19	.214	.07	48
Natural environment	.09	.536	.29	.038*	-.09	.563	-.08	.567	.15	38
Local identity	.06	.771	-.12	.467	.21	.303	.25	.310	.10	33
independent from issue	.13	.000***	.11	.000***	.06	.004**	.18	.000***	.17	2284

Independent Variables: Civic-, intergovernmental-, internal- and corporate-dependency
Dependent Variable: Networking activity
B = Unstandardized Coefficient
* = p < .05, ** = p < .01, *** = p < .001

Going back to the theoretical assumption, where it was presumed that variation in priority issue will influence the relation between dependency and networking activity - and looking at the derived hypothesis:

Hypothesis 6: There will be variation in the relation between specific types of dependency and networking activity over different issues.

The initial findings seem to be supporting this hypothesis to an extent, as the level of the significant relationships does vary over some of the different issues and also for some of the issues only some of the dependency types are significant. Looking closer at the sub-models, for the priority issue of *local attractiveness*, an increase in dependency generally leads to an increase in *networking activity*. In case of the issues *social policies* and *infrastructure* this holds for all dependency types except the *internal* one. For the issues *economic growth*, *politico-administrative* issues, *public safety* and *natural environment*, a significant increase in

networking activity goes along for some of the dependency types. Overall, out of 36 possible relations, 15 are significant.

All significant results are distributed over seven of the nine different issue priorities. The issues *integration of minorities* and *local identity* do not have any significant relations between the dependent and independent variables.

Furthermore, all significant results are showing a positive relationship between the independent *dependency* variables and the dependent variable *networking activity*. This means that when the level of dependency increases, the level of *networking activity* generally also does (at least in all significant relationships in the model). Taking *civic dependency* as an example, with *local attractiveness* as priority issue, the model predicts that when civic dependency would increase by one unit of measurement, network activity would increase by .16 units of measurement (while holding all other variables constant).

Regarding the size of the positive effect, when *politico-administrative* is chosen as priority issue, the influence of *civic* dependency on *networking activity* seems comparatively the highest one (also overall). An increase in this type of dependency by one unit leads to an increase in networking activity of .31 units (while holding all other variables constant; all variables that are indicated here, are measured on the same scale from 1 to 5)

Intergovernmental dependency has its highest positive effect of .18 on *networking activity* when the priority issue is *natural environment*.

I*nternal* dependency, has its highest and sole significant positive effect of .09 on *networking activity* when the priority issue is *local attractiveness*.

Lastly *corporate* dependency has its highest positive effect of .24 on *networking activity* when the priority issue is *economic growth*.

Regarding the general fit of the nine models, the R^2 measurements for the sub-models range between .07 and .34, meaning that between 7 and 34 percent of variance in networking activity can be explained by the included independent variables.

Now to conclude the answer to the question *"How do different levels in the types of dependency influence the networking activity of mayors on specific issues?"*: The results show that there is some variation over different priority issue choice and when there is a significant relationship, it is a positive one. Thus, an increase in dependency seems to go along with an increase in networking activity for some of the issues and dependency types. The effects vary over the chosen priority issues in their size and also overall statistical significance.

6.3 Influence of the Municipal Setting on Networking Activity

The sub-question *"How does the municipal setting influence the networking activity of mayors?"* takes model I from part 6.1 and ultimately expands it by the control variables *size*

and *financial situation* to assess their influence on networking activity. This is also done to see if the relationships, that were established so far, will stay intact.

To start with, in table 14 one can see the nine sub-models (per chosen priority issue), where the dependencies between solely *size* and *financial situation* and networking activity as dependent variable are looked at. This makes up model II. Preliminary results show only results for size having a significant influence on networking activity for the issues economic growth and social policies

Table 14: **Model II - Network Activity in Relation to Setting Variables**

Per Priority Issue	Size		Financial Situation			
	B	Sig.	B	Sig.	R^2	N
Local attractiveness	.02	.412	.03	.136	.00	942
Economic growth	.13	.000***	-.01	.646	.03	450
Social policies	.11	.016*	.06	.127	.02	383
Infrastructure	.00	.991	-.08	.223	.01	118
Politico-administrative	.14	.289	-.01	.883	.02	68
Public safety	.14	.395	.02	.910	.02	43
Integration	.18	.110	.09	.323	.08	42
Natural environment	-.07	.776	-.03	.869	.00	34
Local identity	-.13	.547	.03	.862	.01	30
Independent from issue	.07	.000***	.01	.456	.01	2192

Independent variables: Size, financial situation
Dependent variable: Networking activity
B = Unstandardized Coefficient
* = p < .05, ** = p < .01, *** = p < .001

The hypotheses that are developed from the sub-question concerned with the municipal setting are the following:

Hypothesis 7: The higher the population of the mayoral municipalities, the higher the level of networking activity of mayors.

followed by

Hypothesis 8a: The better the financial situation of the mayoral municipalities, the lower the level of networking activity of mayors.

Hypothesis 8b: The better the financial situation of the mayoral municipalities, the higher the level of networking activity of mayors.

In table 15 model I is combined with the setting variables *size* and *financial situation* to form the final model III. Again, we have the nine sub-models - one for each issue choice.

