# Bridging the gap between the project and its environment

*An explorative study on boundary spanning within Dutch infrastructure projects*

By Yorick Haaze

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# Abstract

Infrastructure project organisations stumble upon a social boundary between the project organisation and the project environment, which often leads to plans that are considered as unsatisfactory in within the project environment. Infrastructure planning literature and policy, however, tends to improve the link between the project and its environment by shifting this boundary, instead of spanning it. Although the concept of boundary spanning has shown great potential integrating different worlds and achieving more inclusive solutions, the concept is barely explored within an infrastructure context. This research explored boundary spanning between the project and its environment, by analysing the boundary spanning activities (relational activities, information exchange, coordination/negotiation, mediation/facilitating, guarding/isolating) that are employed in relation to the conditions (Environmental characteristics, Composition of the boundary spanning role, organisational support & feedback, and individual determinants) that facilitate boundary spanning activity. Based on the qualitative case study data, collected from two Dutch infrastructure projects (ViA15 & Blankenburgverbinding), two major findings have been made. Firstly, a higher degree of environmental stress (political uncertainty, diversity/complexity, interdependency) leads on the one hand to more guarding and isolating behaviour due to decreased motivation, but because of interdependency, the organisation is also forced to coordinate/negotiate with the stakeholders. This finding is in conflict with the findings in other boundary spanning literature, which suggest a higher degree of boundary spanning activity due to these conditions. Secondly, the personal network of a boundary spanner (project director) at the ministry in combination with personal conditions like motivation and experience had a big impact on the boundary spanning activity within the project, characterised by a high degree of information exchange/knowledge sharing, relational activities, and mediation and facilitating.



**Keywords:** *Boundary spanning, Boundary spanning activities, Project-project environment boundary, Facilitating conditions, Boundary spanner, Infrastructure projects*

# Preface

With the completion of this thesis a put an end to a challenging phase of my life. Finishing my master programme 'Environmental and Infrastructure Planning' at the University of Groningen turned out to be a lot more difficult than I initially expected. Although the courses went well for me, studying from home affected me mentally. Because of this, the research process of my master thesis took a lot longer than planned. However, I am very proud and happy that I did not give up at times I did not believe I would ever come to this point.

I also realise that I would not have completed this thesis without the support of the people around me. Firstly, I would like to thank my family and friends who were always there to support me. It was nice to escape from this research process every now and then with these people. Furthermore, I would like to thank all the people who thought along with me about this research. I never heard a single rejection when I asked for their input. I would also like to thank the respondents who took the time to answer my questions and helped me to get in touch with other respondents. Lastly, a special thanks goes to my supervisor Tim Busscher for is endless patience. His positive and substantive input gave me the courage to carry on and finalise this research.

This is the end of my life as a student. Although this thesis project was difficult, I enjoyed my student life very much. In all honesty, I am a little bummed that it is all over now. However, I am also very much looking forward to the new challenges ahead in my professional career in the field of environmental and infrastructure planning.

Enjoy reading!

Yorick Haaze

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# List of abbreviations

BBV = Blankenburgverbinding (project)
DIAD = Diversity, interdependence, and authentic dialogue
RWS = Rijkswaterstaat (Dutch executive agency of the Ministry of Infrastructure and Water

# 1. Introduction

## 1.1 Motivation

The world we live in is becoming increasingly complex. Developments within today's society rarely stand on its own, they are often part of a complex system, shaped by interrelatedness and multi-dynamics (Urry, 2002; Healey, 2007; De Roo & Boelens, 2016; Chettiparamb, 2019). This increasingly complex reality is also a breeding ground for boundaries (Van Meerkerk & Edelenbosch, 2018a). The world of infrastructure planning is no exception to this development. Actors in the field of infrastructure planning stumble upon barriers that are institutional, physical or social in nature (Van Geet et al., 2019; Arts, 2007; Proag, 2021; Heeres et al., 2016). These barriers are often treated as problems, that could be fixed via processes of institutional change (Van Geet et al, 2019; Arts, 2007; Heeres et al., 2016). However, in practice, this would only lead to boundary shifts, instead of durable solutions. All too often, attempts to better integrate infrastructure in its environment, for example, do not lead to desired outcomes (Van Geet et al., 2019; Heeres, 2012a; Heeres, 2017; Ferreira Borges, 2012). While the behavioural concept of boundary spanning is already widely adopted in other fields of study, to date, it has received little attention in infrastructure planning practice and research (Van Meerkerk & Edelenbosch, 2018a, Van der Brink et al., 2019). Nevertheless, boundary spanning, which literally is about working across certain boundaries, can be a potent tool to better integrate separate worlds (Balogun et al., 2005; Colman & Rouzies, 2019; Ratcheva, 2009; Edelenbos & Van Meerkerk, 2015). Since several studies state that interaction of project organisations with their respective environments is key for achieving integral infrastructure development, this study will focus on the boundary between infrastructure projects and their environment.

## 1.2 Background

Infrastructure projects have a big impact on their environment, like environmental losses, safety issues, landscape damage, habitat losses, disadvantaged liveability and urban fragmentation have a big impact on the project-environment (Heeres, 2012a; Heeres, 2017; Ferreira Borges, 2012). Between the 1970 and 2000, when car mobility in the Netherlands was growing extremely, concerns about these negative impacts of infrastructure started to grow (Heeres, 2012b). In that time, infrastructure planning was sector-driven, dominated by the transport sector. The top-down planning approach, based on predictive mathematical models, did not leave much space for the input of stakeholders in the project environment. This way of planning has been effective and efficient for several decades. However, as the pressure on space and the complexity of society in the country increased, resistance against this planning culture started to emerge (Heeres et al., 2017; Healey, 1996). In 1996, a British urban planner named Patsy Healey, suggested a communicative turn in the field of spatial planning. This could be seen as the starting point of a new era in planning, characterised by participatory processes in which different interests many different interest are expressed in an open planning "arena" (Healey, 1996). This paradigm in the field of planning is known for its focus on improvement of coordination, communication, cooperation and integration in infrastructure planning (Woltjer, 2002; Gustavsson, 2015; Buick et el., 2012). In the late 1990s, the widely supported communicative turn in planning became an increasingly adopted guideline in Dutch infrastructure planning projects, by exploring new participatory modes for the planning of these projects (Woltjer, 2002). Besides the mutual gains that were generated, or attempted to generate, by these new inclusive modes of planning, imperfections in the social dynamics also became more visible (Innes & Booher, 2000; Huxley, 2000). The power relations, diversity and complexity within the project environment were

widely articulated in the planning arena, and turned out to be hard to channel into plans that satisfied all the actors in the project environment.

The increasing complexity and -social dynamics in infrastructure planning together with the increasing interaction between the project and its environment, also led to the entry of systems theory in planning theory (Booher & Innes, 2002). Today, in planning theory, the world is increasingly perceived as a collection of systems and subsystems that are connected to each other (Van Assche & Verschraegen, 2008; De Roo & Boelens, 2016). Infrastructure projects can also be considered as a system, an open system to be more precise. The open system approach is based on the idea that the organisation (project organisation) is a natural system that is interdependent on its environment. In other words, the organisation transforms inputs derived from the environment, to outputs, that are returned to the same environment (Van Meerkerk & Edelenbos, 2018a). Looking at infrastructure projects that way, makes it easier to identify the boundary that this research is focused on: the project-project environment boundary. Moreover, the inputs and outputs could be translated to the concept boundary spanning that will be explored in this research context.

## 1.3 Research problem and focus

As infrastructure planning processes has become increasingly interactive and inclusive, the boundary between the project and its environment has become more emphatically present. Social dynamics shaped by trust, interests, responsibilities, power, knowledge and skills often lead to conflicts between the project and the project environment (Innes & Booher, 2000; Heeres, 2017). The project is defined as the project organisation, as the organisation that executes the project. In the Netherlands infrastructure projects are executed by 'Rijkswaterstaat'. This executive organisation, that is institutionally required to deliver infrastructure, has to intervene in an environment where people live, work, recreate, travel etc. This environment consists of people and organisations with other interests and responsibilities related to the same region. These people and organisations are part of the project environment. The project environment, can be defined as *'the aggregate surrounding things, conditions or influences*' (Caldwell, 1963 p. 133). Thus, in other words, the project environment includes everything outside the project (Youker, 1992).

As mentioned in section 1.1, the concept of boundary spanning has proven to be effective to better integrate separate worlds (Balogun et al., 2005; Colman & Rouzies, 2019; Racheal, 2009; Edelenbos & Van Meerkerk, 2015). Boundary spanning can be defined as a set of activities (section 2.4) (relational activities, information exchange, coordination/negotiation, mediation/facilitating, guarding/isolating) performed by individuals within an organisation or between organisations, in order to cross these respective boundaries (Van Meerkerk & Edelenbos, 2018a;Schotter et al., 2017). Boundary spanning actors that employ boundary spanning activities. Boundary spanners can be defined as the ones '*who are especially sensitive to and skilled in bridging interests, professions, and organisations*' (Webb, 1991, p. 231). They are the "*people who pro-actively scan the organizational environment, employ activities to collect information and to gain support across organizational or institutional boundaries, disseminate information and coordinate activities between their 'home' organisation or organisational unit and its environment, and connect processes and actors across these boundaries*" (Van Meerkerk & Edelenbos, 2019, p. 2). They connect different interests, build trust within and outside organisations and improve the coordination between decisions and the implementation of these decisions within project processes (Van Meerkerk & Edelenbos, 2018a; Van der Brink et al., 2019).

Boundary spanning activity within an open system (section 1.2) does not stand on itself. In order to understand boundary spanning activity within an infrastructure project system, it is important to understand the system. In other words, it is important to understand the factors within the system

that facilitate or stimulate boundary spanning behaviour. Van Meerkerk & Edelebosch (2018a) describe these factors as facilitating conditions. These conditions relate to the environment, the organisation and even the individuals within the infrastructure project system.

## 1.4 Research aim and questions

This research will explore boundary spanning activities within road infrastructure projects and the facilitating conditions that are related to these activities. The research will be focused on boundary spanning between the project organisation and the project environment, and on the facilitating conditions that are related to these activities. When it becomes more clear what boundary spanning activities are employed, it will be possible for future studies to research the effect of the activities. Eventually this could lead to new behavioural frameworks that help to improve boundary spanning as a tool to strengthen the link between the infrastructure project and its environment.

The main research question that will be answered is:

*What boundary spanning activities are employed in order to cross the project – project environment boundary and what facilitating conditions are identified as influential on these activities?*

This question will be answered via the following sub-questions:

- What relevant boundary spanning activities can be found in the literature?
- What conditions influence boundary spanning activities?
- What boundary spanning activities are employed in order to span the boundary between the infrastructure project and the project environment in practice?

## 1.5 Thesis structure

This thesis consists of five chapters. Chapter 1 (this chapter) introduced this study, explained the reason and background behind this research, and introduced the research questions. Chapter 2 is the theoretical chapter, which describes and explains the underlying theoretical framework of this research. This chapter goes deeper into the concepts of boundary spanning, boundary spanners, social systems, boundaries, and facilitating conditions. Chapter 3 outlines the methods that are used to conduct this research. The chapter also describes the cases that are researched. Furthermore, this third chapter also explains why these methods are used and why these cases for this specific research. Subsequently, in Chapter 4 the research findings are presented. This chapter provides an overview of the facilitating conditions that are found within the research cases, and the boundary spanning activities that were employed in the respective cases. Chapter 4 also displays the relationships that were found between these conditions and activities. Chapter 5 will first critically discuss the findings in relation to the research questions, this discussion part will also discuss the limitations that were experienced or identified during the research process. Subsequently, in the conclusion part, the research questions will be answered and the most important findings will be highlighted. Chapter 5 ends with implications and recommendations for future studies.

