Bachelor Thesis

Analysis of the 'Netzallianz Digitales Deutschland' from a Network Governance Perspective

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Abstract

The broadband provision in Germany lags behind compared to other countries. In order to improve the broadband expansion in Germany the 'Netzallianz Digitales Deutschland', a panel between public and private actors with the aim of improving the digital infrastructure, was established.
The first aim of this thesis is to compile a document analysis to provide information on the broadband provision in Germany and to make clear why the Netzallianz emerged. Subsequently, the structure of the Netzallianz and its policies are evaluated.

The second aim of this thesis is to fill the gap of studies dealing with the Netzallianz by analyzing it from a network governance perspective. The research question **"How does the 'Netzallianz Digitales Deutschland' and its policies confirm or refute theory of Network Governance?"** is answered through this thesis. Therefore, a theoretical framework based on a literature review of network governance theories is created and the Netzallianz is analyzed accordingly. The thesis concludes that the Netzallianz can be considered as a type of network governance and evaluates which differentiations of network governance apply to it in order to understand the nature of the Netzallianz.

1: Introduction

The broadband expansion in Germany has been in public debate for a long time, with critics arguing that the expansion progresses too slow with emphasis on the backlog of fiber optics provision in Germany compared to other countries. A recent study from the OECD found out that Germany is ranked 32nd of 37 member states when comparing fiber optics provision (Statista, 2017). For this backlog, different kinds of political and economic reasons can be identified, for example the focus of the German government and broadband providers on the expansion of older technologies instead of the future-proof fiber optics (Sistig, 2017). The annual data volume increases by 30%, which leads to an internet demand that is three times as large by 2020 compared to 2016. Because of that, faster and more modern broadband technologies are inevitable (BREKO Breitbandstudie 2017, 2017). Further, a stable and good broadband connection is important for different social and economic reasons. In fact, in times of a globally connected value chain and international markets, broadband internet connections became just as important as transport infrastructure such as roads or railways for the competitiveness of national economies. By expanding the broadband infrastructure in Germany, the national economy could grow as companies are more likely to settle at locations with a fast broadband internet access. Especially rural areas in Germany are undersupplied as the expansion is more expensive and less profitable than in urban areas, due to a lower population density leading to less possible customers. A consistent expansion of fiber optics would make the living standards of urban and rural areas more even and could help to decrease urbanization (Wernick, Queder, Martins & Gries, 2017).

The German government recognized these benefits of and problems with broadband expansion and created the 'Netzallianz Digitales Deutschland', a panel between two public and 13 private actors, consisting of telecommunication companies and unions of telecommunication companies. The Netzallianz has the goal of reaching a comprehensive access to modern digital infrastructure (Netzallianz Digitales Deutschland, n.d.).

As the Netzallianz is a panel between private and public actors that share common goals and objectives, it might be seen as a form of network governance. To find out to what extent that is the case, this thesis will focus on answering the main research question:

> **Research Question: "How does the 'Netzallianz Digitales Deutschland' and its policies confirm or refute theory of Network Governance?"**

In order to answer this research question, this thesis starts by taking a look at different theories on network governance. Therefore, the terms 'network' and 'governance' will be split and individually defined. The combination of these definitions is used to conceptualize network governance. This combination is rounded off by taking a look at other theories on the concept.

Before the description and analysis of the Netzalianz comes, this thesis will take a closer look at the German broadband provision by explaining the different technologies in use. Furthermore, numbers on the status quo and the development of broadband provision in Germany are given. Subsequently, the benefits of and problems with broadband and fiber optics expansion are evaluated. During this descriptive part, following sub questions are followed:

> Sub Question 1: How does the broadband provision in Germany look like in 2018?
> Sub Question 2: What did the Netzallianz do in order to improve the broadband expansion in Germany?

The aim of this partis to get an insight on the broadband situation in Germany in order to understand why the Netzallianz was established. The reasons for the emerge of the Netzallianz is part of the theoretical framework on networks, which includes differentiations of networks based on their establishment.

Afterwards, the Netzallianz will be introduced by describing its structure and policies. The two course books which include policy measures from 2014 until 2016 and from 2016 until today are examined. The last part of policy description of the Netzallianz consists of the framework which was developed to support Germany in reaching the 'Gigabit society' by 2025. The Gigabit society describes an advanced society in which information and communication technologies are fully established and people, machines and processes are completely interconnected (Eckpunkte Zukunftsoffensive Gigabit-Deutschland, n.d.). After this description the analysis section of the thesis follows. Therefore, the Netzallianz is applied to the theoretical framework on network governance.

1.1: Relevance

Currently, there are not many studies on the Netzallianz publically available. In a broader sense, the relevance of this thesis can be described as an attempt to contribute to this gap of information on the Netzallianz. Because of the achieved policy measures laid down in the course book 2014, it can be seen that the Netzallianz plays a significant role for the policy-making on broadband expansion in Germany (Kursbuch Netzausbau, 2014). This makes studies on the Netzallianz relevant.

The scientific relevance of this thesis is based on analyzing how the theories of network governance can be applied to the Netzallianz. There are many theories and publications that include divergent ideas and differentiations on how to define modes of network governance. As private and public actors work on common goals and objectives, the Netzallianz might be one of those modes of network governance. This thesis creates a theoretical framework which will be used to analyze the Netzallianz. This framework contributes to the scientific literature by giving other researchers the possibility to make use of it when analyzing other cases of possible modes of network governance. The analysis of the Netzallianz will help to understand the nature of the Netzallianz for anyone concerned. Furthermore, it helps to understand the structure and functioning of the Netzallianz which helps to make adjustments if needed.

As mentioned before, the fiber optics expansion in Germany is criticized to be advancing too slowly. The public argues that Germany "overslept" the digitalization and numbers and comparisons with other countries show that Germany lags behind (Statista, 2017). The Netzallianz tries to make the expansion faster and more modern and sustainable (Kursbuch Netzausbau, 2014).
But what has the Netzallianz been doing? By describing and analyzing the goals, policies and measures on broadband expansion of the Netzallianz this thesis tries to fill the gap of studies that deal with the Netzallianz. Therefore, this thesis will take a look at the structure of the Netzallianz and its action points of the course books. The description of the policies and goals since 2014 makes all the data available in one document and helps to determine the functioning and measures of the Netzallianz faster, giving this thesis a social relevance as well.

2: Methods

The method part of this thesis is written before the theoretical part, as the method that is used for writing the theory needs to be expounded beforehand. This thesis is a case study based on a document analysis and a literature review, meaning that only qualitative data is used. The literature review examines recent and relevant literature in order to create "a firm foundation for advancing knowledge" (Webster & Watson, 2002, p. 13) by forming a theoretical framework for modes of network governance. It has to be mentioned that a literature review is always open to bias, as literature might be accidentally omitted (Grant & Booth, 2009). The idea is to take a look at the Netzallianz, a panel between public and private actors that might be described as a network.

In order to find out how the network governance theory can be applied to the Netzallianz, the thesis conceptualizes network governance by taking a look at its characteristics and features. By using a qualitative literature review as a method, the possibility to come up with insightful hypotheses on the Netzallianz after the analysis is opened (Grant & Booth, 2009). The terms 'network' and 'governance' are being split and individually defined and afterwards combined in order to conceptualize the concept of network governance.

The description of the structure and the policies of the Netzallianz is based on official documents published by the German government and on the course books of the Netzallianz of which two editions were published so far: One for the period of 2014 to 2016 and one for the period of 2016 to today. In order to get an idea of why the Netzallianz was established in 2014, what problems and which situation it faces in the German broadband market, this thesis does also give an overview of the broadband market based on different studies and published documents. This part of the thesis can best be described as a document analysis, which means that documents are interpreted and presented in order to give voice and meaning around the topic. The document analysis makes it possible to gather data about the broadband situation and the Netzallianz effectively, as documents are a very accessible and reliable source of data. Just like the literature review the document analysis creates the risk of bias due to gaps in the documents or the fact that not all data is covered by the documents used (RESEARCH METHODOLOGY, 2016). In order to reduce these threats in the present thesis, I tried to stay objective and took a look at network governance and the broadband provision in Germany from different perspectives. Therefore, literature of of authors with different backgrounds and documents of public and private actors as well as press releases have been used.