Table 15: Models I, II and III - Network Activity in Relation to Dependency and Setting[7]

Per Priority Issue	Civic B			Inter-governmental B			Internal B			Corporate B			Size B			Financial situation B			R^2		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Local attractiveness	.16***		.16***	.10***		.08***	.09**		.10**	.15***		.16*		.02	.00		.03	.01	.17	.00	.17
Economic growth	.07		.07	.07		.09*	.05		.06	.24***		.21*		.13***	.12**		-.01	-.01	.12	.03	.16
Social policies	.15**		.17**	.16***		.13**	-.03		-.02	.14**		.14**		.11*	.04		.06	.06	.16	.02	.17
Infrastructure	.24**		.27**	.18*		.16*	.04		.03	.20*		.22*		.00	-.01		-.08	-.01	.33	.01	.34
Politico-administrative	.31**		.37**	.10		-.01	.12		.03	.16		.28*		.14	.10		-.01	-.05	.30	.02	.45
Public safety	.30**		.26*	-.07		-.11	.19		.01	.21*		.42**		.14	.01		.02	-.14	.34	.02	.42
Integration	.02		.22	.07		.03	-.04		-.06	.19		.19		.18	.25*		.09	.13	.07	.08	.30
Natural environment	.09		.10	.29		.33	-.09		-.03	-.08		-.06		-.07	-.08		-.03	.00	.15	.00	.17
Local identity	.06		.07	-.12		-.13	.21		.24	.25		.35		-.13	-.28		.03	.13	.10	.01	.16
Independent from issue	.13***		.14***	11***		.10***	.06**		.06**	.18***		.18***		.07***	.04		.01	.01	.17	.01	.18

Dependent variable: Networking activity

Independent variables: Model I: Civic-, intergovernmental-, internal- and corporate-dependency

Model II: Size, financial situation

Model III: Independent Variables: civic-, intergovernmental-, internal- and corporate-dependency, size, financial situation

B = Unstandardized Coefficient

* = p < .05, ** = p < .01, *** = p < .001

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[7] For each independent variable the results for all three models are put next to each other to be able to answer the last hypothesis and assess the influence of the added control variables on the relationships in model I.

It can be said that hypothesis 7 is only supported by the sub-model result for the *economic growth* issue. The earlier statistical significant relationship in model I and sub-model for *social policies* loses its significance when the variables are combined into the final model. The only time the population size of the mayors' municipality seems to have a (positive) relationship on his or her networking activity seems to be when the issue choice is *economic growth*.

Regarding hypothesis 8a and 8b, reaching a conclusion there seems clear. Neither is strongly supported by the results. There is no consistent direction of relationships which would support one of them more than the other, and none of the relationships are statistically significant.

In including the control variables *size* and *financial situation* all significant relationships stayed intact, except the *size* coefficient from model II no longer being significant. Variation here seems to be explained by the dependency variables.

The impact of *intergovernmental* dependency on networking activity gains significance under the priority issue choice *economic growth* as well as the impact of *corporate* dependency when the priority issue is *politico administrative*. In model III *size* also has a significant impact on networking activity when the chosen priority issue is *integration*. The latter has to be treated with caution though as for the regression model III under the issue integration the only troublesome Durbin Watson value if 1.3 is given. Overestimation of significance is more likely here.

7. Conclusion

In the beginning of this paper Benjamin Barber was quoted with the strong message that "only pragmatic problem solving by mayors […] promises a sustainable *global* future" (Barber, 2013, p. xi). This problem-solving capability of mayors was linked to their networking activity and also their dependencies on other actor, on which cooperation and support they rely to solve issues. The goal of this paper was to further facilitate the understanding of networking behaviour of local leaders as well as factors that influence said behaviour.

This paper showed that, on average, European mayors tend to indicate a relatively high level of networking. The chosen priority issues themselves are clustered around a few very popular issues. Looking at networking activity in terms of varying priority issues, variation in the level of network activity is present, but not in a major way.

The hypothesis regarding the stakeholder structure and the resulting variation in dependency that goes along with certain issue choices were, to a certain extent and for most or some issues, confirmed by the results.

The control variables do not seem to have a major impact. In that sense Andrews et al. (2011) and their theoretical assumption regarding the impact of the setting on organizational behaviour and the level of networking could not be extensively confirmed with the available

data and choice of model set-up. The only statistically significant exception are the issues *economic growth* and *integration*, where if chosen, the population size has a significant impact on networking activity. Both relationships seem theoretically plausible, as it can be argued that networking activity increases as result of economic growth - which in turn might be more attributable to bigger cities. Diversity and resulting (networking) efforts regarding integration happening more extensively in bigger cities seems also plausible.

These two are the only significant links that were found for the setting variable *size* though. Following the argumentation that bigger cities are a more complex setting in which also societal changes tend to set in first or are first enabled due to the possibilities of innovation (Dvir & Pasher 2004) – one would have expected significance for some of the other issues as well. The results, however, do not support municipal population size having an impact on networking activity over other issues than the two previously mentioned.

Concerning the financial well-being of the mayors' municipalities and the opposing assumptions that were made, having no significance but also no directional trend as well is surprising. The model might be lacking a theoretical connection or variable to fully capture what is happening there.

Concluding the main focus of this thesis, namely to answer to which extent variation in the priority issue choice has an effect on the level of different dependency types, it can be said an effect was found for some of the issue choices, but not for all. Only the second hypothesis about corporate dependency being influenced by the issue being of economic nature is confirmed over all of the priority issues.

Concerning significant variation in terms of the relation between dependency and network activity over the different priority issue choice – this could be found for 15 out of 36 possible relations.

If one would move onward and take these findings as a starting point, one could imagine further research into the single specific issues and the gathering of more data that focuses even more specific on networking activity and issues dependencies of (European) mayors.

8. Literature

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9. Appendix

9.1 Operationalisation

All variables are based on the POLLEADER II data set. They are grouped by tables for the *municipal setting, priority issues, dependencies* and *networking activity*.