# 2. Theoretical framework

## 2.1 Boundary spanning

One could state that the relative importance of crossing boundaries is changeable through time (O' Flynn et al. 2013; Pollitt, 2003; Sullivan & Skelcher, 2003). However, in the past decades, with the increasing complexity within society, a wide array of boundaries emerged or became more prominent (Van Meerkerk & Edelenbos, 2014). In (infrastructure) planning the need for more collaborative and integrative policy approaches has increased, which has led to an increasing need for boundary spanners and boundary spanning activities (Gustavsson, 2015; Buick et al., 2012; Buick et al., 2019; Van Geet et al., 2019; Arts, 2007). The concept of boundary spanning is broadly accepted as a driving force to build relationships, interdependencies and interconnections within and outside organisations (Bossink, 2004; Di Marco et al., 2010; Fellows & Liu, 2012). Still, whereas the concept of boundary spanning was already introduced in the 1970s, it tends to remain fuzzy (Aldrich & Herker, 1977; Bednarek et al., 2018). A reason for this fuzziness could be that the concept is adopted in many different disciplines over the years (Van Meerkerk & Edelenbos, 2014).

### Defining boundary spanning

In the 1970s literature about boundary spanning, the concept is defined as a practise that facilitates knowledge exchange between two or more organisations (Aldrich & Herker, 1977; Leifer & Delbecq, 1978). However, this definition neglects the assumption that boundaries can also exist within organisations (Buick et al., 2019). Complexity thinking has developed the notion that boundary spanning has many different dimensions of "learning and knowing" (Guston 2001; Kates et al. 2001; Brown et al. 2010). Bednarek et al. added these features to the definition by describing the boundary spanning practise as: '*Work to enable exchange between the production and use of knowledge to support evidence-informed decision-making in a specific context*' (2018, p. 1176). This definition, however, is not explicitly focused on crossing certain boundaries in order to link the infrastructure project to the project environment. The definition also neglects the fact that linking the project to the project environment is not only about evidence-based decision making. The decision-making within infrastructure projects is also about considering preferences and dealing with the emotions within the project environment (Innes & Booher, 2000). Therefore the definition of Jonsson et al., defining boundary spanning as '*the activity of collecting and making sense of peripheral information or knowledge so as to expand an organization's local knowledge*' (2009, p. 235), fits better to the specific boundary this research focuses on. The peripheral information/knowledge could be interpreted as the information coming from the project environment. Still, the definition of Bednarek et al. (2018) stresses the practise of 'enabling exchange', which lacks in lacks in the definition of Jonsson et al. (2009). Thus, making sense of peripheral information should not only be interpreted as processing all the peripheral information in order to find a beneficial solution for the project environment. It should also be considered as creating the right circumstances to support/encourage the environment to cooperate and share their opinions, ideas, knowledge and information with the project organisation. Section 2.4 elaborates on the boundary spanning activities that are considered as relevant for spanning boundaries like the project-project environment boundary.

### The boundary spanner

As mentioned in (section 1.3) boundary spanners are the ones '*who are especially sensitive to and skilled in bridging interests, professions, and organisations'* (Webb, 1991, p. 231) and "*people who pro-actively scan the organizational environment, employ activities to collect information and to gain support across organizational or institutional boundaries, disseminate information and coordinate activities between their 'home' organization or organisational unit and its environment, and connect processes and actors across these boundaries*" (Van Meerkerk & Edelenbos, 2019, p. 2). These definitions, however, do not indicate who to expect as a boundary spanner in the infrastructure project organisation. Cross & Parker (2004) suggest that boundary spanners are the managers who are expected to link the organisation with the environment. Thus, in the context of this research, the boundary spanners are expected to be the managers within the project team who are expected to perform certain boundary spanning activities within the project environment.

## 2.2 Project as an open social system

### Systems & communicative turn

In section 2.1 the concept of boundary spanning was defined through the lens of this research, and the specific boundary this research is focused on. However, the boundary this research focuses on requires more elaboration. Boundary spanning cannot be understood without a broader understanding of the specific context of the boundary that is spanned. As mentioned in section 1.1, the world around us is becoming increasingly complex. Due to multi-dynamics and interrelatedness the world is becoming uncertain and unpredictable. Within the academic literature, the world is increasingly approached as a set of systems and subsystems in order to better understand the roots of complex behaviour and events and to be able to better predict and even adjust the outcomes (Arnold & Wade, 2015). Systems theory is also frequently used in the boundary spanning literature in order to frame this context, because every system has its own internal/external boundaries (Van Meerkerk & Edelenbosch 2018a). Systems theory is also adopted in planning theory. For instance, Innes and Booher (1999) framed the communicative turn (section 1.2), which led to more inclusive planning process in infrastructure planning, also through a systems approach. A system could be defined as 'a network, a structure with connections, within which agents act, mostly in ways which reproduce and reinforce the system, but sometimes in ways which lead the system to evolve' (Chick & Dow, 2005, p.5). Booher and Innes (2002) conceptualised communicative/collaborative planning as a collaborative network called 'DIAD' (diversity, interdependence, and authentic dialogue). This network was considered as more capable of learning and adaption than a set of disconnected actors when it comes to fragmentation and rapid change. The DIAD network ideally leads to 'network power' which could be described as a power all participants in a planning process share and which leads to mutual gains. Planners could guide the social system towards network power by fulfilling several roles within this system (Booher & Innes, 2002). Although the DIAD concept was not adopted in a boundary spanning context, the ideas behind it are similar to the concept of boundary spanning. For example, the roles of planners within this system are comparable to activities boundary spanners perform (section 2.1). Moreover, diversity, complexity and authentic dialogue, which are the DIAD conditions, are very much related to the conditions that are suggested within the boundary spanning literature (Van Meerkerk & Edelenbosch, 2018a.). Driving forces for network power in a DIAD network are self-interest and rational choice, because people within a participatory process have become aware that their interests are at stake.

The participants are not selfless, or searching or searching for the greater good. Primarily, they are standing up for themselves (Booher & Innes, 2002).

## Open Systems approach and project-project environment boundary

The previous section outlined the DIAD network approach in communicative planning theory. The concept of DIAD networks is valuable to understand the social dynamics in the project process, ideally leading to a win-win situation for the project and its environment. However, boundary spanning literature is rooted in the organisational literature. The systems approach within the organisational literature fits better to this research context because the research focuses on the actions of project organisations, or actors within project organisations the span the boundary between the project and the project environment. Within the organisational literature, Thompson (1967) approaches the organisation as an "open system". The open system approach starts from the idea that the organisation is a natural system that is interdependent on its environment, which also relates to the conditions of the DIAD network. In other words, the organisation transforms inputs derived from the environment to outputs, which are returned to the same environment (Van Meerkerk & Edelenbos, 2018a). Central to the idea that organisations are natural systems is that the organisations is able to stabilise itself. The organisation spontaneously '*governs the necessary relationship among parts and activities and thereby keeps the system viable in the face of disturbances stemming from the environment'* (Thompson, 1967, p. 7). In the context of infrastructure projects, via interactive processes, the organisation extracts information, opinions, support etc. from its environment, and subsequently converts this to an end-product that is built in the environment. The open system approach as shaped by Thompson (1967) suggests that the organisations strives to reduce uncertainty as much as possible from the 'technical core', by reducing the variables that might affect this core. The technical core, in this research context, refers to the demand of the client to deliver a certain infrastructure connection. Figure 1 simplistically displays this process. The arrows are the cross boundary activities actions that are performed in order to protect the core of the project organisation. These actions are boundary spanning activities (section 2.4). Figure 1 also illustrates the boundary between the project and the project environment. As mentioned in section 1.3, the project environment can be defined as *'the aggregate surrounding things, conditions or influences'* (Candwell, 1963 p. 133). Thus, in other words, the project environment includes everything outside the project (Youker, 1992). However, the project organisation is not able to manage, deal with, or take into account everything outside the project. Therefore, the project manager scans the environment and filters the relevant stakeholders out of it (Youker, 1992). The relevant project environment is the filtered project environment, based on relevance, dependency, power etc. The relevant project environment basically is a collection of the most important/relevant stakeholders.

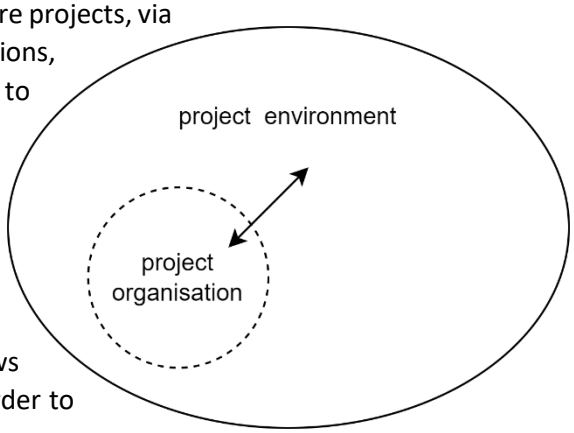

*Figure 1: Infrastructure project system*

## Project-project environment boundary

In the previous section, the boundary between the project and the project environment was defined as a boundary between the project organisation and the 'aggregate of surrounding things'. However, this does not say anything about the nature of the boundary between the project and the project

environment boundary. Boundaries and boundary spanning behaviour, could be interpreted in many different ways. Boundaries can be constructed, physical, symbolic, subjective (soft), objective (hard), imagined and/or real (O'Flynn et al., 2013). Hard boundaries in terms of formal institutions and jurisdictions have an impact on the boundary between project and project environment. These institutions that exist intentionally or unintentionally impact the course of a project. Institutions like for example the new nitrogen measures, are therefore considered as part of the 'relevant project environment'. These hard boundaries also impact the dynamics between the project and the project environment. Still, within a social system like the infrastructure project (figure 1), the boundary between the project and the project environment is considered as a predominantly soft boundary. As mentioned in section 1.3, the boundary is characterised by conflicts of trust, knowledge/skills, responsibility, networks, power and interests. These characteristics are in line with the categorisation of soft boundary types by Buick et al. (2019):

- Knowledge: Differences in knowledge as a result of cultural background, education, access to information and discipline can form boundaries between people and groups of people.
- Culture: Cultural differences that form boundaries between certain organisations or within certain organisations.
- Political: Boundaries between ideology, interests, positions, parties.
- Disciplinary: Between two or more different educational disciplines that look at certain issues or situations in a different way. This category is related to the category of knowledge.
- Networks: Between different networks (social, professional, governance etc.).
- Mental models: Between the different perspectives people or organisations view the world.