The structure of the document analysis is organized chronologically and thematically. The thematic organization describes the broadband provision in Germany first, as the Netzallianz was found due to this situation. Because of that, the description of the Netzallianz follows. The description of the history of broadband provision in Germany and the policies of the Netzallianz are organized chronologically. This thematic and chronological organization of the document analysis helps the reader to get informed about the research setting which may ease the reader's understanding of the content of this thesis. (Writing Center, n.d.)
For the literature review the online databases Google Scholar and Web of Science have been used in order to find relevant literature. The sources for the document analysis were found by browsing through government websites and by using Google.

As only the Netzallianz is being described and analyzed, this thesis can be described as a case study. A case study is a comprehensive description of an individual case and its analysis. By analyzing a single case only, this thesis is able to collect a lot of details about the Netzallianz and can come up with hypotheses on the nature of the Netzallianz from a network governance perspective after the analysis. It is important to mention that this single case study does not make generalisation possible, meaning that its contribution to the scientific world is limited (Starman, 2013).

3: Literature review

3.1: Theory

The theoretical part of this thesis starts by presenting the theoretical background on the concept network governance. In order to get an adequate definition of network governance, this thesis will split the concept into the terms 'network' and 'governance'. At first, theory on the structure and functioning of networks is examined. Secondly, a closer look is taken on the concept governance, while focusing on different forms of governance. A solid theoretical ground for the concept of network governance is created by combining the definitions and theories on networks and governance. Afterwards, this theoretical ground will be complemented with the support of theory on the concept network governance itself.

3.1.1: Theory on Networks

Networks became more and more relevant in our society in the past years, which lead to an astounding amount of literature. In a broader sense, networks can be defined as groups that consist of three or more legally autonomous organizations that work together to achieve not only their own goals but also a collective goal (Hill & Lynn, 2004). However, this broader definition leaves room for interpretation on what a network entails, the differences between networks (e.g. how they were established or how the function) make it hard to find an all-encompassing definition of networks.

Carlson and Sandström (2008) argued that the main reason for the emerge of networks has been a shared common goal or concern between various autonomous actors, which resulted in a joint coordination of action. This gives networks a key strength in bringing together actors from different backgrounds, which also gives networks huge potentials in solving problems of all kinds (Carlsson & Sandström, 2008). However, there might be tensions and problems within networks, resulting from a high number of actors that are involved in the decision-making process. Even though the actors of a network share one common goal, the individual interests of actors could still clash, leading to deadlocks and stagnations (Klijn, 2008). The relatively free and autonomous position of actors within networks stands out and shows that networks can be considered as a specific form of governance

and a somewhat unique mechanism of coordination (Provan & Kenis, 2008). This is also confirmed by the generally voluntary and open character of actors of networks, as actors can decide for themselves whether they want to participate in a network and pursue the common goal jointly or not.

Different perspectives on the topic have created very differentiated views on networks, for example, networks can be defined by emphasizing the power distribution within the network, the form of relations (e.g. professional or informal) or the functioning of the network (e.g. resource management or type of service delivery) (Ouden, 2015).

Kenis and Provan (2008) tried to resolve the divergent theories of networks by distinguishing three different types of networks. Their differentiation mostly looked at different structures of networks. Before differentiating between the three types of networks, they determined two dimensions of networks. Firstly, networks can either be brokered or not brokered. Highly brokered networks only have a bit of interaction between organizations and the decision-making power of the network is centralized. Networks that are not brokered are highly decentralized and every organization interacts with the other organizations when governing the network. Secondly, networks can be governed by a network participant or be externally governed.

These two dimensions lead to the three types of networks. The first type of the three different networks is called 'participant-governed network' and implies that decisions are made collectively and power is more or less symmetrical. This means that they are not brokered and they have a high level of interaction between the network members. The second form is called 'lead-organization network' and implies that major network activities are coordinated by one organisation and the network is highly centralized, meaning that the power is brokered with one of the network participants. Both participant-governed and lead-organization networks are governed internally by networks participants. The third and last form of networks are 'Network Administrative Organizations' (NAO) and are governed by an external administrative entity of any form, e.g. by a public or private, (de-)centralized individual or organization. (Provan & Kenis, 2008)

A different approach on creating a more differentiated view of networks by Ouden (2015) uses four paradigms that help to differentiate between networks. These four paradigms all try to explain the establishment of networks as an instrument of coordination. This differentiation rather deals with the creation of networks instead of the structure, as in Kenis and Provan`s approach.

The first paradigm that Ouden uses is based on Positivism, which is associated with the fact that knowledge is created through observation and grounded on empirical research. Thus, the need for a network can be verified through empirical research, meaning that Positivists would argue that networks have been created in the response of needing more collaboration between sectors in order to address societal issues. Positivism sees networks from a macro-level perspective. The second paradigm is based on the Interpretivist paradigm and takes the practices and beliefs of individuals as the starting point for the creation of networks. This can be seen as the micro-level counterpart to the Positivist paradigm. The third paradigm makes use of the critical realist perspective. This perspective is state-focused and therefore underscores that the responsibility to create networks belongs to the state. The state has the role of creating the network and is responsible of designing the way in which the network functions. The fourth and last paradigm is based on the functionalist school and argues that "networks are a response to failures of markets, failures of hierarchical coordination, and to societal and technological development" (Provan and Kenis, 2008, p.233). Therefore, networks may be seen as functional instruments that could help to solve societal problems and produce positive outcomes. However, due to the different natures of networks, there are different styles in managing networks needed. (Ouden, 2015)

The school of Policy Network Analysis tries to find out how the policy-making outcomes of a network are influenced by its structure and by the interactions between the network members. This includes the inclusion or exclusion of interests of certain network members.

Dimensions	*Policy community*	*Issue network*
Membership	Very limited number of members Narrow range of interests represented	Large number of members Wide range of interests represented
Integration	Bargaining and negotiation Frequent interaction	Consultation Unstable pattern of interaction
Institutionalisation	Consensus on policy principles and procedures to approach policy problems	Conflict over policy principles and procedures to approach policy problems

Graph 1: Extremes on the Policy Network Continuum (Fawcett & Daugbjerg, 2012)

Fawcett and Daugbjerg (2012) created a 'Policy Network Continuum' which differentiated between two types of networks. The first type of network is called a 'Policy Community' and has established its own approach to deal with problems. There are certain routines of contacts, common perceptions and values and a stock of policies and knowledge within the community network. These are derived from common views between the network members on the broader social, economic and political objectives. The policy outputs of such networks can be seen as a result of actors that make a choice

from a range of options that have been structurally determined. Policy communities have a limited number of members and only a narrow range of interests between the actors. The second type of network is called 'Issue Network' and is characterised by a lack of consensus on policy principles and network procedures between the actors of the network. Therefore, the actors are likely to disagree on broader social, political or economic objectives. Even if an agreement is reached, it is not based on deeply rooted consensus. Issue networks have a larger number of members in comparison to the policy community. (Fawcett & Daugbjerg, 2012)

The contributions of Ouden, Fawcett and Daugbjerg and Kenis and Provan give good indications on how the structure, the outcome of policy-making progress and the reasons for the creation of networks look like and make a good framework when analyzing the nature of a network.