Municipal Setting

Table 16: Municipal Setting Variables

Variable name	Data Set Name	Data Set Description	Survey Question	Values
size	LN_Inhabitants	log transformation of inhabitants variable	(added by POLLEADER team)	numeric
financial situation	C14_SQ001		*How would describe the financial situation of your municipality?*	1 = Very poor 2 = Poor 3 = Neither good nor poor 4 = Good 5 = Very good

Priority Issues

Table 17: Priority Issue Variable

Variable Name	Name in Data Set	Survey Question and Items
priority issue	A4	*What would you consider as the single most important challenge on the above list? The most important challenge is ...* 1) increase attractiveness of municipality 2) develop social policies 3) protect the natural environment 4) secure public safety 5) address politico-administrative issues 6) preserve local identity 7) stimulate economic growth and employment 8) improve communal infrastructure 9) improve the integration of ethnic, religious or cultural minorities

Items shortened

Networking Dependencies

Table 18: Networking Dependencies Variables

Variables based on survey question A5 Below the subindices that were constructed with the question items		Question: *If you consider this most important challenge to what extent would you say that your administration depends on the corporation and support of the different actors below in addressing this problem. Dependent upon corporation or support of ...*	
		survey item	
variable name	**name in data set**	*each variable based on the mean of the following items:*	**values**
civic	A5_civic		
	A5_7	Neighbourhood organization	
	A5_8	Voluntary organizations and associations	
	A5_9	Individual citizens	
intergovernmental	A5_intergovernmental		
	A5_11	Regional government	
	A5_12	National government	the four created scale variables are numeric, the single question items are Likert-scales:
	A5_13	The EU and other supranational organizations	
	A5_14	County government	
internal	A5_internal		1 = No dependency
			2
	A5_1	The majority party / coalition in the council	3
	A5_2	The opposition in the council	4
	A5_3	The municipal civil service	5 = Highly dependent
corporate	A5_corporate		
	A5_4	The local business community	
	A5_5	Knowledge institutions (e.g. universities)	
	A5_6	Professional organizations	

The above described index variables were constructed with the following pattern matrix resulting from factor analysis:

Table 19: Pattern Matrix for Dependency Question Items

Question Items	Component			
	1	2	3	4
Neighbourhood organizations	**0.78**			
Voluntary organizations and associations	**0.85**			
Individual citizens	**0.70**			
Regional government		**-0.83**		
National government		**-0.82**		
The EU and other supranational organizations		**-0.76**		
County government		**-0.63**		
Majority party / coalition in the council			**0.82**	
Opposition in the council			**0.63**	
Municipal civil service			**0.58**	
Local business community				**-0.80**
knowledge institutions				**-0.84**
professional organizations				**-0.73**
Other municipalities in the region	0.36			

Small coefficients supressed with a cut-off value 0.3

N = 1747, Kaiser-Meyer-Olkin Measure of Sampling Adequacy= 0,81

Table 20: Item-Total Statistics per Dependency Type

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Civic dependency					**base .75**
Neighborhood organizations	6.52	3.230	.602	.370	.64
Voluntary organizations and associations	6.19	3.389	.596	.363	.65
Individual citizens	6.33	3.295	.540	.291	.71
Intergovernmental dependency					**base .77**
Regional government	10.16	8.169	.617	.394	.69
National government	10.53	7.272	.657	.480	.66
The EU and other supranational organizations	10.83	7.180	.633	.459	.67
County government	10.63	8.549	.390	.156	.81
Internal dependency					**base .51**
Majority party / coalition in the council	6.65	2.367	.398	.158	.29
Opposition in the council	7.97	2.352	.326	.118	.43
Municipal civil service	6.69	3.149	.275	.084	.50
Corporate dependency					**base .79**
Local business community	6.11	3.624	.595	.359	.75
Knowledge institutions	6.60	3.172	.672	.452	.66
Professional organizations	6.72	3.533	.619	.392	.72

Networking Activity

Table 21: Level of Networking Activity Variable

Variable based on average of the survey question A6 items		Question: *To what extent did you actively engage in the activities below to bring together different actors and stimulate their cooperation in addressing this problem*	
Variable Name	**Name in Dataset**	**Items**	**Values**
networking activity	A6_average		numeric
	A6_SQ001	Organized a platform	1 = Not at all
	A6_SQ002	linking local networks with inter-municipal, regional and(inter)national networks	2 3
	A6_SQ003	linking societal stakeholders with relevant (inter)governmental networks	4 5 = Very much
	A6_SQ005	Acted as a mediator and facilitator	

Table 22: Networking Activity Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Organized a platform	11.17	4.984	0.416	0.197	0.681
Linking local networks	11.55	4.870	0.497	0.328	0.625
Linking societal stakeholders	11.40	4.877	0.559	0.367	0.587
Acted as a mediator and facilitator	11.07	5.404	0.472	0.235	0.642

Cronbach's Alpha value .7

9.2 Descriptive Analysis

ANOVA-test Assumptions and Detailed Results

The assumption of homogeneity of variances needs to be tested to know which ANOVA variant needs to be used.

Table 23: Test of Homogeneity of Variances

Dependency	Based on Mean			
	Levene Statistic	df1	df2	Sig.
Internal	2.726	8	2406	0.005
Corporate	3.185	8	2421	0.001
Civic	0.941	8	2418	0.481
Intergovernmental	2.600	8	2302	0.008

As *internal, corporate and intergovernmental* dependencies have a significant test result, they violate the assumption of homogeneity. For these the Welch-ANOVA and Games-Howell test need to be run. For *civic* dependency a one-way ANOVA and additionally a Tukey post hoc test does work, as it has homogeneity of variances. (Laerd Statistics, 2017)

In table 24 all of the significant results that were found are presented. The priority issues are numbered as followed:

1   local attractiveness
2   social policies
3   natural environment
4   public safety
5   politico-administrative issues
6   local identity
7   economic growth
8   infrastructure
9   integration

See in the following the Tukey-Kramer post hoc test results for *civic dependency* and the Games-Howell post hoc tests that shows the single significant differences for the other three dependency variables:

Table 24: Significant Differences over Remaining Priority Issues

Games-Howell post hoc	Games-Howell post hoc	*Tukey-Kramer post hoc*	Games-Howell post hoc
Internal	Corporate	Civic	Intergovernmental
3 (1, 2, 5)	*7 (1, 2, 3, 4, 5, 6, 8, 9)* *8 (1, 2, 5, 9)*	*1 (2, 5, 6)* *7 (2, 5, 6, 8)* *8 (1, 2, 3, 4, 5, 6)* *9 (1, 4, 7 ,8)*	*1 (2, 5)* *2 (4, 5, 6)* *3 (4, 5, 6)* *7 (1, 2, 4, 5, 6, 8, 9)* *8 (4, 5, 6)*

Between # and (#, #...) each

Single Graphs for Networking Activity over Different Issue Priorities

Figure 4: Networking Activity under Issue Local Attractiveness

Mean = 3.8
Std. Dev. = .7
N = 1016
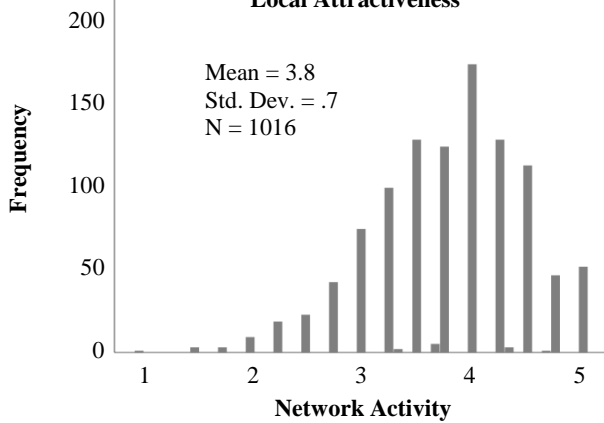
Figure 5: Networking Activity under Issue Economic Growth

Mean = 3.9
Std. Dev. = .7
N = 483
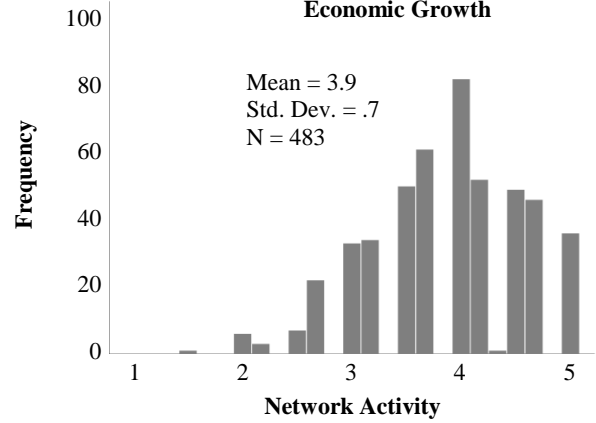
Figure 6: Networking Activity under Issue Social Policies

Mean = 3.7
Std. Dev. = .7
N = 438
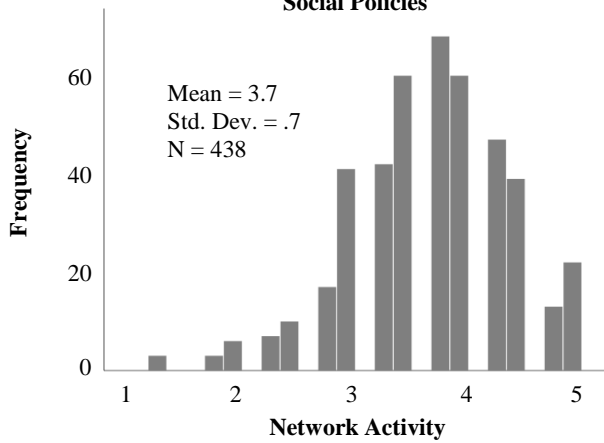
Figure 7: Networking Activity under Issue Infrastructure

Mean = 3.6
Std. Dev. = .8
N = 129
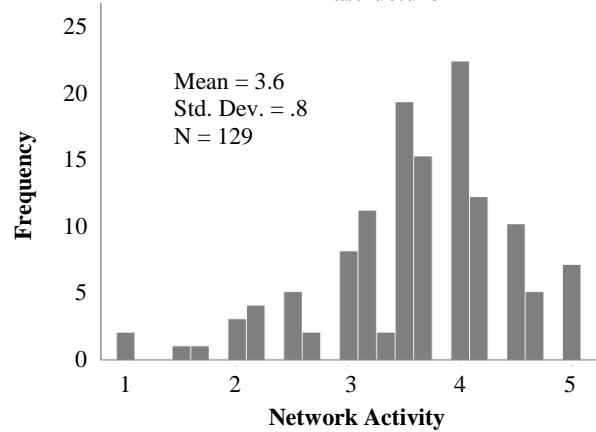
Figure 8: Networking Activity under Issue Politico-Administrative

Mean = 3.6
Std. Dev. = .8
N = 114
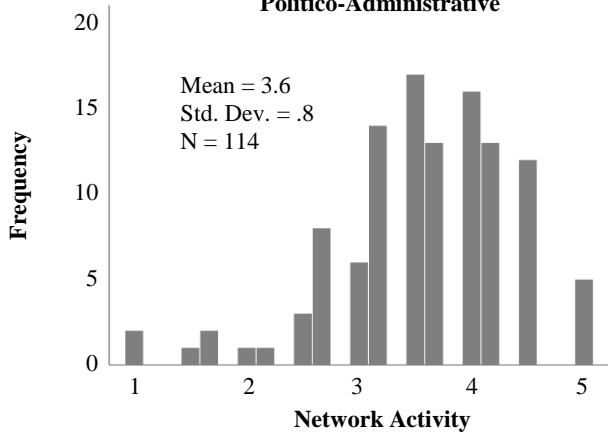
Figure 9: Networking Activity under Issue Public Safety