## 2.3 Facilitating conditions

The literature on boundary spanning in fields related to project management and governance is mainly focused on the effects of boundary spanning behaviour (Van Meerkerk & Edelenbosch, 2018a), for example on network performance (Van Meerkerk & Edelenbos, 2014), team performance (Ancona & Caldwell, 1992), absorptive capacity (Ebers & Maurer, 2014), or innovation (Tushman, 1977). Until recently, there was no attention for the facilitating conditions and antecedents of boundary spanning activities in fields related to the context of this research (Lee & Sawang, 2016). As mentioned in section (2.2) the infrastructure project, because of the complex nature of infrastructure planning, approached as a system. Systems exist and develop through de dynamics between different elements that are part of the system. In other words, the actions that are employed within the system do not stand on itself, they are related to certain conditions within the environment. Thus, in order to understand boundary spanning in infrastructure projects, a deeper understanding of the conditions that facilitate boundary spanning activity is needed. Van Meerkerk & Edelenbos (2018a; 2018b) translated the insight on the facilitating conditions for boundary spanning activity from the fields of business and psychology to the context of public management and governance. They distinguished four determining conditional factors on boundary spanning behaviour: environmental characteristics, the composition of the boundary spanner, organisational support & feedback, and individual determinants. It is striking that these conditions are related to the conditions of DIAD-networks (diversity, interdependence, and authentic dialogue), which lead to mutual gains in a communicative planning process (Booher & Innes, 2002). The facilitating conditions and their effect on boundary spanning activity, as extracted from the literature of Van Meerkerk & Edelenbos (2018a/2018b) are described as follows:

## Environmental characteristics

### Interdependency, uncertainty, diversity/complexity, relational capital

Several studies identify a certain relationship between environmental uncertainty and boundary spanning behaviour (Van Meerkerk & Edelenbos, 2018a). From an open system (section 2.2) perspective, the assumption is that a higher degree of environmental uncertainty, based on for example complexity and dynamics, leads to more boundary spanning activity. However, the relationship is not entirely clear. Some studies like McGowan & Bozeman (1982) identify a strong relationship, while other studies like, for example, Au & Fukuda (2002) found no relationship. Most of the studies on the relationship between boundary spanning and environmental complexity identify a weak or moderate relationship (Jerrel, 1984; Lazorchak & O'Neal, 2001; Lysonski et al., 1988; Van Meerkerk & Edelenbos, 2014). Diversity is closely related to uncertainty. The dimension of diversity or heterogeneity refers to the degree of difference between the organisation and the environmental aspects the organisation has to relate itself to. Diversity is high when the number of stakeholders with different interests is high (Hertogh & Westerveld, 2010). In general, the more diversity leads to more uncertainty for the organisation (Scott, 1987). Moreover, the more parties included in the funding of the project, the more complex and uncertain the project is. Different funding parties often have different characteristics, priorities, interests, which leads to more boundary spanning activities (Van Meerkerk & Edelenbos, 2018b). Funding is also related interdependency among different actors involved in the project. Interdependency is also related to other forms of external power and influences in the project environment. Interdependency leads to more complexity and uncertainty (Van der Brink et al., 2019). There is a general consensus within the literature that more boundary spanning activity is employed when the levels of interdependency are higher (Addi-Raccah, 2015; Alexander, 1987; Wang et al., 2018; Callister & Wall, 2001). This makes sense, because when the organisation needs the support of different actors within the environment, they need to build a bridge between the organisation and the environment. The opposite is also true: when the organisation itself has all the power, less boundary spanning activity is needed. Callister & Wall (2001) also stress the importance of relational capital within the project environment. They assume that trustful relationships or a higher degree of relational capital has a positive impact on the quality of boundary spanning activities. When the actors within the environment carry negative energy/emotions with them from encounters in the past, this leads to less boundary spanning activity (Callister & Wall, 2001).

## The composition of the boundary spanning role

The composition of the boundary spanning role is about role definition and role stressors. The role definition comes with different role stressors. Role stressors are factors or conditions, related to the role definition, that impact the well-being and the job-performance of the boundary spanner (Van Meerkerk & Edelenbos, 2018b). Role ambiguity a role stressor that occurs when the employee is uncertain about the expectations linked to his role. The employee lacks the crucial information to be able to perform the expected tasks successfully. A striking conclusion within boundary spanning literature is that people in so called 'boundary spanning positions' (section 2.1), experience different role stressors to a greater extend (Singh, 2000; Nygaard & Dahlstrom 2002). Role stressors can function as antecedents to boundary spanning behaviour. Role ambiguity can have an indirect negative impact on boundary spanning activity (Bettencourt & Brown, 2003). This is in line with the psychological withdrawal theory that says that a loss of job satisfaction and commitment to the organisation presumably leads to a withdrawal of certain functional behaviours (like boundary spanning behaviour), leading to lower job performance (Van Meerkerk & Edelenbos, 2018b). However, the effect of role conflict on boundary spanning is less clear. When there is a lack of resources in the organisation, role conflict can also generate positive stress, which stimulates individuals to employ certain boundary spanning activities (Woisetschlager et al., 2016). The degree of the negative effects

of role stressors on boundary spanning activity can be toned down by role autonomy (Perrone et al., 2003). Role autonomy is the degree of freedom an actor has to balance the different expectations from his/her role definition by thinking out suitable actions and behaviours. Freed from the strict rules and requirements of the organisation, the boundary spanner is better able to uphold commitments to partner organisations (Perrone et al., 2003).

### Organisational support and feedback

Organisational support and feedback concerns factors like organisational support and feedback (Van Meerkerk & Edelenbos, 2018). The interaction and dynamics (Like for example trust, team consensus, bonding) that exist between co-workers within the organisation is also included in this section, because this has impact on the working climate. A supportive positive working environment can trigger boundary spanners to engage more in boundary spanning behaviour (Van Meerkerk & Edelenbos, 2018). Boundary spanning can be a stressful job. When organisational or top-management is able to provide confidence and psychological support, this has a positive effect on the level of boundary spanning activity (e.g., Qiu, 2012). Organisational feedback impacts the motivation and the work of the boundary spanner. Research has been done on the relationship between management feedback and job commitment, job performance and job satisfaction (Dumond, 1994). This study has identified that Performance Management Systems (PMS) that are more focused on effectivity rather than efficiency lead to more employee commitment and confidence, the positive relationship between these factors and the degree of boundary spanning activity has been discussed in the previous section about the composition of the boundary spanning role. Furthermore, consuming regular feedback on performance is a way for boundary spanners to acquire information about the role they are supposed to fulfil (Singh, 1998). Like discussed in the previous section, clarity about the role definition mitigates the effect of role stressors like role ambiguity, which has a positive effect on the degree of boundary spanning activity. However, an overload of information can lead to role overload, which has an opposite effect on the degree of boundary spanning activity.

### Individual determinants

Finally, as a matter of course, the degree of boundary spanning is also determined by the personal capacity of boundary spanners within the organisation. In the literature several individual determinants are perceived as a factor of influence on boundary spanning activity. The factors that are considered in the literature as important factors of influence on boundary spanning activity are: competences, motivation, experience and personal networks (Au & Fukuda, 2002; Dollinger, 1984; Giaretta, 2013; Tushman & Scanlan, 1981; Marrone et al., 2007).

#### Competences

An employee with experience is exposed to several different cultures and management functions. These experiences enhance the capacity to perform coordinative or ambassadorial activities, which makes it easier to work across certain barriers (Au & Fukuda, 2002; Giaretta, 2013). Besides experience, there are several other competences of influence on boundary spanning activity. Dollinger (1984) found that the capability to process information correlates positively with boundary spanning activity. Within the complex environment of an infrastructure project, there is a wide array of stimuli that trigger the boundary spanners' attention. A boundary spanner who can discriminate among all these stimuli is better able to process all the information that is necessary for the boundary spanning practice. Furthermore, communicative skills (including listening) are beneficial for the effectivity of the boundary spanners' work (Weerts & Sandmann, 2008). The same goes for other social skills like empathy and conflict management (Williams, 2002; Williams, 2008). All these social competences are particularly important for building relationships with the different actors in the project environment. Mehra & Schenkel (2008) state that boundary spanners are good at adapting to new situations. They

will adjust their behaviour to fit in the new situation/environment (Snyder, 1979). Because the work of a boundary spanner is demanding and exhausting, it is important that the boundary spanner is convinced of his/her own qualities or abilities (Marrone et al., 2007).

### Motivation

Motivation is also a factor of influence on boundary spanning activity. Yoo et al. (2014) have identified a positive relationship between achievement-striving motivation and boundary spanning activity. A source of motivation for the boundary spanner might be the desire for upward mobility within the organisation. The will of the employee to continue his/her career within the organisation stimulates the motivation to gather useful information for the organisation (Woisetschlager et al., 2009).

### Personal networks

The last individual determinant are the personal networks of the boundary spanner. Boundary spanning is about building relationships and linking different people and ideas across a certain boundary. When an employee enjoys a rich internal and external network, the boundary spanner will become more successful in gathering and spreading information and ideas across boundaries. Therefore, personal networks are perceived as stimuli for boundary spanning activity (Tushman & Scanlan, 1881).

## 2.4 Boundary spanning activities

### Categorising boundary spanning activities

There is a growing amount of literature about the effects of boundary spanning on team performance and network performance (Lechner & Downling, 1999; Williams, 2013, Lundberg, 2013). Traditionally the focus of boundary spanning related literature is on intra-organizational coordination and knowledge transfer (Okhuysen & Bechky, 2009). The emphasis in this literature is the translation, transfer and transformation of knowledge across boundaries (Carlile, 2004, Lundberg, 2013). The systemic literature of Van Meerkerk & Edelenbos (2019) divides the boundary spanning activities in four specific categories (coordination/negotiation, relational activities, information exchange/knowledge sharing, mediation/facilitating). As mentioned in section 2.2, the open systems approach is based on the idea that the organisation endeavours to protect its technical core, which is the goal to execute the demands of the client. The above mentioned boundary spanning activities can be considered as activities achieve this, because activities that are focused on improving the connection with the project environment can mitigate conflicts that obstruct the planning process. Moreover, due to dependency relationships (section 2.3), the organisation may need the support of certain stakeholders in order to achieve its goals. On the other hand, some organisations, or individuals within these organisations, are less eager to create a strong connection with the project environment than others. In order the identify anti-boundary spanning behaviour Lehtonen & Martinsuo (2007), perceived the activity of guarding or isolating. All in all, the distinction of all the different activities that are performed within an infrastructure project process creates a deeper understanding of the context of boundary spanning within an infrastructure project. The categories are:

Coordination and negotiation: The activities that are focused on working together, by coordinating cross-border activities and processes, can be defined as coordination and negotiation activities (Van Meerkerk and Edelenbos, 2018b). The wide array of organizations involved within an infrastructure projects can lead to fragmentation. The boundary spanners are the ones who coordinate the different needs within this complex social network. Through coordination and negotiation activities, boundary

spanners generate the right conditions for tighter coupling and make the collaboration process run smoothly (Ancona & Caldwell, 1992; William, 2002; Van Meerkeek & Edelenbos, 2019).

Relational activities**:** One of the core activities of a boundary spanner is building and maintaining relationships between different actors/organisations (Marchington et al., 2005; Van Meerkerk & Edelenbos, 2018b). In this context relationships do not only refer to formal relationships, but more importantly, they do refer to informal relationships (Williams, 2002; Ferguson et al., 2005; Haytko, 2004). Relational activities are about facilitating potential win-win situations, by connecting and collecting different interest within and outside a certain organisation (Van Meerkerk & Edelenbos, 2018b); Stjerne et al., 2019. Several scholars put weight on the required ability of boundary spanners to connect actors and organisations in order to make collaboration possible (Wilson & Johnson, 2015; Smink et al., 2015; Steadman, 1992;Edelenbos & van Meerkerk, 2015; Luo, 2001; Williams, 2002; Williams, 2013). For relational activities, the boundary spanners should be a social character that is able to understand the different needs exist within and around the project. Building sustainable relationships is about building trust, showing empathy and listening to the different actors that are important to the project (Williams, 2002; Van Hulst et al., 2012).

Information exchange and knowledge sharing**:** The first literature on boundary spanning already stressed the importance of boundary spanners who collect and distribute information (Aldrich & Henker, 1977). The key aspect of this category are information collection and transfer, environmental scanning and information filtration. It is about knowing where and how to attain the right information, and subsequently about delivering the information to the people who need it (Miller, 2008; Van Meerkerk & Edelenbos, 2019). However, within the dynamic environment of infrastructure projects, people speak different languages and have different knowledge backgrounds. Therefore information translation and sense-making are also essential aspects of within the category of information exchange and knowledge sharing activities (Tushman & Scanlan, 1981; Birkinshaw et al., 2017). The goal of the boundary spanner is to bring together two different worlds or domains that function according different principles, procedures and routines (Carlile, 2002)

Mediation and Facilitation**:** Another boundary spanning category that is prominent in the boundary spanning literature, is the category of mediation and facilitation of cooperation (Fennel & Alexander, 1987; Firestone & Fisler, 2002; Van Meerkerk & Edelenbos, 2014; Van Meerkerk & Edelenbos, 2019). The boundary spanner is able to bring unlikely parties, agendas or actors together (Williams, 2002). These parties and actors have their own specific identities and interests. The task of the boundary spanner is to identify window of opportunities among these parties, which could also be seen as an entrepreneurial activity (Birkinshaw et al., 2017; Williams, 2013). This activity is also about actively engaging with the formed connections to conduct their opinions in order to benefit the project (Lundberg, 2013). Eventually the circumstances should be created to develop constructive interactions and cooperation (Van Edelenbos & Meerkerk, 2019).