3.1.2: Theory on Governance

The concept of governance, in a broader sense, describes "the processes of interaction and decision-making among the actors involved in a collective problem that lead to the creation, reinforcement, or reproduction of social norms and institutions" (Hufty, 2011, p. 405). Governance puts an end to the monopoly of state governing as it involves other actors into the policy-making, leading to a new order of governing actors in the society. Due to the inclusion of other actors in the governance process, the state could lose sovereignty and power in three directions: upward, because international or transnational actors are involved, downward, because decision-making is decentralized and involved actors have a say as well, and horizontally, as non-state actors take part. (Ouden, 2015) Treib, Bähr and Falkner (2007) argue that "the crucial criterion to distinguish different types of governance is [...] the relationship between public and private actors in the process of policy-making" (Treib, Bähr & Falkner, 2007, p. 4). Therefore, this thesis tries to create a framework for the analysis of modes of governance by taking a look at the interaction between the governance actors.

Kooiman (2003) distinguishes between three different modes of governance as based on the interaction. The first type of governance is called 'self-governance' and is based on actors that are organizing themselves. This type is characterised by decentralized, informal and horizontal relations between the actors as well as autonomous positions of the actors. The interaction between the actors is the crucial point to success, as they are mutually influencing each other. The second type is named 'co-governance' and is characterised by all kinds of co-concepts, namely collaboration, coordination and co-operation. This shows the importance of interdependencies between the different actors. The interdependence is created from two sources: The common concern of the actors involved and the need to join forces in order to achieve the common goal. The third form of

governance is a 'hierarchical governance' and, although it might seem outdated at first, still plays an important role today. This type is characterised by a top-down relation between the actors, with one actor aiming to have control of the other actors. Kooiman stresses that most examples of governance modes are hybrids of these three types, meaning that not one single type can be applied but rather a mix of at least two of the types of governance modes fit (Kooiman, 2003).

3.1.3: Theory on Network Governance

After describing the single concepts of 'network' and 'governance', this part of the thesis will now combine the two in order to describe the concept of 'network governance'. On top of that, other literature about network governance will help to get an adequate framework of the concept. Modes of network governance have three distinctive features. The actors involved are autonomous and interdependent, the collaboration between these actors takes place within a self-constructed structure and the modes of network governance have the ability to work on and solve complex social problems jointly. This means that modes of network governance differ significantly from other modes of governance, such as hierarchies or markets (Ouden, 2015).

Interdependence as in network governance was defined by Provan (1993) as (1) the need for collaboration to address problems since no single actor possesses all the necessary resources, and (2) the horizontal cooperation as the unique feature of governance networks (Provan, 1993). This also indicates that the autonomous positions of the actors involved will lead to horizontal cooperation. However, this horizontal coordination does not mean that power is divided equally between the actors but only shows the mutual dependence of the actors. Jones, Hesterly and Borgatti in their definition stress that network governance contracts are implicit, open-ended and socially- but not legally-binding (Jones, Hesterly & Borgatti, 1997). However, it is important to mention that next to the common goal of the actors, every actor tries to achieve its individual goals as well. This means that the different levels of power between the actors play a big part in determining the influence they have on the policies. Certain actors might have a bigger influence due to e.g. an unbalanced possession of resources. Ansell and Gash (2007) said that certain power imbalances between participants, for example the lack of capacities, status or resources, offer a risk that the cooperative governance process will be prone to manipulation by stronger actors and produces distrust and weak commitment. These power imbalances could lead to different levels of influence on the decision-making process between the actors involved (Ansell & Gash, 2007).

To sum it up, the concept of network governance can best be described as an arrangement between autonomous and interdependent public and private actors with a collective goal, collaborating in order to reach their common objective.

3.1.3: Public Private Partnerships

Next to the explained modes of network governance, another form of governance, the Public Private Partnership has gained relevance in the past years. Public Private Partnerships can be seen as something similar to network governance because both concepts include the cooperation between public and private actors. However, they can be distinguished by one crucial feature. The actors in a Public Private Partnership try to perform certain tasks or deliver certain services, for example the construction of a new road. As a consequence, the aim of the public actor in a Public Private Partnership is to achieve a high level of coordination while the private actor aims to provide the ordered service and tries to fulfill the objectives of the public actor. Public Private Partnerships are more formal and committed to contracts . (Ansell & Gash, 2007) while modes of network governance are more informal and based on achieving a consent decision-making between the actors with the aim of producing policies.

4: Document Analysis

4.1: Broadband Provision Germany

This section of the thesis starts by providing background information on the broadband provision in Germany. At first, the variants of broadband technologies in use are explained. Then, some information on the development and the status quo of broadband provision in Germany is shared. Afterwards, the benefits of broadband connections and the problems that may arise with its expansion are evaluated. Subsequently, the 'Netzallianz', a network between public and private actors with the common goal of developing the digital infrastructure in Germany, will be presented by describing the structure and the functioning of the Netzallianz and by taking a closer look on its goals and policies. The illustration of the broadband situation in the first place will help to understand and comprehend the reasons for the creation and the policies of the Netzallianz.

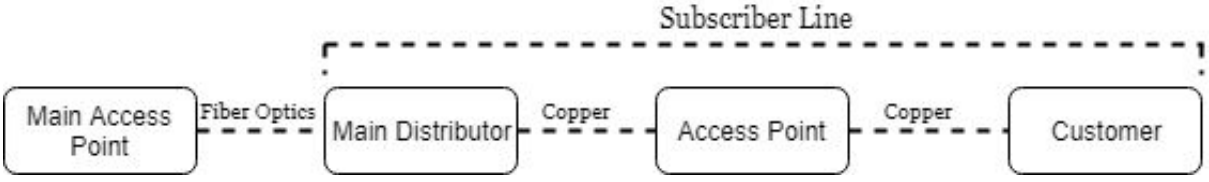
4.1.1: Definition Broadband

Before getting into details on the broadband situation and development in Germany, the term broadband has to be clarified. Broadband internet connections, usually just referred to as 'broadband', can be defined as a form of data transmission that is more efficient than other lower-rate, temporary, dial-up accesses. Two factors define whether an internet access is considered to be a broadband connection or not: Firstly, in contrast to other technologies, broadband connections are capable of being always on. Secondly, the speed plays a role, as traditionally a speed of >256 Kbit/s had to be reached. More recent definitions set the limit at 2-4 Mbit/s. The speed of a

broadband connection needs to be defined as well, as authors and scientists have different understandings of it. Broadband speed is defined by the physical characteristics of a broadband connection (such as the technology which regulates the bandwidth), policies for allocation of resources (e.g. priorities) and the behaviors of consumers. Thus, in contrast to the definition of speed in other literature, not only the bandwidth of a broadband connection play a role when it comes to speed, but other factors have to be kept in mind as well. This thesis, however, will compare the maximum speed possible with each broadband technology. First of all, this allows to compare the potential of each of the technologies. Secondly, different ways of measuring the speed of broadband that reaches households produce different outcomes. Speed losses within a household, for example the use of WiFi instead of a direct connection with an ethernet cable, can hardly be included into the measurements (Wernick, Queder, Martins & Gries, 2017).

4.1.2: Variants of Broadband

Currently, there are a few different broadband technologies offered in Germany. This paragraph tries to wrap up the key differences between the most important broadband technologies used in Germany, while evaluating the biggest advantages and disadvantages. This will help to understand the progress and the status quo of broadband provision in Germany and gives the possibility to compare the German status quo with other countries. Furthermore, the importance of fiber optics expansion in the future becomes clear by comparing the potential speed of each of the technologies.