Mean = 3.7
Std. Dev. = .7
N = 74
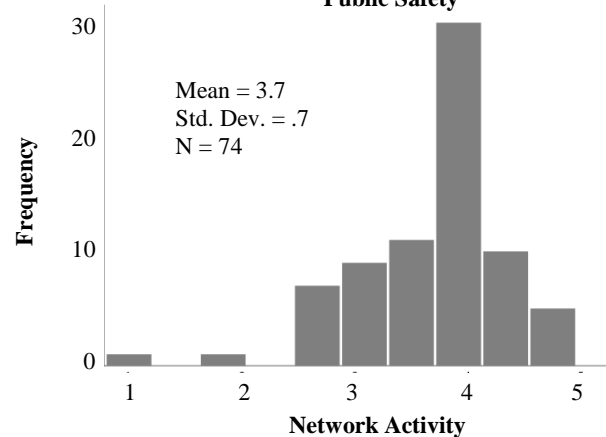
Figure 10: Networking Activity under Issue Integration

Mean = 3.9
Std. Dev. = .6
N = 52
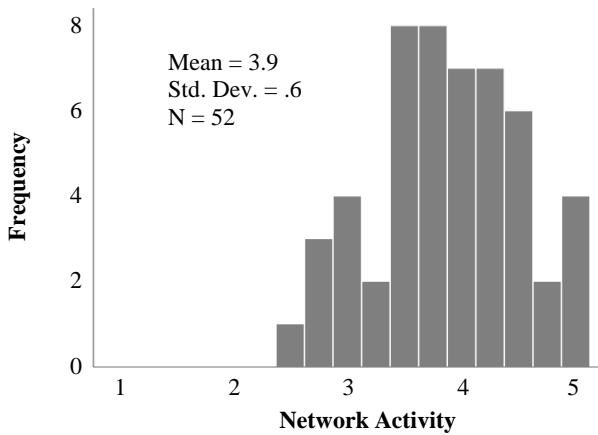
Figure 11: Networking Activity under Issue Natural Environment

Mean = 3.8
Std. Dev. = .8
N = 40
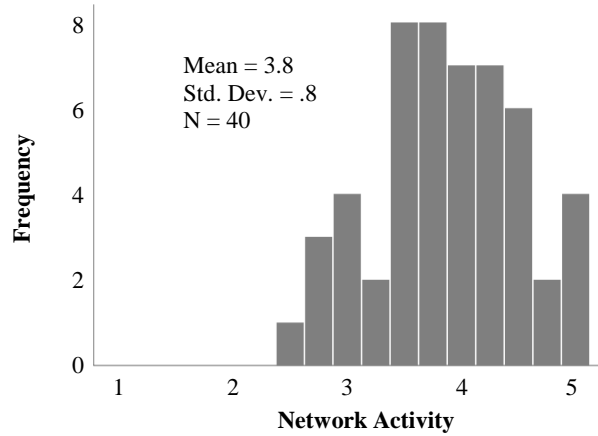
Figure 12: Networking Activity under Issue Local Identity

Mean = 3.4
Std. Dev. = .8
N = 34
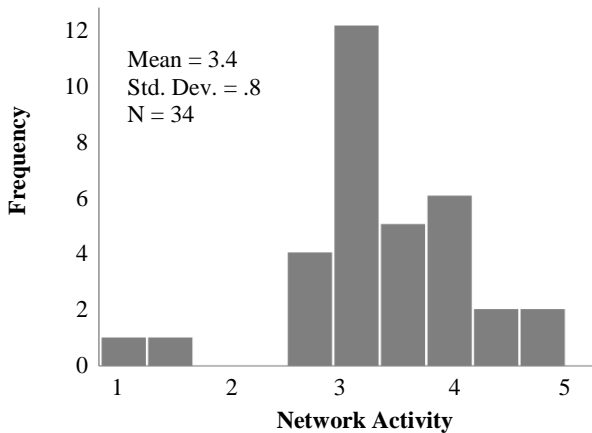
9.3 Multiple Linear Regression Assumptions

To justify the use of a multiple linear regression model, some key assumptions have to be met for it to be applicable to the used data. In the case of multiple linear regression, eight assumptions have to be met. The assumptions are taken as stated in Laerd Statistics (2015) and are checked in the following section. It is also discussed how to proceed further in case of a potential violation.

The checks for regression model III are shown in more detail. Models I and II are tested as well but are only mentioned when the results differ from those of model III.

1) Continuous Dependent Variable

As discussed and argued for in the operationalisation in part 4.3, the variable *network activity* is treated as continuous. Therefore, this assumption is met.

2) Two or More Independent Variables

Civic-, *intergovernmental-*, *internal-* and *corporate-dependency* as well as the control variables *size* and *financial situation* make up the six independent variables. They are all treated as continuous variables.

3) Independence of Errors

The third assumption is the independence of errors (meaning the noncorrelation of them). It is assumed that "independent observations from the underlying population" (Casson & Farmer, 2014, p. 593) are given. The independent variables should not influence each other. If this assumption is violated, any testing of statistical significance is potentially faulty.

Violations of this assumption can be detected by using the Durbin-Watson test, which detects error correlation. The range of the test result is 0-4. A value of 2 indicating that there is no error correlation, smaller values implying negative and larger values positive correlation between errors. (Laerd Statistics, 2015)

Table 25: **Durbin-Watson Test per Chosen Priority Issue**

Independent variables	internal, intergovernmental, civic, corporate, size, financial situation
Dependent variable	networking activity
Per priority issue	
Local attractiveness	2.0
Economic growth	1.8
Social policies	1.9
Infrastructure	2.2
Politico-administrative	1.8
Public safety	1.9
Integration of minorities	1.3
Natural environment	2.1
Local identity	1.8
Independent from issue	1.9

Except for the issue *integration of minorities*, all Durbin-Watson values over the different issues indicate that there seems to be no correlation between residuals. The values all cluster around 2. The value for integration of minorities of 1.3 is the only worrisome value, where interpretation of the coefficients has to be done with caution.