Guarding and isolating**:** The last category of boundary spanning activities is actually not about spanning a boundary. This category can be considered as the opposite of boundary spanning, choosing not to bridge the boundary, but to guard/isolate the project for influences from its environment (Lethonen & Martinsuo, 2007). Instead of activities in the other categories, activities within this category have an internal focus, aimed on keeping things from the environment (Ancona & Caldwell, 1992).

## Changing activities

While focussing on infrastructure projects through a boundary spanning lens, it is also important to realise that boundary spanning activities might change during the course of the project (Lindgren et

al., 2008). Projects are complex, which means that not only the project organisation itself is subject to change, but also the environment around the project changes over time (Baccarini, 1996). Related to this complexity, every construction project is structured in different phases (e.g. exploration, planning, implementation and maintenance). Usually, during every phase different key actors are present. These key actors have different responsibilities, goals and expertise with respect to their predecessor (South et al., 2018). Early stages are focused on the need and the purpose of a new infrastructure project, but when the project develops, the focus moves towards detailed designs and questions about implementation (Legacy et al., 2012). Simultaneously, the extent to which stakeholders participation is possible during a project process decreases as the project plans are starting to take shape (Leendertse et al., 2016). The challenge for the project team is to maintain the focus to cross the boundary between the project organisation and the project environment throughout the whole project process (Arts, 2007).

## 2.5 Conceptual model

The conceptual model (Figure 2) summarizes the mechanism that, according to the literature leads to several boundary spanning activities. The facilitating conditions that exist within the project organisation, within the project environment, or within the boundary spanner as individual have impact on the activities the boundary spanner employs in order to span the boundary between the project organisation and the project environment.

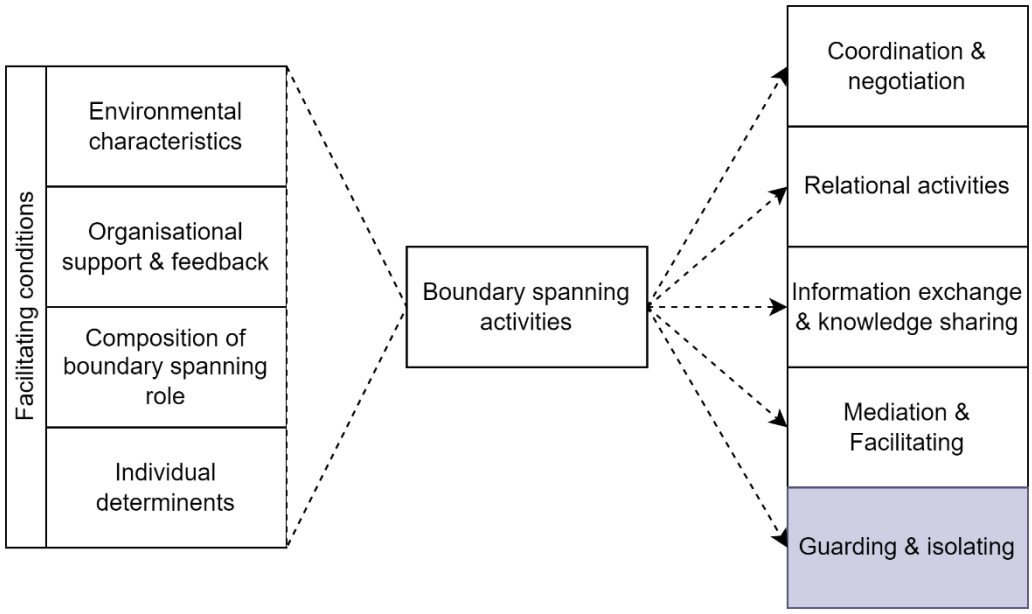


*Figure 2: Conceptual model*

# 3. Methodology

## 3.1 Research design

This research explores boundary spanning activities across the boundary between the project and the project environment. Within science, two types of research can be identified: intensive studies and extensive studies (Clifford et al., 2014). Extensive research designs is often referred to as the 'large-n' type of research. In other words, the researcher collects data from a great number of cases in order to find certain patterns and regularity. Intensive research designs, on the other hand, are focused on describing thoroughly a single, or small number of cases. Thus, in short, the difference between the two types of research design is a matter of scale or a matter of depth or breadth (Sayer, 2010). However, the respective research designs are also based on a different research philosophy. Extensive research designs rely on the idea that patterns in data reflect to underlying causes or processes and these patterns can only be disturbed by measure error or 'noise'. However, in the complex world we are living in, it is rare that one simple cause leads to a simple effect (Clifford et al., 2014). As noted in section 2.2, infrastructure projects can be seen as an open system. Many interrelated variables influence the course of the project. In order to explore a relatively unknown concept within this infrastructure project environment, it is necessary to understand the social dynamics within infrastructure projects. Therefore, this research was conducted using an intensive research approach.

### 3.1.1 Case study

Although both extensive and intensive research approaches can be undertaken in both a qualitative and/or a quantitative mode, the intensive research approach is particularly linked to qualitative methods (Sayer, 2010). Since boundary spanning is about human behaviour, which is complex, subjective, messy and contradictory, this research was also conducted using a qualitative research method. Qualitative methods are suitable for understanding such behaviour, within complex environments as infrastructure projects (Clifford et al., 2014). Within qualitative research, five main research approaches can be found: ethnography, grounded theory, narrative research, phenomenology and case/multiple case study. For this research the multiple case study was considered as the most suitable research approach. A case study can be defined as: "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin 2003, p. 13). Case studies are considered as suitable for research in which context plays an important role, with large numbers of variables in combination with a small number of applied units (De Vaus, 2001). The complex research environment of infrastructure projects, in which many different variables have impact on the phenomenon of boundary spanning met these conditions. Moreover, case study method is flexible and can be used for different research aims, also for the explorative research aim of this study (Clifford et al., 2014). Furthermore, the chosen method is ideal for in-dept, small-scale studies. The method offers the possibility to produce a comprehensive in-dept output using limited resources. The case study method allowed for gaining insight on boundary spanning, from different perspectives of different actors and stakeholders within the studied infrastructure cases. On top of that, the chosen method made it possible to highlight the different relationships that exist within these cases. These relationships are crucial in order to discover boundary spanning in the project setting. A case selection could be focused on one case, but this research has studied two cases. The reason for choosing more than one case, which allows for greater dept, was that the study of two cases make it possible to compare the different the different facilitating conditions and the set of boundary spanning activities that were identified within these project settings. Because, as described in (section 2.3), infrastructure projects are influenced by many different factors. These factors can contribute can lead to different

boundary spanning behaviour and, thus, also to different boundary spanning activities. A very common point of criticism on the case study method is the lack of generalisability (Flyvbjerg, 2006; Using more than one case also increases the possibility to make general statements.

## 3.2 Case selection

The two cases that are studied in this research are the ViA15 project (figure 3, section 3.3.1) and the Blankenburgverbinding (figure 4 , section 3.3.2) project (BBV). These cases are selected on the basis of multiple criteria. The first criterion is time. Recently finished projects or projects that are still in progress are easier to study in depth, because the situations and events within the process are still fresh in the memory of the actors involved. Moreover, it is easier to approach the right people to interview when the project is still in progress or is recently finished. Still, the selected projects are situated in or partly in the implementation phase, because this makes it possible to identify boundary spanning activities that are employed in order to ensure continuity throughout the different phases of the project. As mentioned in (section 2.4) boundary spanning activities might also change during the course of the project. Thus, in order to get a good picture of what happened during the entire project process, the project should (at least) be progressed to the implementation phase. The third criterion used is the size of the project. Size is measured in terms of stakeholders. A larger number of stakeholders in combination with different interests leads to more complexity, which may lead to several kinds of boundary spanning activity (section 2.3). Lastly, since the research is about the boundary between the project and the project environment, it was also important to select projects with a clear contrast between the project and the project environment. Altogether, these criteria helped to identify more boundary spanning activity within both of the projects.

**Table 1: Cases**

| Project | Road(s) | Region | Project start | Current phase | Expected completion |
|---|---|---|---|---|---|
| Blankenburgverbinding | A24 | Rotterdam | +/- 2009 | Implementation | 2024 |
| ViA15 | A15, A12 | Arnhem | +/- 2008 | Waiting for implementation | 2025 |

## 3.3 Case description

### 3.3.1 ViA15

The first research case is the ViA15 project in the Arnhem-Nijmegen region (figure 3). In the 1960s the desire to create a better highway connection between Rotterdam and Germany already existed. But in the 2000s, when the roads around Arnhem and Nijmegen become increasingly congested, the desire to build this new highway connection became bigger within the Ministry of Infrastructure and Water and the Province of Gelderland (Rijkswaterstaat, n.d.). However, the area where this highway should be built is rich in natural historical values with the nature reserve 'Rijnstangen'. The new highway could be a threat to this natura 2000 area. Moreover, the area consists of small villages and hamlets, whose citizens are afraid the highway will negatively impact their living conditions. In other words, a boundary between the project and the project environment can be found.

The plans for the ViA15 project (Figure 3) include a new connection between the A15 and the A12 and a widening of the already existing A15 and A12 (Rijkswaterstaat, n.d.). The new highway connection

between ‘Node Ressen’ forms an important traffic link in the Dutch highway network, between the Randstad and Germany. The currently dead-end A15 will be extended, crossing the Pannerdensch Kanaal via a bridge. The section between Duiven and Zevenaar will be deepened in order to mitigate the impact of the highway on the nature reserve where the road is planned to be built. The newly planned highway will be built parallel to the ‘Betuweroute’ railway.

Rijkswaterstaat and the province of Gelderland work together with the stakeholders (Table 2) to integrate the project in the region (Rijkswaterstaat, n. d.). The province is an important financier of the project, and simultaneously invests in the secondary road network. The objectives of the ViA15 project are to improve the accessibility and the traffic safety within the region, while simultaneously improving the liveability and water safety. The newly planned highway will improve the robustness of the road network within the region, whereas the impact of the intervention on the living environment is taken into account.