Graph 2: Example of a broadband connection (VDSL) (self-created)

The first technology that is being used in Germany is the 'Digital Subscriber Line' (DSL) and uses copper cables that are being laid from the main distributor to the access point and from the access points to the building. A DSL can reach a maximum downstream of 16 Mbit/s and an upstream up to 1 Mbit/s. The speed of a DSL can be significantly increased by laying fiber optics from the main distributor to the access point. This type of cable installation is called 'Fiber To The Curb' (FTTC) and opens up the possibility for a 'Very high speed Digital Subscriber Line' (VDSL) with a downstream of 50 Mbit/s and an upstream of 10 Mbit/s. Vectoring, an algorithm which hinders speed losses due to crosstalking, can increase the speed to up to 250 Mbit/s downstream and 50 Mbit/s upstream. The main disadvantage of DSL and VDSL is that the distance between the household and the access point determines the speed that reaches the household. The physical insertion loss of copper cables

means that a distance of about 1.5 km will cause that only circa 30% of the broadband speed reaches the household.

A different technology that can be used to provide a household with broadband internet is to use the cables for television (coaxial network). Therefore, a different modem needs to be installed in the household. This technology is named 'cable modem' and can provide a downstream of up to 400 Mbit/s and an upstream of up to 200 Mbit/s. This technology has become more popular in the rural areas of Germany in the past years, because Fiber optics are not comprehensively laid and it provides a much better down/upstream than a common DSL. However, one big disadvantage of the cable modem is that it is a shared medium, meaning that it is being used for the internet connection, telephone and the TV of a household all in one. Thus, the connection speed heavily depends on the utilization of the modem, which means that the down/upstream will heavily decrease whenever all of the mentioned services are being used at once.

By laying fiber optics from the main distributor to the access point and to the building/household, very high bandwidths can be reached. 'Fiber To The Home' (FTTH) describes a direct connection between the household and the access point, whereas 'Fiber To The Building' (FTTB) means that fiber optics are laid to the buildings, but copper wires link the last few metres to the households. However, due to the much shorter distance of copper wires being used, there is only a marginal loss of bandwidth and FTTH/FTTB currently provides a download rate of up to 1000 Mbit/s and an upload rate of 500 Mbit/s can be reached. Fiber optics could provide much higher download/upload rates (up to 100.000 Mbit/s), but that is not yet offered by the broadband providers (Deist, Proeger & Bizer, 2016).

4.1.3: Numbers on Broadband Provision

After the overview of the variants used for broadband connections in Germany, this paragraph will give an overview by providing some key numbers about the broadband provision in Germany.

In 2014 the German government had the goal of providing every German household with a downstream of at least 50 Mbit/s. This goal was justified with two arguments: Firstly, the living standards between urban and rural areas supposed to be made more even. Secondly, a better broadband infrastructure shall increase the competitiveness of the German economy (Deist, Proeger & Bizer, 2016). In mid 2014, 64.1% of all German households with access to the internet have had a downstream of at least 50 Mbit/s. However, big differences in broadband expansion become clear when comparing urban and rural areas. While in urban areas more than 90% of the households have

had 50 Mbit/s downstream, only every fifth household in rural areas have had access to such speed. The reasons for this difference are explained in part 5.1.5 of this thesis. In 2015 the German Federal Ministry for Transport and Digital Infrastructure (BMVI) started to support broadband expansion projects financially. Subsidies were granted for projects that aim to expand broadband connections with >50 Mbit/s. Therefore, 2 billion € a year were made available and especially granted to projects in rural areas. The maximum costs for each project was 15 million. This subsidy could be combined with other types of funding, for example from federal states (BMVI, 2016).

The goal of providing a downstream of at least 50 Mbit/s to every German household has not been reached. Even though the core element (backbone) of the German telecommunication network consists of fiber optics, only 80.5% of all German households have had access to a downstream >50 Mbit/s by the end of 2017 (Statista, 2017), while circa a third thirds of the German households in rural areas reached that speed (Steiger, 2018).

There have been 33.2 million German households that have had a broadband connection in June 2017, of which about 22% were used by cable modem and about 75% have had a broadband connection via DSL or VDSL. However, only 2.2% of all broadband connections were based on fiber optics only (Bundesnetzagentur, 2017). Germany lacks behind when comparing the fiber optics expansion to other countries. A study that was published by the Organisation for Economic Co-operation and Development (OECD) in 2017 shows that Germany is ranked 32nd of the 37 member states (Statista, 2017). A different study by the FTTH council Europe from september 2017 shows similar results: Germany is ranked 24th of the 28 EU member states when comparing fiber optics provision (FTTH Council, 2017). Since February 2018 the German government stopped to subsidize projects that aimed to expand projects with copper cables (FTTC) and started to solely subsidize projects that include fiber optics expansion (Sawall, 2018). The annual amount of subsidies was increased from two billion € to three billion €. Even though this encourages municipalities and companies to expand fiber optics in Germany, a comprehensive expansion of FTTH/FTTB is still expected to cost between 85.5 to 93.8 billion €. Therefore, the financial capacities of the German government will not suffice and a lot of the investments have to be taken by municipalities and broadband providers (Deist, Proeger & Bizer, 2016).

In the third quartile of 2017, 40.1% of the broadband connections were offered directly by the Telekom, making it the biggest broadband provider in Germany. The second biggest provider is Vodafone (DSL + Kabel Deutschland) with a market share of 19.6 percent in June 2017, followed by

1&1 (13.7%) and Unitymedia (10.5%) and O2 (6.4%). Next to that, smaller providers exist with a market share of less than 2.5% each. (Statista, 2017)

4.1.4: Benefits of Broadband internet

Now that the broadband situation in Germany is explained, this thesis will describe the benefits of broadband internet and, in today's time, the importance of fiber optics expansion.

A study conducted by Ericsson (networking and telecommunications company), Arthur D. Little (Consulting Firm) and the Chalmers University of Technology that was published in 2013 researched socioeconomic effects of broadband access. The study was split into two parts: The first part investigated the socioeconomic effects from a macroeconomic (national) perspective while the second part took a look at microeconomic (household) effects of broadband speed. Next to analyzing 40 other articles and studies, the authors analyzed their own dataset which consisted of the GDP per capita as the dependent variable (published by the OECD) and the average achieved broadband speed as the investigated variable (measured by Ookla on www.speedtest.net). On top, five control variables were included into the model. The authors described that broadband connections add to the economic output of a country. Communication is very important in knowledge-based communities as it spurs productivity and hence increases competitiveness. Broadband connections make better communication possible and thereby gives the GDP the ability to grow. With increased broadband speed, companies also save a lot of money on hardware and software that would have been spent elsewhere in order to receive the advantages that broadband provides, for example on communication systems. The money saved can be used for investments that lead to a higher demand of services and goods, and could increase the GDP as well (Deist, Proeger & Bizer, 2016).

Further positive effects of a broadband connection are that larger amounts of data can be distributed and gathered than before, meaning that new opportunities for commercial and creativity are opened, for example by being able to reach customers globally. Companies that analyze big data will profit from a fast broadband internet access (SOCIOECONOMIC EFFECTS OF BROADBAND SPEED, 2013). On top of that, more people become able to work from home which saves commuting time and fuel. Thanks to high-quality video conferences, the amount of business trips can be reduced as well, which does also have a positive effect on the environment. Furthermore, broadband expansion creates new jobs as engineers and craftsmen are assigned with it and a better digital infrastructure could lead to more innovation and thus more jobs. Education can also be improved by broadband access: Teachers become able to confer more easily with parents and students that miss a class due

to sickness are able to follow real time video lectures or talk to group members or fellow students online in order to rework the missed lesson content (Deist, Proeger & Bizer, 2016).