4) Linearity

Here a linear relationship between each independent variable and the dependent one is assumed. To check if this assumption is sufficiently met, partial scatter plots of the variables can be constructed, while holding the rest of the variables constant. These plots are checked

for any indication for a relationship between the variables. This means that the distribution of the case values for the variables are not random but follow a pattern. A pattern then can be used to infer a relationship between the variables. If variables without relationship would be included into the model, the results might be skewed, as the b coefficients could be estimated wrong. Also, to meet the first assumption, the linearity of the relationship has to be confirmed. If the pattern does not go along a straight line (e. g. is curved instead), the false use of a linear regression model might also deliver skewed results in form of misinterpretation. (Casson & Farmer, 2014, p. 593)

A regression line, as well as locally adjusted regression curve is added to facilitate the linearity check. See figure 13 as an example.

Figure 13: Partial Regression Plot - Issue Politico Adminsistrative

R^2 linear = .16
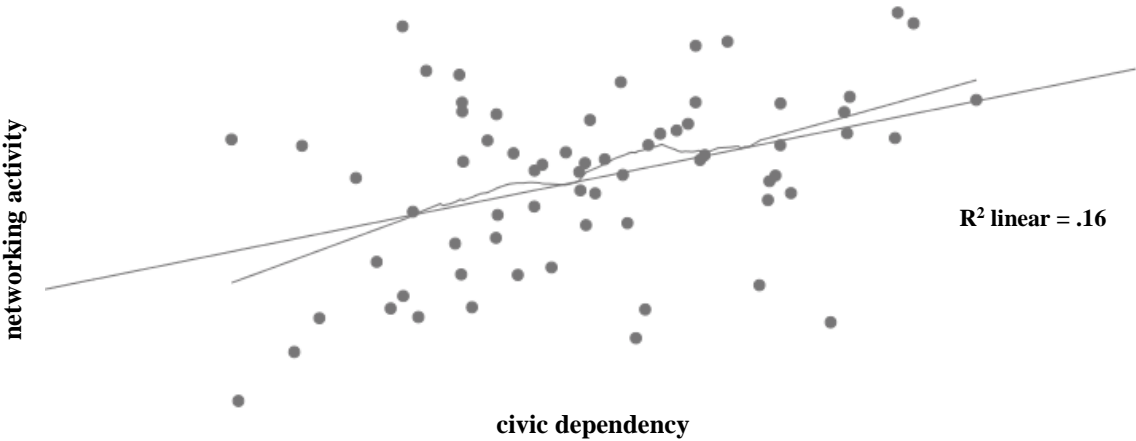
5) Constant Error Variance (Homoscedasticity)

Here it is assumed that the error variance should remain constant and not change across different values of X. If violated, meaning errors variance is not homogenous, heteroscedasticity is the result. This can lead to inefficient standard errors.

Violations of the homoscedasticity assumptions can be detected by plotting the predicted values against studentized residuals of the regression. Here "a random spread suggests that the variance is constant" (Casson & Farmer, 2014, p. 593). If the points resemble any kind if shape, this might be an indication for a violation of the assumption and heteroscedasticity being the case. (Laerd Statistics, 2015) See figure 14 as a example.

Figure 14: scatter plot (issue politico administrative)
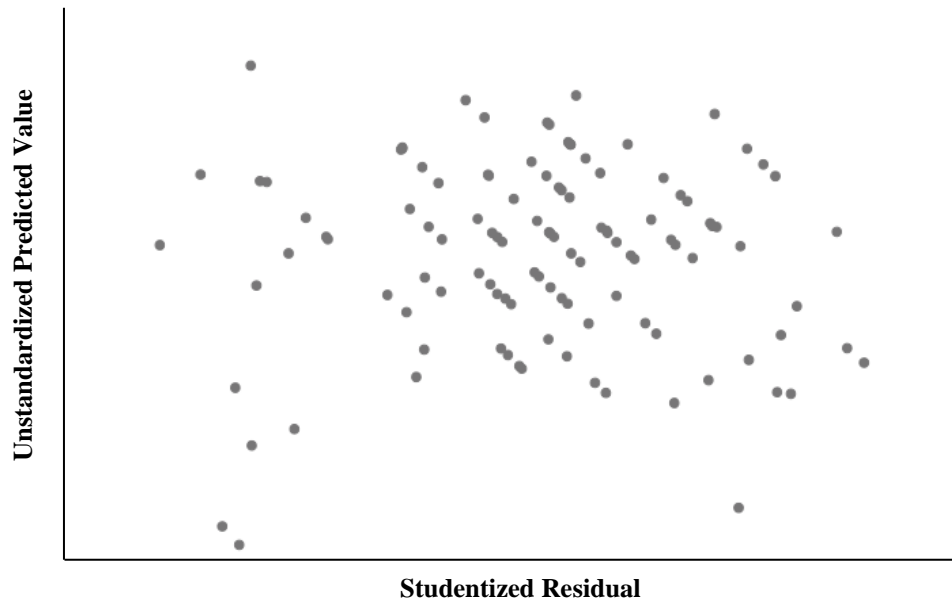
The interpretation of these plots in the context of this thesis is somewhat difficult, as the visible stripe pattern seems to be a result of the variable construction, where continuous variables where build out of the means of ordinal question items. The lack of singular value variation seems to producing the stripe pattern. As no other shape e. g. funnel is visible, this assumption is cautiously seen as met.

6) No Multicollinearity

There should be no high correlation between the independent variables. If this were the case it would become difficult to understand which of the independent variables explains the variation in the dependent one. This can be checked by looking at the variance inflation factor. As shown in the next table, all values are below two and thus way below the threshold of 10 where one might suspect multicollinearity.