**Table 2: Stakeholders ViA15**

| National | Regional | Local | Private |
|---|---|---|---|
| - Ministry of Infrastructure and Water | - Province of Gelderland<br>-Waterboards Rijn and Ijssel<br>-Waterboards Rivierenland | - Municipalities of Arnhem, Nijmegen, Zevenaar, Duivem, Westervoort, Overbetuwe, Lingewaard | - Social organisations<br>- Transport organisations<br>- Regional businesses<br>- Nature organisations |

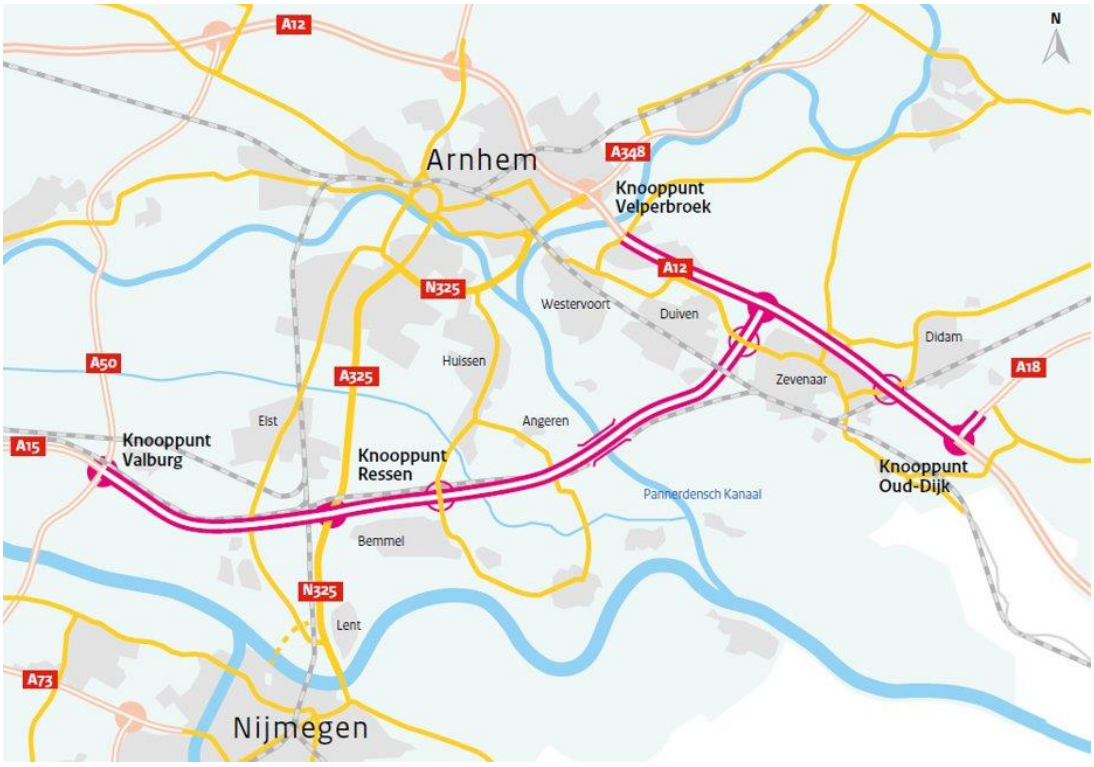


*Figure 3: ViA15 project (Rijkswaterstaat, 2015)*

### 3.3.2 Blankenburgverbinding

The second research case is the Blankenburgverbinding project (Figure 3), which is located to the west of the city of Rotterdam. The south west of the Netherlands is an important region for the Dutch economy. Besides the so-called 'Greenport of Westland'(horticultural center) and the biggest port complex of Europe (Port of Rotterdam), the region includes also a lot of other business and creative activity (Leendertse et al., 2016). The density of activities in the Rotterdam region has put the road network under pressure. Accessibility issues do already exist and are also expected to increase in the future. By planning a new highway connection, the region attempts to guarantee accessibility, continuity of economic activity and a proper quality of life in the future. The project connects the A15 and the A20 highways, while crossing the river of the Nieuwe Waterweg. The connection improves the connection of the Port of Rotterdam with the hinterland and increases the robustness of the infrastructure network in the Rotterdam region.

However, The new infrastructure project crosses a densely populated area including valuable ecological zones. A vulnerable area, with on the southern bank of the crossed canal an industrial area, and on the northern canal of the river an nature and recreation area. 'The northern bank area was not waiting for this new highway, whereas the southern bank really needed it' – Project director (Neerlandsdiep, 2018). Because such an intervention has a big impact on this region, stakeholders (Table 3) are actively involved in the planning and design process. In this process, 'the search for integrated spatical quality is […] the base' (Leendertse et al., 2016, p1). In short, a boundary to be spanned by the project organisation.

**Table 3: Stakeholders BBV**

| National | Regional | Local | Private |
|---|---|---|---|
| - Ministry of Instrastructure and Water | - Province of South Holland<br>- Water Boards 'Hollandse Delta' | - Municipalities of Rotterdam, Maassluis, Rozenburg and Vlaardingen | - Port of Rotterdam<br>- ProRail<br>- Social organisations<br>- Transport organisations<br>- Regional businesses<br>- RET |

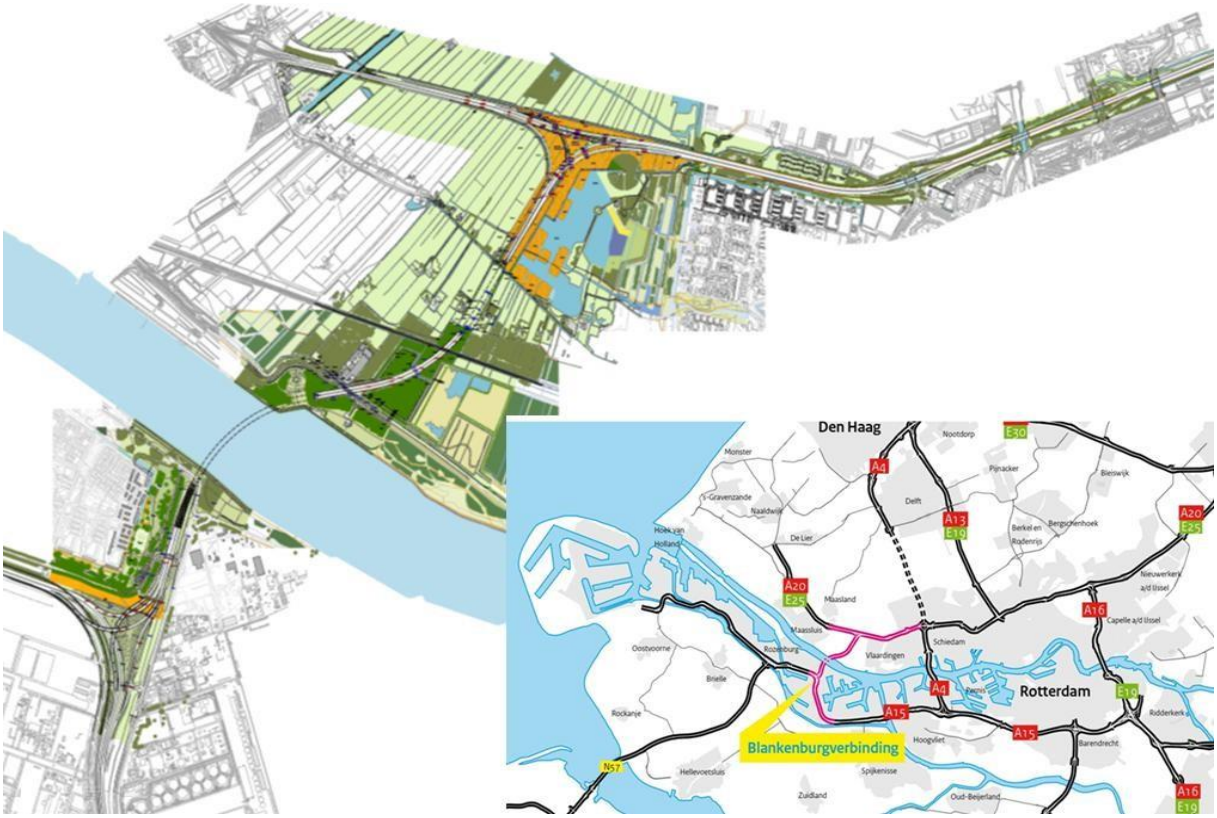


*Figure 4: Blankenburgverbinding project (Leendertse et al., 2016)*

## 3.4 Data collection

In case study research six common ways to collect data can be distinguished. The different data collection methods are: interviews (semi-structured, structured or open), documents, participant observations, direct observations, archival record and physical artifacts (Yin, 2018). Since the research focusses on immaterial evidence, physical artifacts were not considered as useful. Because the scope of the study is about the project process across the different phases, whereas the project cases are already at the later stages, it was not possible to use observational method of data collection anymore. Lastly, the researcher did not have access to archival records that could have been useful for this study. As a consequence, two methods of data collection remain. The first and most prominent method in this research are the interviews that are conducted for this research. Secondly, policy documents are studied in order to gather additional information about the projects (*Appendix A)*.

### 3.4.1 Semi-structured interviews

Verbal interchange is an excellent way of gathering information (Clifford et al., 2014). Conversations with this specific purpose, other than simply talk, are labelled as interviews (Díaz-Bravo et al., 2013). Based on the level of structure, interviews can be divided into three different categories of interviews can be distinguished: semi-structured, structured and unstructured (Fontana & Frey, 2005). Structured interviews are because of the structure easier to analyse. However, within this kind of interview, there is no space to improvise or pick up on certain topics that are mentioned. Because respondents do not always react the way you expect it as an interviewer, it was considered to leave some space for variation between the different interviews (Dohrenwend, 1965). However, still, the data should cover the content of the research. Therefore, the semi-structured interview technique was used to gather data for this research.

The respondents (Table 4) were selected via snowball sampling. This means that the questions were asked to assist the researcher to identify the right people to interview for this research. The main benefit of this method of sampling is that this method is suitable for identifying a network within a certain organisation (Handcock & Gile, 2011). Within the context of this research the focus was on identifying a boundary spanning network. After all, the respondents have more knowledge about who might have been involved in boundary spanning activities between the project and the project environment than the researcher For the starting interviews two managers were selected, because as mentioned in (DFSD) these are more likely to engage in boundary spanning activities. And because they are considered as potential boundary spanners, they are also more likely to have good connections with other relevant people involved in these activities. Frequently expressed critique on the snowball sampling method is that the method produces less representative. However, the population within the infrastructure project context can be considered as what Handcock and Gile (2011) call a 'hard to reach' population. These populations are hard to approach as an outsider, which makes the snowball sample method the most suitable method for this research.

**Table 4: Respondents**

| Nr. | Project | Position | Period of involvement | Interview duration |
|---|---|---|---|---|
| 1 | ViA15 | Manager project environment (RWS) | 2008-now | 00:43:08 |
| 2 | ViA15 | Contract manager (RWS, hired) | 2018-now | 00:51:11 |
| 3 | ViA15 | Project manager (municipality of Duiven) | 2015-now | 01:06:06 |
| 4 | ViA15 | Project manager (province of Gelderland | 2018-now | 00:26:30 |
| 5 | BBV | Stakeholder manager / manager project environment (RWS) | 2009-2015 & 2020-now | 00:45:04 |
| 6 | BBV | Manager project environment (RWS) | 2016-now | |
| 7 | BBV | Project director (RWS) | 2009-now | +/- 1 hour |
| 8 | BBV | Contract manager (RWS) | 2012-2016 | 00:38:22 |
| 9 | BBV | Project manager (Municipality of Vlaardingen) | 2012-now | 00:38:39 |

## 3.5 Data Analysis

As human beings we try to make sense of situations and events we encounter every day (Clifford et al., 2014). Data analysis could be seen as the refinement of this everyday process (Stake, 1995). Stake (1995) describes this process as a matter of careful reflection 'taking something apart' (p.71) and try to understand it, and, subsequently, try to give a meaning to it within the framework of our wider understanding about the world. In order to carefully reflect on the gathered data for this research, the ATLAS.ti v9 software was used. The data was analysed through a framework of deductive codes (see codelist *Appendix B*), derived from the boundary spanning literature, in order to minimise bias in interpretation. These codes refer to boundary spanning conditions, or boundary spanning activities. The questions posed to the respondents, are listed in *Appendix C*. These questions do not always directly relate to boundary spanning conditions or boundary spanning activities. Namely, open questioning led to respondents addressing certain factors or phenomena by themselves. Especially for boundary spanning conditions like individual determinants, this was important, because in-depth research into the functioning of individuals within the project was not feasible. Direct questions would not have led to the same data quality on these conditions.

## 3.6 Ethical considerations

This research is conducted taking into consideration the three principles of ethical behaviour set out by Clifford at al. (2014). The principles are: justice, beneficence/non-maleficence and respect. The principle of justice can be considered as the core of conducting ethical research. This principle starts from the good intentions of the researcher. He/she should be respectful to others and the research aim should be pure. The second principle is about maximizing the benefits and minimizing harm and discomfort to others by employing the research. The last principle about respect is about regarding the participants as autonomous agents and those who are not autonomous should be protected. In *Appendix* D the principles are organised in combination with the actions that are taken by the researcher in order to meet these principles.