4.1.5: Benefits of Fiber Optics

There can be different reasons identified on why fiber optics should be the preferred broadband technology for the future, with its future-proofness leading the way. The annual growth of the German data volume amounts to 30%. This means, that the total amount of data that is being transferred via broadband connections is expected to increase by nearly ten times from 58 billion GB in 2016 to 470 billion GB in 2025. Next to these prospects, there have been studies on the future demands on downstream. It is expected that by 2025, 75% of all German households will demand a broadband connection that provides a downstream of at least 500 MBit/s (BREKO Breitbandstudie 2017, 2017). As explained before, fiber optics is currently the only conventional technology that is able to meet these demands. Another factor that indicates the importance of fiber optics expansion is that comprehensive fiber connections help Germany to keep its position as Europe's strongest economy. Municipalities or cities that have fiber optics are more attractive for companies and startups to settle. This will help the German economy to grow even further and helps decreasing the unemployment rate (Wernick, Queder, Martins & Gries, 2017).

Next to the higher speed, fiber optics broadband has other technological advantages as well. It is much less failure-prone than DSL or cable modems and the shared usage of fiber optics does not limit the connection speed as much as other technologies e.g. cable modems. Furthermore, with fiber optics no broadband speed gets lost due to the distance between the customer and access point as with DSL/VDSL. On top, the potential speed of fiber optics of up to 100.000 Mbit/s makes it very future-proof and the only technology to meet the data demands of the future. (Vorzüge von Glasfaser-Internet, n.d.).

4.1.6: Problems Fiber Optics Expansion

The main problem that Germany currently faces when it comes to fiber expansion are the high costs that come with it. In order to lay fiber optics 80-90% of the investments are used for the underground laying of the wires (Wernick, Queder, Martins & Gries, 2017).

Especially in rural areas the high costs for fiber optics expansion is the main reason for the backlog of Germany in fiber optics provision. The profitability of fiber optics expansion is determined by three factors: Firstly, the population density plays a role and influences the number of houses that are opened up after fiber optics have been expanded. Secondly, the penetration rate and take-up rate,

meaning the number of households that get access to the service is a factor. Thirdly, the ARPU (Average Revenue Per User) is an important factor.

The higher population density, the only factor that cannot be influenced by the broadband providers, makes the fiber optics expansion in urbanised areas much more profitable as broadband providers have more possible customers with less investment costs for the laying of fiber optics. It can even be seen that competition between different broadband providers in urban areas occurs, making it only a matter of time until fiber optics expansion is comprehensively completed in urban areas. In rural areas the population density is much smaller and more investments have to be taken in order to realize the expansion. This makes the expansion not as profitable as in urban areas, leading to less competition and stagnation in expansion. This is also the reason for the low availability of VDSL connections which provide more than 50 Mbit/s in 2018: The distances between the main access point and the main distributor are rarely laid with fiber optics in rural areas. Thus, only a third of all households in rural areas have had a connection speed of >50 Mbit/s, while most of these households were using a cable modem instead of VDSL or fiber optics (Wernick, Queder, Martins & Gries, 2017). Mattes and Pavel (2012) argued that comprehensive fiber expansion does not make sense from an economic perspective, only if the government gives companies the incentive to expand in unprofitable areas by paying back the losses, a comprehensive expansion can be reached and the benefits of fiber optics can appear (Mattes & Pavel, 2012).

The Telekom shares the view that a comprehensive fiber optics is not viable. In February 2018, the Chief Technology Officer (CTO) of the Telekom argued in an interview that the high prices for FTTH/FTTB are not worth it and FTTC should be made available for everyone before other technologies are promoted. Furthermore, he argued that there is no need for FTTH/FTTB yet by adding that “in the classical consumer sector 100 Mbit/s [downstream] are rarely required” and only “from 2030 onwards higher bandwidths will be required” (Rügheimer, 2018). The Telekom has had a market share of more than 40% of all German broadband customers in 2017, making the Telekom one of the biggest influencers on the German fiber optics expansion (Statista, 2017). However, this clashes with the studies and predictions presented before, which argue that fiber optics expansion is already important today in order to have different socioeconomic benefits, and also due to the increasing internet usage. (Wernick, Queder, Martins & Gries, 2017).

4.2: Netzallianz Digitales Deutschland

Now that the importance of broadband and fiber optics expansion became clear and the problems that come with it were presented, the Netzallianz will be described.

The German government confirms the importance of expanding broadband and especially fiber optics and argues that it is plays a crucial role for the increasement of welfare and security in every national economy. Furthermore, it confirms that the expansion is a key step in order to stop urbanization or other ongoing social changes. To promote the broadband expansion as fast as possible, the German government decided to strengthen the cooperation with private actors of the telecommunication industry (Teltarif, 2018) (Kursbuch Netzausbau, 2014). Therefore, in 2014 the 'Netzallianz Digitales Deutschland' was established by the former German Minister for Transport and Digital Infrastructure, Alexander Dobrindt. The Netzallianz is a network that consists of different public and private actors and discusses the future investments and measures to expand the digital infrastructure in Germany. Its main goal is the "comprehensive access to the most modern digital networks for consumers and companies" (Netzallianz Digitales Deutschland, n.d.). This part of the thesis will take a look at the structure of the Netzallianz and the actors involved, as well as its policies and objectives.

4.2.1: Structure of the Netzallianz

In total, there are 15 members in the Netzallianz taking part in its meetings, of which two members are public and 13 members are private actors. The two public members of the Netzallianz are the Federal Ministry for Transport and Digital Infrastructure and the Federal Network Agency of Germany. An employee of the Federal Network Agency (Jochen Homann) is designated to be the president of the Netzallianz. On top, the public Technical University of Munich (TUM) represents the science of the Netzallianz, however, the TUM is not involved in the meetings and decision-making of the Netzallianz (Kursbuch Netzausbau 2016, 2016).

The 13 private members are made up of eight telecommunication companies and five unions of broadband providers. The eight companies that are members of the Netzallianz have a lot of differences. The first main difference is the size of the companies, as they have different market shares and number of employees. Secondly, they differ in location as some operate regionally or locally and other companies offer broadband everywhere in Germany. Also, some companies operate more in rural areas while others are predominantly offering broadband in urban areas. Nonetheless, only companies that have the highest impact on the German broadband expansion are individual members of the Netzallianz (Kursbuch Netzausbau 2016, 2016).

The smaller telecommunication companies and broadband providers are represented by the five broadband unions. The 'Bundesverband Breitbandkommunikation' (BREKO), for example, consists of more than 300 telecommunication companies (BREKO E.V., n.d.). The companies within the unions,

but also the unions among themselves, have the same differences as the telecommunication companies mentioned before.

However, even though there can be certain differences identified between the members of the Netzallianz, they are all considered to be investment- and innovation willing and the German government decided to promote the broadband expansion collaboratively with these unions and companies. Ever since the creation of the Netzallianz in 2014, no member of it has left the Netzallianz (cf. Kursbuch Netzausbau, 2014 & Kursbuch Netzausbau 2016, 2016).

The German Federal Ministry for Transport and Digital Infrastructure (BMVI) wrote that the members of the Netzallianz meet once to twice a year in order to discuss the implementation and the progress of the measures and policies. As the Netzallianz can be considered as a panel between high-level officials that share confidential opinions, it was consciously decided to not write protocols of the meetings. However, the public is informed with press conferences, press releases, the course book and other publications that are published on the website of the BMVI (antwort-bmvi-netzallianz, 2015).

4.2.2: Policies of Netzallianz

The policies of the Netzallianz are laid down in the 'Kursbuch' (course book) which is published every two years. The course book has been published twice so far and includes measures with which the transitional goal of having a comprehensive supply of 50 Mbit/s by 2018 and the long term goal of a 'digital society' can be reached. The will be explained in this part of the thesis. Next to the measures for expanding broadband and fiber optics in Germany, the Netzallianz did also include some other policy measures, for example on the expansion of mobile networks, into the course books. However, the main concern of the Netzallianz is the broadband expansion. In the following, a closer look will be taken at the policies of the Netzallianz as laid down in the course books and in the framework for a digital society.