Table 26: Variance Inflation Factor Values

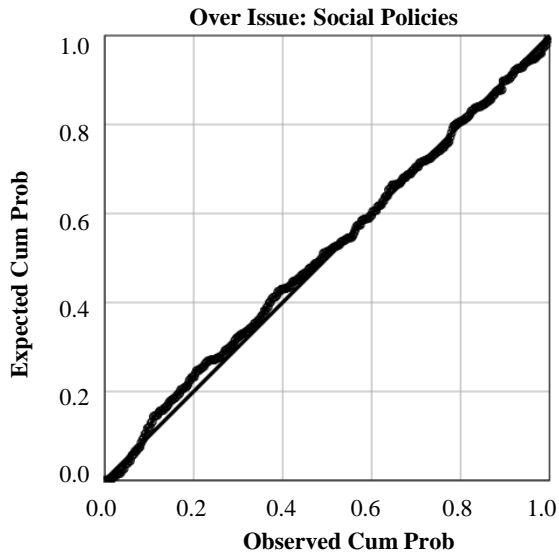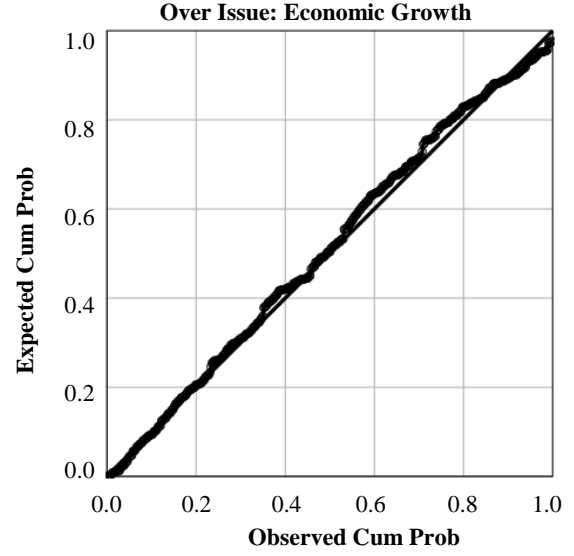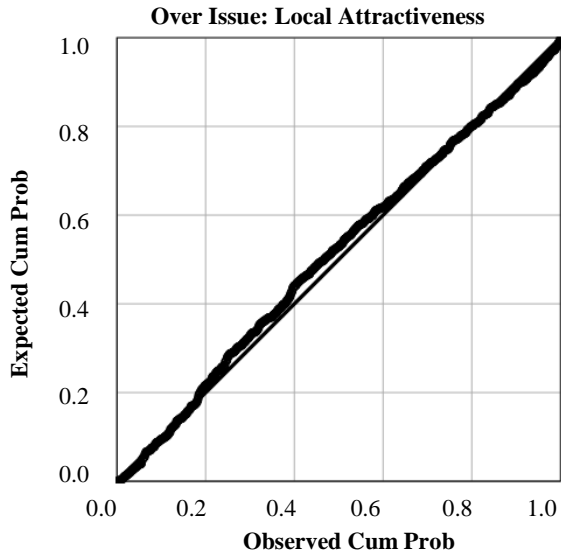| Independent Variables	Internal	Corporate	Civic	Inter-governmental	Size	Financial Situation
Per priority issue						
Local attractiveness	1.1	1.4	1.3	1.1	1.0	1.0
Economic growth	1.1	1.4	1.3	1.3	1.0	1.0
Social policies	1.2	1.6	1.4	1.1	1.0	1.0
Infrastructure	1.3	1.9	1.7	1.2	1.0	1.1
Politico-administrative	1.1	2.0	1.5	1.5	1.0	1.0
Public safety	1.2	1.8	1.4	1.7	1.1	1.0
Integration of minorities	1.7	1.9	1.6	1.2	1.3	1.1
Natural environment	1.1	1.6	1.5	1.3	1.4	1.5
Local identity	1.2	1.8	1.6	1.5	1.2	1.2

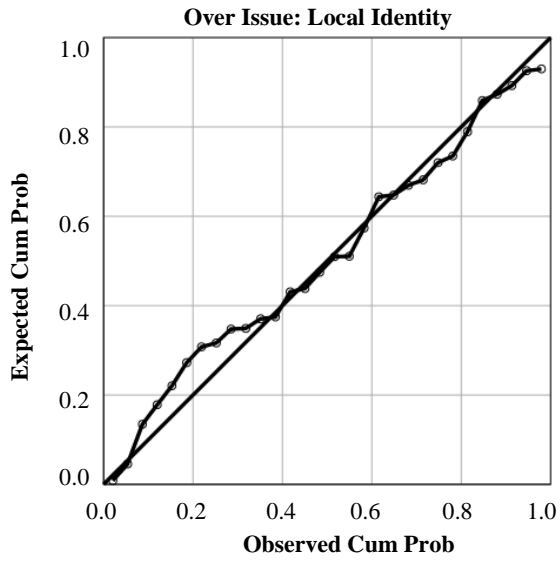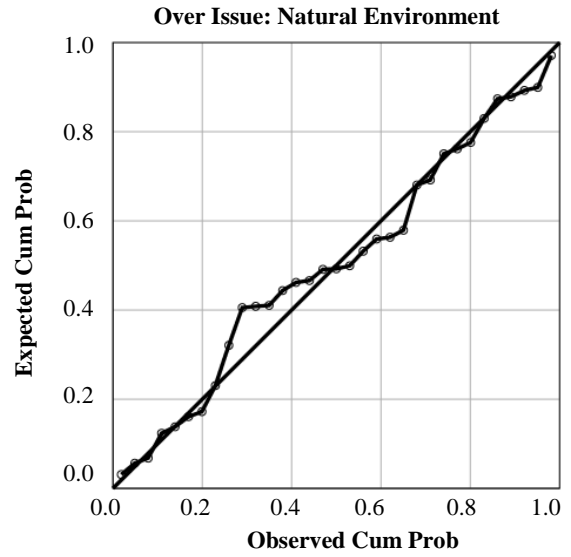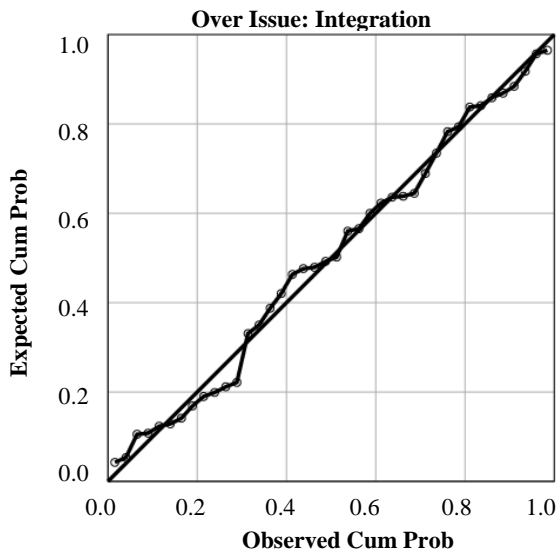Dependent variable: Networking activity