# 4. Results

## 4.1 Reading guide

This chapter will provide an overview of the results of this research. This chapter covers the collected data that is relevant to the research aim and the accompanying research questions (section 1.4). As mentioned in section, the collected data includes qualitative data gathered from policy documents and semi-structured interviews with different actors involved in the project processes of the BBV and the ViA15. Table 4 (section 3.4.1) displays the respondents, including a number that is used as a reference to each individual respondent. The research has explored a relationship between the facilitating conditions for boundary spanning activity and the boundary spanning activities that are employed during the course of infrastructure projects. Therefore, this chapter consists of three sections: the facilitating conditions (section 4.2), the boundary spanning activities (4.3), and the boundary spanning relationships (section 4.4). Sections 4.2 and 4.3 start off with a Table (Table 5/6) that gives an overview of the results per theme/subtheme. Subsequently the results are systematically explained in the subsequent subsections. Section 4.4 can be considered as an overview that highlights the boundary spanning relationships that were found in the collected data.

## 4.2 Facilitating Conditions

**Table 5**

| Main theme | Sub theme | Findings | |
|---|---|---|---|
| | | ViA15 | BBV |
| Environmental conditions (4.2.1) | Interdependency | High<br>Highly dependent on the Province of Gelderland<br><br>Dependent on land-bound municipalities | Medium<br>Dependent on land bound municipalities and the Port of Rotterdam<br><br>No funding stakeholders besides the ministry |
| | diversity/complexity | High<br>Conflict about natural and cultural/historical values<br><br>Conflicts with municipalities/residents<br><br>Conflicts within the Province<br><br>Complexity due to new nitrogen measures | Medium<br>Conflict about natural and cultural/historical values<br><br>Conflicts with municipalities/residents |
| | (Political) uncertainty | High<br>Long period of uncertainty about building the new highway or not<br><br>High degree of national political involvement<br><br>Organisational stress during elections within the project environment | Medium<br>Uncertainty in the beginning due to fall national government.<br><br>Relatively low political uncertainty |
| | Relational capacity | Medium<br>Relational difficulties due to railway project in the past.<br><br>Already existing residents consultation structure | Medium<br>Low trust among certain municipalities<br><br>Due to toll construction closer relationship with the ministry |
| Composition of boundary spanning role (4.2.2) | Role ambiguity | Medium<br>Higher degree of participation leads to higher expectations among participants. | Medium<br>Higher degree of participation leads to higher expectations among participants. |
| Organisational support & Feedback (4.2.3) | Organisational support and feedback | Low<br>Lack of budget led to limited possibilities for the boundary spanner. | |
| Individual determinants (4.2.4) | Individual determinants | Medium<br><br>The observed actors within the organisation were motivated to reach to the best imaginable solution for the region. However, due to difficult circumstances, the motivation decreased during the course of the project. | High<br>The experience of important boundary spanners in the project organisation was considered as valuable for the course of the project<br><br>Project director worked for the ministry in the past, which increased the space for a more area-oriented planning approach.<br><br>Project team is fairly positive about the course of the project and the actors are actively engaged to involve the project environment. |

### 4.2.1 Environmental conditions

**Interdependency**

| ViA15: High | BBV: Medium |
|---|---|

The factor that stood out in terms of interdependency within the ViA15 project, was the role of the province of Gelderland. The province of Gelderland is one of the biggest investors in the project, which causes a dependency relationship between the project organisation and the province. The following quote underlines the important role of the provincial funding in the project.

> *'Yes, I think the fact that the province is a big investor has a big influence on the fact that the project is going to be realised. The project has dealt with a lot of political pressure and critique, which makes it easier for ministers to cancel it. However, with the funding of the province, there is a way to continue the process.'* - Respondent 1 (RWS)

In contrast to the ViA15 project, the BBV project was less dependent on the province, in fact, the province of South Holland was not even mentioned as an important stakeholder. Within this project, the Port of Rotterdam was an important stakeholder, because the new highway is largely intended to increase the accessibility of the seaport, and because the highway crosses a branch of 'De Maas' river. The funding, however, within the BBV project is completely arranged by the Ministry of Infrastructure and Water , which leads to less interdependency compared to the ViA15 project.

Furthermore, as a project organisation in the Netherlands, you are legally obligated to hear the land-bound municipalities, because the municipalities are authorised supervision on municipal soil. However, because the national government can overrule the municipalities, the respondents from the land-bound municipalities do not believe that the municipalities could 'tackle' the project on the long term.

> 'That new highway will come anyway' – Respondent 3 (Municipality)

Nevertheless, several respondents stated in that project organisations in general are dependent on local support. Without a certain degree of support or trust in the organisation, it is considered as impossible to complete the project. The next section will elaborate more on this.

**Complexity & diversity**

| ViA15: High | BBV: Medium |
|---|---|

As mentioned in section 3.3, both the projects are sensitive within their project environment, because the planned highways cross recreationally , culturally and naturally valued areas. On top of that, the land-bound municipalities hardly benefit from the new highway connection. These municipalities and their residents were worried about the negative consequences the highway would generate, whereas the city regions that do not have to deal with these negative consequences, are seen as important drivers for the project. Within the ViA15 project, the controversy around the project also led to a certain *tug-of-war* among the different municipalities in the region about the position of the road.

> *'The road moved further away from Groessen, causing that the highway crosses the small neighbourhood called 'Helhoek'*. So eventually every decision that is made has a major impact on other people. It will never be the perfect situation.' – Respondent 3 (municipality)

Besides the resistance against the project within the project environment, both projects also had to deal with new nitrogen measures. Especially for the ViA15 project, these measures were a problem, because the plans have been turned down by the council of state. Therefore, the ViA15 was considered

as more complex than the BBV project. The adjusted plans, including the buy-up of farms in the region, are currently treated by the council of states, which means the project is still awaiting for approval.

**Political uncertainty/complexity**

| ViA15: High | BBV: Medium |
|---|---|

The ViA14 project was characterised by its political interference. The following quote is an example of the continuous debate about the continuation of the project:

> *'Then the Minister has spoken: 'This road is not going to be built', but a few years later the Minister decided: 'This road is going to be built'. The decision-making process on this project has always been balancing on a knife edge, whether the road would be realised or not.'* – Respondent 2 (RWS, hired)

This uncertainty was fed by the public resistance (see complexity & diversity), which was also expressed via lobby groups with connections in the national government.

> *For example, someone from Helhoek knew people at the House of Representatives and he started a lobby, after which all sorts of questions arose in the national government regarding this project.'* – Respondent 3 (Municipality)

The role of the province was considered as important for the continuity of the project. Due to the provincial funding, in combination with their regional interest, the project kept moving on. However, simultaneously, the dependency on the province also generated political uncertainty, due to the political opponents in the provincial states and the elections every 4 years that causes a lot of tension within the project organisation:

> *'I think it can be a big factor of influence that there are elections every couple of years. At the province, or at the municipalities…, this can lead to… Well, we experience these moments as very tensive, because right now we might have that political support at the Provincial states, our biggest investor, but when this changes, this has its impact on our project. The same goes for municipalities.'* - Respondent 1 (RWS)

In the BBV project, political uncertainty only affected the project in the beginning.

> *'At the beginning of the project, 2011 I think, the government fell right before the official voting on whether the project would continue or not. Because of this, we couldn't do anything until the new government was set. After this event we didn't have to deal with a lot of political uncertainty.'* – Respondent 7 (RWS)

**Relational capacity**

| ViA15: Medium | BBV: Medium |
|---|---|

Both of the projects were not enjoy a rich relational capital with their project environments. Events in the past had impact on the relationship between the ViA15 project organisation and its project environment:

> *'A couple of years ago ProRail built a railway close to our project. Initially, the plans for this railway included a bridge across the Pannerdensch canal, however, the people in the project environment did not want this and took action against these plans. Subsequently, we had to tell the same environment, the same people, that we are planning to build a bridge on the same spot. So the bridge that has been fought against in the past, is still coming.'* - Respondent 1 (RWS)

Whereas a lack of trust among certain municipalities in both projects also made interaction and participation more difficult. Still, eventually, in both projects a turning point was found among most of the municipalities who at that point decided to cooperate with the respective project organisations.

According to respondent 8, the fact that the BBV project is a toll project had the positive effect that the project became closer to the ministry.

> *'The toll project was not implemented by Rijkswaterstaat, the ministry did that. Because of this, two different projects had to be put together. Although this increases the complexity, this also meant that Rijkswaterstaat became closer to the ministry. In other words, the distance between the project and the ministry which is usually quiet big, became smaller due to this situation.'* - Respondent 8 (RWS)

### 4.2.2 Composition of boundary spanning role

**Role ambiguity**

| ViA15: Medium | BBV: Medium |
|---|---|

Both project organisations struggled with the degree of public participation in the project process. Whereas open minded thinking could lead to more creative solutions, the expectations of participants also increases when they become involved in these projects. High expectations subsequently lead to disappointment, which the organisations wanted to avoid.

### 4.2.3 Organisational support & Feedback

| ViA15: Low |
|---|

Within the ViA15 project, the budgetary limits affected the space for input from the project environment. Initial plans had to be changed to fit the project budget.

> *'Uhm, then the client came and said, this solution is not possible, it doesn't fit in our budget. Go to the municipalities and negotiate again about it.'* - Respondent 1 (RWS)

### 4.2.4 Individual determinants

**Competences/Personal networks**

| ViA15: Medium | BBV: High |
|---|---|

The factor experience was considered as an important competence of the boundary spanners within the BBV project organisation. The project director, who was considered as an important boundary spanner within this project, described the impact of experience as follows:

> 'Experiences in the past are very important for a manager. I always say grey hair is a good thing. Thanks to my experience, but also for example <name>, the contract manager his experience, we know how to deal under certain circumstances. We know how to act in different worlds.' – Respondent 7 (RWS)

However, according to respondent 7, experience also has its downside:

> *'Older people also tend to be less flexible. Sometimes they refer to phenomena from the past, that do not necessarily have to apply for the current project context. Older, experienced, people should try to stay open-minded.'* – Respondent 7 (RWS)

The experience of the project director, who worked for the ministry before, also provided her a network. The personal network of the project director was considered as essential for boundary spanning.

> *'Usually, the distance between the project and the ministry is quiet large, so a project is quiet dependent on a person who has some connections there. In the Blankenburgverbinding project, we were lucky to have a project director who worked for the ministry in the past, so she has a very valuable network. Then you are welcome in the House of Representatives, the doors are open, so she could fulfil the role as a boundary spanner. This network is essential to span boundaries. When you do not have this network, you cannot span boundaries.'*– Respondent 8 (RWS)
>
> '*My network at the ministry helped me to know how people at the ministry think. When you know this, and the people there know you, it is easier to realise the objectives that are important to the region.'* – Respondent 7 (RWS)

**Motivation**

The uncertainty and misfortune within the ViA15 project had its impact on the motivation within the organisation.

> '*When it became clear that we had to wait for at least a year, but maybe longer. People started to work for other projects. The people who are still on the project still believe in its success, however, there is not much to do. The enthusiasm is gone.* – Respondent 2 (RWS, hired)

Around the BBV the enthusiasm to achieve the best result for the region was more visible than around the ViA15 project. The project director was considered as an socially engaged personality, which spilled over to the rest of the organisation and the environment.