4.2.2.1: Course Book 2014

The first course book was published in October 2014 and supports the former goal of the German government of reaching comprehensive provision of broadband speed of at least 50 Mbit/s for every German household. This shall create equal living standards for everyone and should ensure the same chances for every citizen or company. Furthermore, broadband expansion is needed in order to meet the increasing data volume in the future. The Netzallianz demands from politics to give subsidies as incentives for companies to expand broadband in areas where a market-driven expansion is not profitable.

Before setting the policy measures, the course book presents common objectives between the public and private actors of the Netzallianz. The common goals can be divided into three pillars: fast, modern and sustainable. Firstly, all actors agreed that the broadband expansion shall take place as fast as possible. Therefore, all conventional technologies and fundings should be used. The second pillar demands that the expansion shall take place in a modern way, meaning that only the most modern technologies and procedures shall be used and have to be standardized. The third pillar is based on a sustainable expansion. Actors share the opinion that FTTH and FTTB are the technologies of the future and that copper wire shall be replaced step by step. Furthermore, all actors share the opinion that an efficient expansion is only possible with strong cooperation between the federal government, the federal states, municipalities and the companies that expand the broadband (Kursbuch Netzausbau, 2014).

Afterwards, the course book presents the five action points that count as the measures/policies of the Netzallianz in 2014. The crucial aspects are to improve the 'Breitbandatlas' (broadband atlas) which contains information about the provision of broadband and is based on contributions of more than 300 broadband providers. This data is provided voluntarily twice a year by the members of the Netzallianz. It aims to show the availability of broadband connections in Germany to consumers and companies. However, the measure of the Netzallianz in 2014 aimed at improving the atlas by adding planned broadband expansions of municipalities, data that helps companies and unions to plan more efficiently. Furthermore, the Netzallianz wants to find a way to stop data from being raised twice for the broadband atlas. The 'Infrastrukturenatlas' (infrastructure atlas) consists of data about all kinds of infrastructure in Germany, for example railway tracks or streets. It is only available for certain companies and public actors as it includes sensitive data. However, as it has been used nearly three times as often between 2013 and 2014, the Netzallianz decided to contribute more data on the availability of broadband. Furthermore, the Netzallianz tried to standardize the funding of broadband expansion projects and wants to further promote the expansion for companies and consumers by creating incentives for new technologies. In order to make the application for funding easier and to get an overview of ongoing funding, the Netzallianz wants to create a website that includes a databank with ongoing fundings. On top of that, the broadband expansion shall be fastened by implementing a new regulation to support the laying of fiber optics at every construction site (Kursbuch Netzausbau, 2014).

4.2.2.2: Course Book 2016

The second course book was published in June 2016 and evaluates the success of the policy measures from 2014 and sets new policies. The Netzallianz kept the transitional goal of the German government to reach >50 Mbit/s comprehensively in Germany. A big part of the policy measures from 2014 were achieved by the Netzallianz.

The Netzallianz was able to extend the broadband atlas with information on the planned broadband expansions and construction sites and a procedure to stop the collection of data twice has been found. Furthermore, a website that includes a databank about fundings was uploaded and is being used to allocate subsidies (www.breitbandausschreibungen.de). The 'Gesetz zur Erleichterung des Ausbaus digitaler Hochgeschwindigkeitsnetze' (DigiNetzG; Law to ease the expansion of digital high-speed networks) was submitted by the Minister for Digital Infrastructure Alexander Dobrindt and passed by the federal cabinet. The draft of this law was discussed and approved by all members of the Netzallianz. It regulates that fiber optics have to be laid adequately at every construction site, e.g. railway, streets or bridges. On top of that, the program for subsidies on the expansion of broadband by the cabinet in 2015. The federal government decided to provide 2 billion € for the expansion of broadband in 2015. This funding can be combined with other types of funding, for example from federal states. The Netzallianz campaigned for such a funding measure in order to promote the broadband expansion (Relaunch des Breitbandförderprogramms, n.d.) (Kursbuch Netzausbau 2016, 2016).

The new course book of 2016 includes six instead of five action points. However, this thesis again only mentions the most important policy measures of these six action points. The Netzallianz plans to make the locations of construction sites more transparent and available for companies. This measure shall help to implement the DigiNetzG sufficiently by giving the providers the availability to find out where fiber optics can be laid. Therefore, another databank shall be created which includes all the construction sites in Germany. Secondly, the broadband atlas shall be improved by making it more accurate which will help to point out underdeveloped areas even better. Also, the availability of mobile networks will be added. The next crucial point of the course book states that the EU plans to create a 'Digital Single Market'. The Netzallianz agreed that ideas for the regulation of this single market will be decided by all actors jointly in an ad hoc decision-making process. The sixth and last action point calls upon scientists and universities to study the possible framework to lead Germany into a Gigabit society (Kursbuch Netzausbau 2016, 2016). The Gigabit society describes an advanced society in which information and communication technologies are fully established. That means that

people, machines and processes are completely interconnected (Eckpunkte Zukunftsoffensive Gigabit-Deutschland, n.d.).

4.2.2.3: Framework Gigabit-Society

The framework to lead Germany into the Gigabit society was published in 2017 by the Netzallianz and is named 'Zukunftsoffensive Gigabit-Deutschland'. It starts by describing the Gigabit society and by stressing the importance of the progress in technology and expansion in order to get there. Four phases were identified. Phase 1 is the transitional goal of reaching >50 Mbit/s comprehensively in Germany by 2018. Phase 2 aims at providing fiber optics connections to all industrial areas, also in undersupplied areas. In phase 3 the requirements for a comprehensive 5G-high speed mobile network shall be created and in phase 4 a comprehensive high speed digital infrastructure (fiber optics broadband) shall be created in Germany by 2025. In order to reach these goals, the Netzallianz wants to strengthen the fiber optics networks and the willingness to invest into these, help with the expansion of 5-G high speed mobile networks and increase the synergies for the DigiNetz-law. Different measures to increase cooperation with private and public actors and to make money for investments available are presented by the Netzallianz in this framework towards a Gigabit society. (Zukunftsoffensive Gigabit-Deutschland, 2017). The Netzallianz plans that a total investments of a 100 billion € will be spent by all actors involved (Netzallianz beschließt Zukunftsoffensive Gigabit-Deutschland, 2017). That investment would be enough for a comprehensive expansion of fiber optics if the calculation of Deist, Proeger and Bizer, who calculated that a comprehensive expansion costs 85.5 to 93.8 billion €, is accurate (Deist, Proeger & Bizer, 2016).

5: Analysis

Now that an overview of the structure, the functioning and the policies of the Netzallianz was given the analysis follows. Previously, the concept of network governance was defined in a literature review. Therefore, the terms network and governance were individually defined and combined in order to get an explanation of network governance. This combination was rounded off with other theories on network governance. In the analysis the Netzallianz will be connected to these theories.

5.1: Network Analysis

The definition of a network as given by Hill & Lynn (2005) says that a network can be described as a group that consists of three or more legally autonomous organizations that work together to achieve not only their own goals but also a collective goal (Hill & Lynn, 2004). The Netzallianz is a panel

between at least three autonomous members, namely two public actors and 13 private telecommunication companies/unions, with the common goal to develop the digital infrastructure in Germany. The members of the Netzallianz agreed on common objectives in the course book of 2014. These include that all members will promote the broadband expansion as fast, modern and sustainable as possible (Kursbuch Netzausbau, 2014). Furthermore, the Netzallianz has the common goal to reach a "comprehensive access to the most modern digital networks for consumers and companies"(Netzallianz Digitales Deutschland, n.d.). Hence, the Netzallianz fits with the definition of Hill and Lynn and can be considered a network. The Netzallianz does also fit with the addition of Carlson and Sandström (2007) who argued that the main reason for the emerge of networks has been a shared common goal or concern between various autonomous actors, which resulted in a joint coordination of action (Carlsson & Sandström, 2008).