7) No Significant Outliers

Unusual points can skew the results and reduce the accuracy and significance of the statistical analysis. As all of the gathered values have been checked for input errors and are either based on limited Likert-scale items or in case of *size* (population of the municipality) have been calculated as logarithmic score, there seems to be no theoretical argument that might warrant a removal of any value that is indicated as outlier. In case of this paper, this assumption seems less relevant.

8) Normally Distributed Errors

The residuals of the linear regression model should follow a normal distribution. One can check this by looking at the normal predicted-probability plots. If errors are not normally distributed, this will result in the least squares estimation being less accurate. For example, it might give rise to outliers or in influential cases. As stated, violations can be detected by creating Q-Q plots, which compare the probability distribution of the studentized residuals against a normal distribution. The better the fit of the points on the line, the higher the chance that the assumption is met. (Laerd Statistics, 2015)

Here the normal P-P plots of regression standardized residuals over different chosen issue priorities. The dependent variable is *networking activity*.

Over Issue: Local Attractiveness

Over Issue: Economic Growth

Over Issue: Social Policies

Over Issue: Infrastructure

Over Issue: Politico-Administrative Issues

Over Issue: Public Safety

Over Issue: Integration

Over Issue: Natural Environment

Over Issue: Local Identity
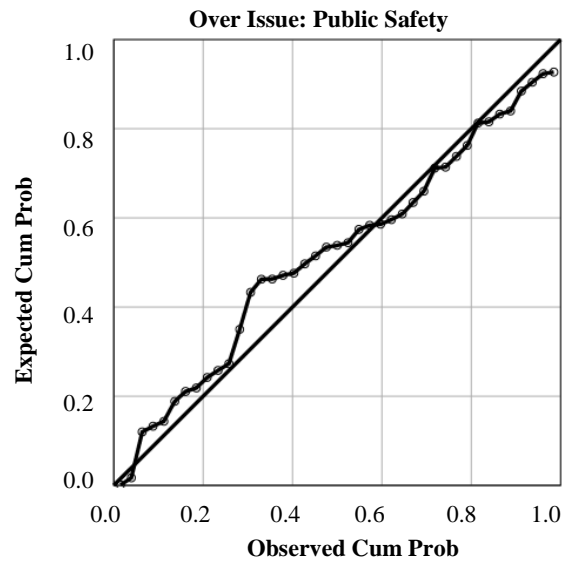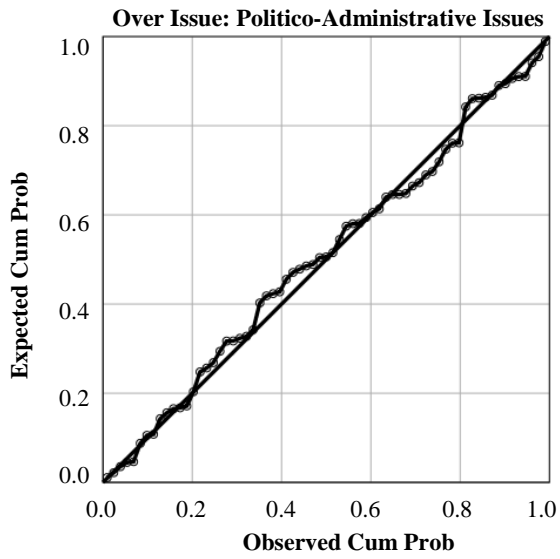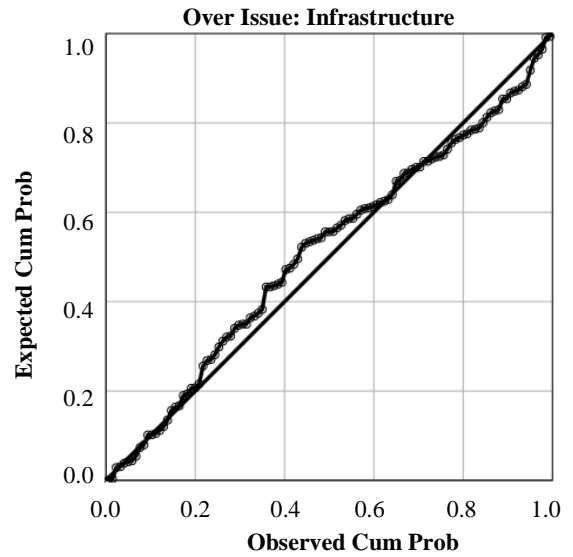
As one can see, the point distributions follow more or less strictly the diagonal lines. The assumption of normally distributed errors seems to be met.

9.4 Declaration of Originality

I hereby confirm that the present bachelor thesis is solely my own work and that if any text passages or diagrams from books, papers, the internet or other sources or in any other way used, all references – including those found in electronic media – have been acknowledged and fully cited.

Enschede, 04.07.2018

Kim Can Sami Meilinger