> '*You keep on speaking of a boundary, but for me there is no boundary. I mean, there is, but I don't want to see it. I'm looking behind the boundary and try to think what is best for the region.'* – Respondent 7 (RWS)

## 4.3 Boundary spanning activities

**Table 6**

| Boundary spanning activity | Findings | |
|---|---|---|
| | ViA15 | BBV |
| Coordination & negotiation (4.3.1) | Due to political nature of the project, the organisation is forced to employ many negotiation activities within the project environment | Negotiation took place during activities that were more informative, or facilitating in nature. |
| Relational activities (4.3.2) | 'legs on the table-meetings'<br><br>'Shared working' | Informal meetings<br><br>Trust building in the project environment |
| Information exchange & knowledge sharing (4.3.3) | Large scale informative open days<br><br>Joining residents consultation sessions<br><br>Organised informative sessions | 'Drawing board-sessions'<br><br>Informative sessions<br><br>Informing the House of Representatives<br><br>'Sounding board- groups'<br><br>Helping unhappy people to submit public comments against the project. Hiring lawyers for them. |
| Mediation & Facilitating (4.3.4) | Facilitating interaction between minister and local stakeholders | Sophisticated participation program with multiple interactions between different groups of stakeholders, which also had generated a mediation-effect |
| Guarding & Isolating (4.3.6) | Project organisation is forced into a defensive position due to past events and due to new nitrogen measures. | Less guarding and isolating, more proactive boundary spanning behaviour. |

### 4.3.1 Coordination & negotiation

| ViA15: High | BBV: Low |
|---|---|

The boundary spanning activity of coordination and negotiation was identified within both of the project processes. However, within the ViA15 project process this kind of boundary spanning was more emphatically present than in the BBV project process. The word *negotiation* was often used in the interviews regarding the ViA15 project, whereas it was not mentioned in the interviews about BBV project. The negotiation activities were, for example, about the distribution of the budget over the project environment:

> *'So I think, that's also a kind of negotiation, what I just said: like, we want to do this, but it doesn't fit in our budget, so we need to drop something else… Yeah, that's a kind of negotiation we did.'* - Respondent 1 (RWS)
> *'Uhm, so in the beginning we have met the municipalities every week to negotiate about what they wanted.., and we negotiated about what the province would contribute to this… And for example, the province owns the secondary road network, and they wanted to build a proper connection to the highway, so that had to be adjusted as well.'* - Respondent 1 (RWS)

The order to make the process of negotiation run smoothly, coordination was needed:

> '*So we decided to bundle the individual interests within the region into representative parties, for residents, companies, experts on sustainability and nature…., I think it is very important to organise this from the start. The consultation structure, parties that represent groups of people.'* Respondent 1 (RWS)

However, regional stakeholders were also encouraged to take their own responsibility in this process:

> *'At a certain moment we found that the spatial integration could be improved, so we have indicated that to Rijkswaterstaat. The former project director informed us that they were open to our input, provided that we as municipalities in the region would come up with a shared story. Consequently, we gave order to the BRO, an office for spatial planning, to look at the spatial quality.'* – respondent 3 (Municipality)

Within the BBV project, the negotiation took place during so-called 'drawing-board sessions'. Municipalities invested time and money to express their view on the project, in order to discuss possible solutions. However, the degree of negotiation was considered as low, because these meeting were predominantly facilitating (section 4.2.4) or informative (section 4.2.3) in nature.

### 4.3.2 Relational activities

| ViA15: Medium | BBV: High |
|---|---|

Relational activities were present within both project processes. Casual meetings with important stakeholders are examples of these activities. Within the ViA15 project, it was also common to share workspace together with the important stakeholders every once in a while. However, participation within the ViA15 project existed predominantly via already existing local participation sessions, Moreover, participation was also outsourced to the contractor. Within the BBV project, building a strong relationship with the project environment was seen as an important objective for this project organisation. This is also expressed in the well thought out participation trajectory, which was also focused on building a strong connection with the project environment:

> *"Every few weeks I had a meeting with important stakeholders. These were not formal meetings. Even if we did not have anything to say about the project, we still met in order to get to know each other better and to maintain relationships."* – Respondent 7 (RWS)

In an article about the BBV, a project manager also emphasises the effect of the relational activities that were employed by the project team:

> *"Lucas van Winckel (manager project management) is still very enthusiastic about the result: the relationship that was built with the project environment. 'We became familiar faces who were planning to build a road, we were not the big distant government agency. That's why we gained the peoples' trust'."* - (Neerlandsdiep, 2018)

### 4.3.3 Information exchange & knowledge sharing

| ViA15: Medium | BBV: High |
|---|---|

The stakeholders within both projects were circumstantially informed about the respective project situations. Via participation sessions residents and other stakeholders were also enabled to inform the organisation about the project environment. The information exchange and & knowledge sharing within the BBV was considered as higher than in the ViA15 project due to the proactive manner in which project opponents were encouraged to submit comments against the project:

> *We as a project organisation are not against public comments, we even encourage people to submit these comments. We hire lawyers for our 'opponents', because the last thing you want as a project organisation is people crying on the phone.'* – Respondent 7 *(RWS)*

### 4.3.4 Mediation & Facilitating

| ViA15: Medium | BBV: High |
|---|---|

In line with the information exchange and knowledge sharing (section 4.2.3), the different degree of mediation & facilitating was identified on the basis of proactive actions. Within the BBV project the participation trajectory was more sophisticated than in the ViA15 project, in which already existing consultation sessions were used to interreact with the local stakeholders and in with other meetings were outsourced to an external company. Within the BBV people were randomly invited and encouraged to be part of the participation process. During the organised participatory meetings , the project organisation could interact with the local stakeholders, however, at least as important, the local stakeholders could interact with each other. This interaction, initially was experienced as uncomfortable by the participants, but eventually it turned out to be extremely productive:

> *"Many people came to these meetings and said: 'I'm just a witness, I won't participate'. But the fun thing is, we mixed these groups of people, so people from different areas were at the same table. So during these sessions someone said: 'I won't draw a line in my own area' but then someone from, for example Westland said "Well, that's silly because you just drew a line across my house.., I don't like that either, but we are here to think along so you also have to think about your own area'. So in short, these people were correcting each other, which turned out well."- respondent 6 (RWS)*
>
> *"I think that what happens now, we are the example of how a project organisation should behave, although it's never perfect. But we always tried to bring together other parties, not even in our direct environment. For example, near the A20, which will also be broadened, the community gardens and scouting had to move, because the highway came to close to their accommodation. So we found another location for the scouting, and the community gardens could move to the location where the scouting used to be. So we made this transaction possible and both the parties were happier than before they had to move, 1+1=3"* – Respondent 5 (RWS)

### 4.3.5 Guarding & Isolating

| ViA15: Medium | BBV: Low |
|---|---|

Due to several circumstances, like the political pressure, the past ProRail project, and the nitrogen measures, the project organisation of the ViA15 project developed the tendency to guard & isolate the project in order to reach to the implementation phase:

> '*But then we have to explain to the same people who fought for this tunnel, that we are planning to build a highway bridge at the same location*.' – Respondent 1 (RWS)

Moreover, some decisions had to be fixed during the project process, so that these were not negotiable anymore in the future.

*We have negotiated a lot, but at a certain point you have to fix it, otherwise you will never come to an endproduct. Otherwise you will never get to build the highway because the outside is just there.*– respondent 1 (RWS).

Also the decisions that were taken about the project often led to the project organisation defending these decisions.

*'With every amending decision, we received public comments and appeals, so from then you, as Rijkswaterstaat, are defending these decisions.'* – Respondent 2 (RWS, hired)

Within the BBV project the public resistance against the project seemed to decrease during the course of the project, which was also seen in the unusual low number of appeals against the project.

## 4.4 Boundary spanning relationships

The complex nature of infrastructure projects has been displayed in Table 5, since almost every facilitating condition for boundary spanning behaviour has been considered as present within both of the projects. However, some clear differences in the degree of presence of these respective conditions within these respective projects were identified. The ViA15 project can be described as more environmentally complex compared to the BBV project. Interdependency, political complexity and diversity are all considered as high within this project, whereas these conditions were considered as medium in the BBV project. On the other hand, the individual determinants were considered as more emphatically present in the BBV than in the ViA15 project. The personal network of the project director within this project was considered as crucial within this project. Furthermore, boundary spanners within the ViA15 project were, due to the restricted budged, sometimes discouraged to span the boundary with the project environment. Finally, actors within both project dealt with role ambiguity. On the one hand they strived for a creative participatory process, but on the other hand, they wanted to keep the expectations low, because not every wish was feasible.

The boundary spanning activities displayed in Table 6, also show some clear or slight differences between both of the projects. The activities of coordination & negotiation (high) and guarding & isolating (medium) characterised the ViA15 project, whereas these activities were considered as low within the BBV project. Because guarding & isolating was considered an anti-boundary spanning activity, the presence of this activity also indicates that boundary spanning within the project of ViA15 was less present than in the BBV project. This can also be seen in the other activities (relational activities, information exchange & knowledge sharing, mediation & facilitating), which are all considered as higher in the BBV project than in the ViA15 project. In complement to cross-comparison between the cases on the basis of the presence of the conditions, a more in-depth analysis shows that the following three mechanisms play an influential role in boundary spanning between the project and its environment:

## Interdependency

In terms of conditional factors, the ViA15 project can be considered as more complex in several ways. Environmental characteristics like high interdependency, political uncertainty, conflicts and nitrogen measures had a big impact on the boundary spanning activities within this project. Figure 5 displays the first relationship identified in the data, between interdependency and negotiation and continuity. On the one hand, the dependency of the ViA15 project organisation on the Province of Gelderland helped to continue a project, which suffered from high political pressure. On the other hand, the interdependency led to more negotiation among the different stakeholders. In the BBV both the factor interdependency and the negotiation activities were considered as less present.

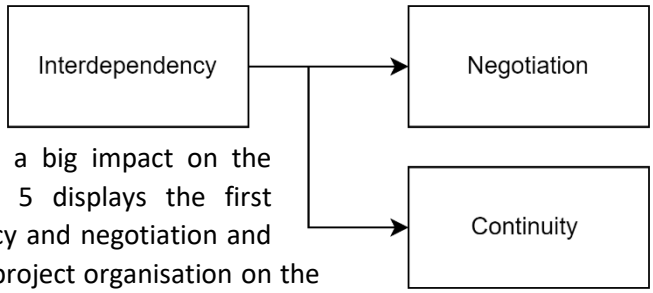


*Figure 5 Interdependency*

## Complexity

Secondly, the highly political ViA15 project process, combined with the new nitrogen measures also led to more setbacks during the course of the project. The data suggests that these setbacks led to less motivation to keep on spanning the boundary towards the project environment. However, as displayed in figure 6, due to the high pressure from outside the project and the interdependency (figure 5), the organisation also had to negotiate again with stakeholders within the project environment.

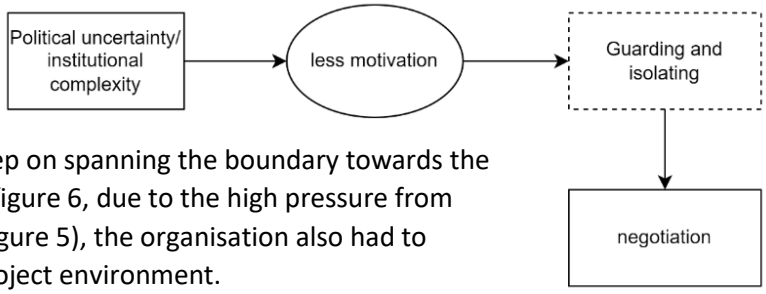


*Figure 6 Complexity*

## Individual determinants

The BBV was compared to the ViA15 project less complex, whereas the individual determinants were more present. This also led to other boundary spanning activities. Within the BBV project, the activities like information exchange/ knowledge sharing, relational activities and mediation/facilitating were more present than in the ViA15 project. As displayed in (figure 7) the different individual determinants that were identified regarding the project director, led to the above mentioned activities. Subsequently, the above mentioned activities led to less public resistance and more support from higher levels of the government. All in all the networks of the project director, and her experience in the field of infrastructure planning trickled down to the rest of the organisation and the project environment, which enforced the already existing motivation and organisational support.