Kenis and Provan (2008) defined two dimensions of networks that lead to three different types of networks. Either networks are highly brokered (centralized and low level of interaction) or not brokered (highly decentralized and every organization interacts a lot). Even though the members of the Netzallianz share common goals and objectives, e.g. a fast, modern and sustainable broadband expansion in Germany, the actors do not interact much as they only meet once to twice a year. Furthermore, the telecommunication companies and unions operate autonomously in different regions. Not much data about the decision-making-process of the Netzallianz is available. However, since the German Federal Ministry for Transport and Digital Infrastructure (BMVI) created the Netzallianz and coordinates it, an employee of the German Federal Network Agency is its president and most of the tasks and responsibilities that come with the policies have to be executed by the public members, one could argue that the public actors should have a bigger say in the decision-making process and that power is rather centralized. Therefore, the Netzallianz can be considered as a brokered type of network.

The two dimensions lead to three types of networks: Participant-governed networks, lead-organization networks and Network Administrative Organizations. The coordination of the Netzallianz is done by two internal members, the BMVI and the Federal Network Agency and the network is brokered and the members interact rarely. This means that the theory of lead-organization networks fits best to describe the Netzallianz. In contrast, Participant-governed networks have a high level of interaction between the members, power is more or less symmetrical as the network is not brokered and is coordinated by all the members jointly (Provan & Kenis, 2008).

Ouden (2015) tried to differentiate networks by using four paradigms that each give a different perspective on the reasons for the creation of a network. The first paradigm named positivism claims that networks have been created in order to have more collaboration to solve societal issues jointly. The second paradigm is the interpretivist paradigm and sees the individual as the starting point for the creation of networks. The critical-realist paradigm is state-focused and underscores that it is the states responsibility to create and coordinate networks. The fourth and last paradigm is the functionalist paradigm and states that the creation of networks is the response to a failure in e.g. markets or technological development. (Ouden, 2015)

The positivist paradigm and the critical-realist paradigm can best be used in order to understand the creation of the Netzallianz. As it can be seen in the document analysis of this thesis, the Netzallianz was established by the German government in 2014. The critical-realist paradigm dictates that it is the government's responsibility to create and coordinate the network. The government fulfills this duty by having the Netzallianz established in 2014 and by coordinating and guiding its work ever since. The creation of the Netzallianz is also a positivist phenomenon: The broadband expansion in Germany has been in public debate as especially the provision of fiber optics in Germany is worse than in many other countries, as shown by a study from the OECD (Statista, 2017). Therefore, the German government established the Netzallianz in order to improve and fasten the broadband expansion by increasing the collaboration with telecommunication companies and unions. The reasons for the creation can thus be backed up with scientific knowledge and empirical data on the importance of a better broadband expansion in Germany. Due to the lack of broadband provision in Germany, functionalists could argue that the creation of the Netzallianz can be seen as a response to failure in expansion. The Netzallianz rather supports and fastens the expansion and does not radically change the planning and regulations on broadband expansion that already existed before the creation of the Netzallianz. This shows that the problems in broadband expansion were not big enough to perceive them as a failure and the Netzallianz was not created for that reason. Thus, the functionalist paradigm of networks cannot be applied to the Netzallianz.

The school of Policy Network Analysis distinguishes between two types of networks. Policy communities have certain routines and common values and knowledge derived from common views between a few network members. Issue Networks are characterised by a lack of consensus between a large number of members of the network. By taking a look at the policies of the Netzallianz, it becomes clear that the actors share common views and objectives as explained before. There has to be consensus on policy principles and procedures as no member of the Netzallianz that has been created in 2014 has left the Netzallianz, even though membership is voluntary. Because of that, the

Netzallianz can be considered to be a ‘policy community’ rather than an ‘issue network’ (Fawcett & Daugbjerg, 2012).

In this context, the special position of the Telekom has to be mentioned. As Ansell and Gash (2007) said, it is important to mention that next to the common goal of the actors, every actor tries to achieve its individual goals as well. During an interview, the Chief Technology Officer of the Telekom revealed that the Telekom aims to provide VDSL and not fiber optics to every German household and said that higher internet data demands will only occur by 2030 (Rügheimer, 2018). This contradicts with the common goal of the Netzallianz of having comprehensive fiber optics by 2025. Coming back to Ansell and Gash`s (2007) theory, it is said that certain power imbalances between participants, for example the lack of capacities, status or resources, offer a risk that the cooperative governance process will be prone to manipulation by stronger actors and produces distrust and weak commitment. Economically, the Telekom is the strongest company of the Netzallianz with a broadband market share of more than 40% (Statista, 2017). They do not seem too committed concerning the goal of the Netzallianz which, according to Ansell and Gash, puts a threat to the trust and commitment of the whole Netzallianz and would also diminish the argument that the Netzallianz can be described as a policy community. However, also the Telekom has increased their fiber optics expansion (Telekom, 2017) and the solidarity between the other members to achieve the common goal relativize this threat.

5.2: Governance Analysis

The definition of governance describes a process of interaction and decision-making between actors on a collective problem (Mark, 2011). This definition can be applied to the Netzallianz very well, but it is still unclear what mode of governance the Netzallianz is. Therefore, in the following it is evaluated which mode of governance can be applied to the Netzallianz by applying it to the theoretical framework.

Kooiman (2003) described three different modes of governance. The first one is called self-governance and prescribes that the actors involved are organising themselves. The second type is co-governance and is heavily dependent on interdependent actors. The third type of governance is called hierarchical governance and is based on a top down approach between the actors, with one actor trying to get control over other actors. Kooiman (2003) stresses that there can be hybrids between these three modes of governance, meaning that real modes of governance are a mix between these three. The Netzallianz can be seen as a hybrid between two of the three modes of governance as it possesses features of both of them. The Netzallianz has features of a

'self-governance' because it is an informal panel and the actors are working autonomously. Furthermore, the Netzallianz has features of co-governance because the actors are interdependent to reach the common goal of comprehensive fiber optics in Germany by 2025. By analyzing documents about the Netzallianz it is hard to say whether it has features of a hierarchical mode of governance or not. It can be said that the public actors do have a stronger position within the Netzallianz and have a bigger impact on the decision-making, but it is very unlikely that they try to gain control over other actors, as that would be very unusual for a public actor. On top, the fact that neither a private member has ever left the Netzallianz nor complained about its functioning and structure in public makes it more likely to argue that no actor tries to gain control over other actors. This would mean that the Netzallianz is no hierarchical mode of governance (Kooiman, 2003).

5.3: Network Governance Analysis

After the combination of the theories of 'networks' and 'governance', it became clear that modes of network governance have three distinctive and unique features, namely that the actors are operating autonomously but interdependent for reaching the common goals and objectives, that the collaboration between these actors takes place within a self-constructed structure and that the networks have the ability to work on and try to solve social problems jointly. Jones, Hesterly and Borgatti added that network governance contracts are implicit, open-ended and socially- but not legally-binding (Jones, Hesterly & Borgatti, 1997)

The Netzallianz can be seen as a mode of network governance as all these features can be applied. The public members and the telecommunication unions and companies work autonomously, as they expand broadband autonomously and the companies have different products at different locations offered. However, in order to reach the goal of the Netzallianz of providing every household with fiber optics by 2025, they agreed that they have to work cooperatively and are interdependent to reach that goal. Not only the members of the Netzallianz, but also the federal states, municipalities and the federal government are included (Kursbuch Netzausbau 2016, 2016). Other policy measures of the Netzallianz, for example the maintenance of the data provided by the broadband atlas, can also only be reached if all members of the Netzallianz work together. These are all factors that make the members of the Netzallianz interdependent and the structure of the Netzallianz gives them the possibility to work on this jointly. The members of the Netzallianz joined the network voluntarily and the course books and other publications and measures are not legally binding, meaning that the conditions of Jones, Hesterly and Borgatti are also met. In contrast, Public Private Partnerships are more formal modes of governance, meaning that the private actors of Public Private Partnerships try to perform certain tasks ordered by the public actor (Ansell & Gash, 2007). As evaluated before, the

Netzallianz is a voluntary and more informal type of governance, meaning that the Netzallianz cannot be considered to be a Public Private Partnership.

6: Conclusion

This thesis aimed for two goals. The first goal comprised a document analysis in order to get an overview of the situation of broadband provision in Germany. Therefore, the subquestions:

SQ_1: How does the broadband provision in Germany look like?
SQ_2: What did the Netzallianz do in order to improve the broadband expansion in Germany?

have been tried to be answered. The main findings of the document analysis on the broadband situation include that the German government has not reached its goal of providing a broadband internet connection with at least 50 Mbit/s by 2018. Only 80.5% of all households have had access to that connection speed in 2018. Furthermore, it became clear that rural areas are especially undersupplied with only every third household reaching that speed.

Afterwards, the benefits of broadband internet and especially fiber optics connections have been analyzed. This analysis showed that broadband and fiber optics bring economic benefits to national economies as the GDP grows. By giving predictions on the annual growth of the internet data volume the importance of fiber optics expansion was affirmed. In fact, an annual data increase of 30% makes fiber optics inevitable for the future. This document analysis of the problems in broadband provision in Germany and the benefits of broadband connections and especially fiber optics makes clear and justifies why the 'Netzallianz Digitales Deutschland' was established in 2014. The document analysis did also include an overview of the policies of the Netzallianz. It was shown that the Netzallianz has agreed on common goals and objectives, such as the provision of fiber optic broadband for every household in Germany by 2025. The main action points and policy measures of the course books of the Netzallianz, which include tasks and responsibilities for for all the members of the Netzallianz. For example, the Netzallianz approved a draft law that eases the expansion of fiber optics. Also, the Netzallianz setted up different data banks for consumers and companies that include data on the broadband provision. Furthermore, the Netzallianz published a framework to help Germany in reaching the Gigabit-society which calls upon every actor involved with the expansion of digital infrastructure to take action and calls upon investments of more than 100 billion € by 2025.

It can be concluded that the Netzallianz plays a big role in promoting and fastening the broadband expansion. Being a panel for the share of opinions and for the setting of policy measures, the success of the policy measures laid down in the course book 2014 show that these goals and objectives can be reached. The public and private members of the Netzallianz agreed on ambitious common goals and objectives for the future and the success of the Netzallianz so far yields hope for an improvement of the broadband expansion in Germany.

The second aim of this thesis, which consisted of an analysis of the Netzallianz from a network governance perspective, followed the research question

> **"How does the 'Netzallianz Digitales Deutschland' and its policies confirm or refute theory of Network Governance?"**

In order to answer this research question, a theoretical framework was created by splitting the terms 'network' and 'governance' and finding theory for them individually. Afterwards, these theories have been combined and other literature on network governance was added. By analyzing how the policies and the structure fit with this theoretical framework. Findings include that the Netzallianz can be considered to be a network as all features of a network are fulfilled. Furthermore, it can be described as a lead-organization and brokered network as suggested by Kenis and Provan. That implies that the Netzallianz is coordinated by an internal actor and is considered to be rather centered and has a low level of interaction between the actors. Next to that, the positivist and the critical-realist paradigms can best be used to describe the Netzallianz, meaning that the state created and coordinates the Netzallianz because in order to solve issues jointly. Furthermore, the common views and objectives between the members make clear that the Netzallianz has the traits of a policy community.

The Netzallianz does also have the characteristics to be classified as a mode of governance. It possesses characteristics of two modes of governance as defined by Kooiman (2003), making the Netzallianz a hybrid of these modes. It has characteristics of self-governance as the actors act autonomously and of co-governance and are interdependent to reach the goals and objectives of the Netzallianz.

After combining the concepts of networks and governance it became clear that the Netzallianz meets all the requirements to be considered a mode of network governance, namely because it consists of autonomous (self-operating) and interdependent (dependent on each other for reaching common goals and objectives) actors that operate in a self-constructed structure and work on problems jointly. Therefore, the following hypotheses can be derived from the analysis:

Hypothesis 1: The “Netzallianz Digitales Deutschland” can be considered to be a lead-organization network with characteristics of a policy community.

Hypothesis 2: The creation of the “Netzallianz Digitales Deutschland” can best be understood from a positivist and critical-realist perspective.

Hypothesis 3: The “Netzallianz Digitales Deutschland” is a hybrid of two modes of governance.

Hypothesis 4: The “Netzallianz Digitales Deutschland” can be considered as a form of network governance.

The social relevance of this study was described as an attempt to fill the gap of studies on the Netzallianz with the help of a document analysis. The ongoing public debate about the broadband provision in Germany make it relevant to study the Netzallianz as its achievements show that it plays a significant role for the improvement of the broadband expansion in Germany. This was done by summarizing as much information about the Netzallianz as possible by describing its structure and policies, and by giving an overview of the broadband market in Germany in order to understand the idea behind the Netzallianz. This makes the Netzallianz more transparent by giving people without background knowledge on the topic the possibility to get an overview with the help of one document.

The scientific relevance of this thesis consisted of understanding the nature of Netzallianz from a network governance perspective. The conclusions and hypotheses created help to do so, however, the findings of this thesis cannot be generalized and do only give insights on the Netzallianz. Furthermore, the theoretical framework that this thesis created in order to analyze the Netzallianz can be used by other researchers when analyzing different cases that could be modes of network governance. The time in which this thesis was written was limited and thus literature might be missing due to accidental omission. It is up to future research to use further differentiations of modes of network governance in order to make the theoretical framework more detailed or to add more information to the document analysis on broadband provision and the Netzallianz.

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8: Appendix

The appendix of this thesis is used in order to shortly explain why I had to throw the initial idea of my Bachelor proposal overboard. The initial idea of my proposal was to analyze the characteristics of members of the Netzallianz. I developed the research question "Which characteristics of private actors in the Netzallianz explain their different degrees of impact on policy formation for digital infrastructure?" and came up with the idea to conduct interviews with the members of the Netzallianz in order to get data for the analysis. The theory part was based on the literature of Kenis & Provan about network governance. I developed eight open Interview questions and started to contact the members of the Netzallianz. I already expected that it would be hard to get into contact with the private members as there are barely any contact details available in the internet. Nonetheless, I contacted the private members as much as possible - without success. I also tried contacting the Bundesnetzagentur (Federal Network Agency) but it was hard to find contact details (only a contact detail for citizen inquiries) and the answer was lousy and did not help me.

But i had a more promising plan in mind in order to create contact with the members - by contacting the Federal Ministry for Transport and Digital (BMVI) Infrastructure directly. Due to an internship at the Federal Ministry for Agriculture earlier this year, I was able to get the contact details of the employees and officials ((co-)chief of division/department) in the BMVI that deal with the Netzallianz. I tried to get into touch via telephone and mail - also without success. A few weeks later the new organogram of the BMVI was uploaded on their website and it became clear that the head of division and the co-chief of the department have changed, probably due to the new German government and the new minister of the BMVI. So I started to contact the new officials but did not reach anyone at first. Only three weeks before handing in this thesis I got a phone call from the new head of the division who told me they would be open for help and could imagine giving interviews. Unfortunately, the time was too short to create contact with the private members of the Netzallianz and to conduct the interviews and I had already started with my backup-plan. However, he sent me a mail with some links to (publically available) documents that were helpful.

During this process I already started to develop the backup-plan. I wanted to stick with the idea of analyzing the Netzallianz as I find the topic of broadband expansion very interesting and I was able to use some of the material and data gathered for the proposal. So I decided to make a document analysis/literature review instead of conducting interviews.