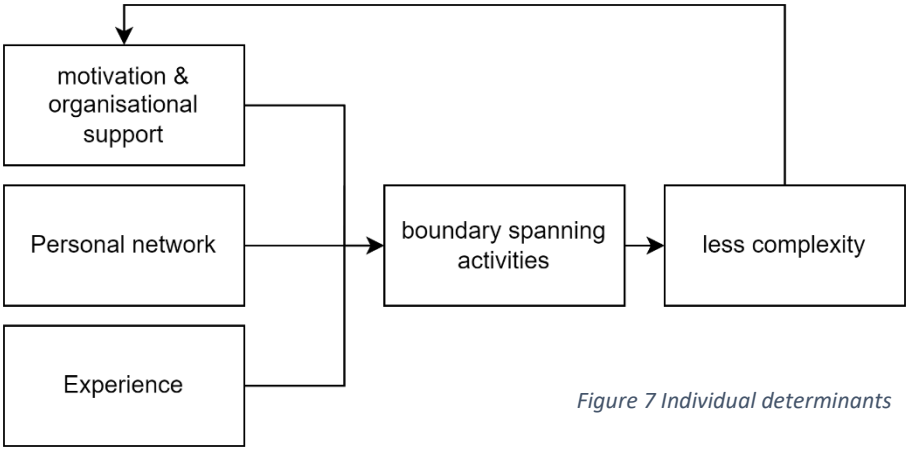


*Figure 7 Individual determinants*

# 5. Conclusion

## 5.1 Discussion

As stated in Chapter 1, there a boundary between the project and the project environment was identified. In infrastructure planning, the focus has been more mostly on shifting these boundaries, instead of spanning them. This, because the problems that emerge due to infrastructure interventions are rarely perceived through a boundary spanning lens. Therefore, this research explored the concept of boundary spanning in the context of the project and project environment boundary. The project has been considered as an open social system, because the project and the project environment are a variation of interaction and social dynamics that eventually lead to certain outcomes. The aim of this research was to explore these interactions in terms of boundary spanning activities that were employed by the project organisation in order to span the boundary with the project environment. However, as the project is considered as a system, these activities do not stand on itself, they arise from certain conditions. Therefore, in order to understand boundary spanning in this infrastructure project setting, it was also necessary to understand the conditions that facilitate these activities. Hence, research question that will be answered in this chapter is twofold:

*What boundary spanning activities are employed in order to cross the project – project environment boundary and what facilitating conditions are identified as influential on these activities?*

As mentioned in section 1.4, this question is answered by three sub-questions. The first sub-question is:

*What relevant boundary spanning activities can be found in the literature?*

Within the literature, several boundary spanning activities are explained that were considered as relevant to this research context. The selection of the activities was mainly based on the idea that project organisations within an open system have their own technical core. This technical core is the aim of the project to fulfil the demand of the client to deliver infrastructure. The organisation strives to protect this technical core, by employing certain activities that span the boundary with the project environment. The activities within the boundary spanning literature that are considered as relevant to this context are: coordination/negotiation, relational activities, information exchange/knowledge sharing, mediation/facilitating. Besides the activities that strive for spanning the boundary with the project environment, project organisation can also protect their technical core by guarding and isolation. These activities are considered as anti-boundary spanning activities, which helped to indicate the degree of boundary spanning activity within a certain infrastructure project.

Question 2: *What conditions influence boundary spanning activities?*

The literature suggests a relationship between conditional factors and (the degree of) boundary spanning activity. However, these conditions were never tested within the context of an infrastructure project. The different facilitating boundary spanning conditions extracted from literature were divided into four categories: environmental characteristics, the composition of the boundary spanner, organisational support & feedback, and individual determinants.

### Environmental conditions

As became clear in the results (Chapter 4), the two research cases differed on several levels in terms of facilitating conditions for boundary spanning. Firstly, the environmental conditions of interdependency, diversity/complexity and political uncertainty turned out to be more present in the ViA15 project than in the BBV project. The literature suggests that a higher degree of environmental uncertainty leads to more boundary spanning activity. However, in most literature on this topic, this relationship is considered as weak or moderate and some researches did not find any relationship between environmental uncertainty and the degree of boundary spanning activity at all. The results of this research also did not show a positive relationship between environmental uncertainty and boundary spanning activity. In fact, the ViA15 project scored lower on most boundary spanning activities (Table 6), whereas the anti-boundary spanning activity of guarding and isolating was, in contrast to the BBV project, also employed in this project. There are different explanations why this outcome is contrary to the most literature on boundary spanning activity. Firstly, the environmental condition of relational capacity, which was perceived as 'medium' in both projects could have a bigger impact on boundary spanning activity than the other environmental conditions. Both projects initially had to deal with a lack of trust within the project environment, which might have had a bigger impact on boundary spanning activity in the ViA15 project than in the BBV project. Secondly, the environmental uncertainty within the ViA15 project, caused by political uncertainty and diversity in the project environment, has been considered a threat to the technical core of the project (sections 4.2 & 4.4). As displayed in figure 6, this environmental complexity had a negative impact on the motivation within the project organisation, which made the project more isolated from its environment.

### Role stressors

According to the literature, the role stressor of role ambiguity has an indirect negative effect on the degree of boundary spanning activity. This, because it has an impact on the job satisfaction of employees in so-called boundary spanning positions. The results show that both the projects struggled with the stakeholder expectations, because more participation increases the expectations of stakeholders. This could be seen as an example of role ambiguity, since the boundary spanners weighted to what extend the participants should be involved in the planning process without ending up in a conflict with disappointed participants. However, since this situation is common for every participatory trajectory, and this condition was found in both of the cases, the effect of this role stressor on boundary spanning activities is not clear.

### Organisational support and feedback

The literature suggests a positive impact of organisational support and feedback on boundary spanning activity. Organisational support could also mitigate the negative impact of role stressors on the degree of boundary spanning activity. Within this research, no explicit search for this condition was made. The research methods used for this study were not adequate to understand the dynamics between the boundary spanners and the organisations they are working for. However, some interesting indications were found within that suggest a lower degree of organisational support within the ViA15 project. These indications are related to the budgetary limits, that discouraged boundary spanners to meet the wishes of stakeholders within the project environment. This is in line with the perceived lower degree of boundary spanning within this project. However, because there is no data on this facilitating condition in the BBV a strong comparison on this facilitating condition is not possible.

### Individual determinants

The BBV was characterised by the impact of individual determinants on boundary spanning activity (section 4.4). According to the literature, experience is an important competence that has a positive effect on boundary spanning activity. Moreover, personal networks and motivation increase boundary spanning activity. In the results a difference can be found when it comes to these different facilitating conditions. Still, because of the research methods used for this study, a certain degree of reluctance on this facilitating condition is required. No personality tests are employed in order to compare the different competences of boundary spanners within the two research cases. However, the statements that are done about individuals in this section are based on (spontaneous) statements about these individuals. These statements indicated that the project director of the BBV complied to the above mentioned criteria, which led to more boundary spanning activity (section 4.2.4). Especially her personal network at the ministry was considered as important for the boundary spanning behaviour between the project and the project environment. Moreover, this project director was present during the entire project process, which also helped to maintain relations within the project environment. The role of the project director also led to less complexity in the project environment (figure 7). On the other hand, the project director of the ViA15 project was not available for this research, which made it harder to compare the situation of the ViA15 with the BBV situation. However, the role project director of the ViA15 project was not mentioned in the interviews, whereas the director of the BBV was mentioned several times as an important factor. Furthermore, the setbacks due to the nitrogen measures and the backlash against the project led to decrease of motivation within the project organisation.

Question 3: *What boundary spanning activities are employed in order to span the boundary between the infrastructure project and the project environment in practice?*

The discussion above about research sub-question 2 already explained the different condition in which the boundary spanning activities within the two research cases emerged. This part of the discussion will take a closer look at the differences in terms of boundary spanning activities that were employed within the researched cases. Section 4.3 gives a clear overview of the boundary spanning activities that are employed within the two respective cases. Furthermore, section 4.4 provides the relationships that were found between the facilitating conditions and certain boundary spanning activities that originated from them. It is, however, important to emphasise the factor of interpretation here. The best example for this is the boundary spanning activity of coordination and negotiation, which was considered as higher within the VIA15 project than in the BBV project. This, because the word ‘negotiation’ was mentioned many times in interviews about the ViA15 project. However, a participation session with local citizens could be also considered as negotiation, since the literature describes negotiation as ‘working together’ and ‘performing cross boarder activities’. Nevertheless, these activities could also be interpreted as mediating/facilitating or information exchange/knowledge sharing. In short, the division of the boundary spanning activities per category is arbitrary to a certain extent. Still, the words that are used by respondents have a deeper meaning. Negotiation can be considered as a business approach of interacting with stakeholders, whereas building relationships, for instance, can be considered as less formal. This deeper meaning also answers this research sub-question. Whereas the ViA15 project kept more distance from its environment (more negotiation and guarding and isolating activities), the BBV stepped more across the boundary, into the project environment (more relational activities, mediation/facilitating, information exchange/knowledge sharing).

## 5.2 Conclusion

This research aimed to explore boundary spanning activities and the conditional factors that impact or initiate these activities. The findings in boundary spanning research in other fields of study, combined with the qualitative data from interviews with actors involved in two infrastructure projects helped lead to an answer on the research question: '*What boundary spanning activities are employed by boundary spanners in order to span the project – project environment boundary and what facilitating conditions are identified as influential on these activities?'.* This research is relatively unique in the boundary spanning literature. Firstly, because of the number and the types of boundary spanning activities that have been researched (Information exchange/knowledge sharing, relational activities, mediation/facilitating, coordination/negotiation and guarding/isolating). Secondly, because of the wide array of facilitating conditions (Environmental characteristics, the composition of the boundary spanner, organisational support & feedback, and individual determinants) for boundary spanning activities, which are the conditions that have an impact on the boundary spanning activities that are employed during the course of the project. Thirdly, because of the context of this research: the boundary between the project and the project environment. This social boundary, shaped by factors like trust, responsibilities, interests, knowledge, power and skills has never been explored in a boundary spanning context. This unique research approach has led to several new insights on boundary spanning in infrastructure planning.

The answer on the research question starts with the boundary spanners, the people who span the boundary between the project and project environment. Within this research context, the boundary spanners turned out to be the managers within the project team (manager project environment, project director, contract manager). The activities these individuals perform are influenced by facilitating conditions for boundary spanning activity. In order to understand these conditions, the project is approached as an open social system, with a technical core. This system is shaped by a collection of dynamics and conditions that impact can have an impact on this technical core, which basically is the demand of the client to deliver infrastructure. The results of this research have shown some important differences. Firstly, the ViA15 project was characterised by a relatively high degree of environmental characteristics that, according to the literature, shows a positive relationship with boundary spanning activity. However, this research concludes that a higher degree of complexity, diversity and uncertainty within the project environment can lead to more stress within the organisation. This stress is not conducive for boundary spanning activity, because (political) uncertainty and conflict situations within the project environment had a negative impact on the motivation of boundary spanners to span the boundary with the project environment, leading to coordination and negotiation or anti-boundary spanning behaviour (guarding/isolating). The budgetary limits within this project, translated to a lower degree of organisational support, might also have had an impact to this more closed attitude towards the environment. This, because these limit are an obstacle in finding ways to satisfy the environment the environment. Still, the project was forced to interact with the environment due to interdependency. The boundary spanning activity that mainly came from this interdependency, was coordination and negotiation. The data regarding the BBV project on the other hand, indicated a higher degree of individual determinants. This project benefited from the network of the project director at the ministry. This boundary spanning individual had a big impact on the boundary spanning activities that were performed within this project. Moreover, the findings indicate an impact of the boundary spanning individual on the facilitating conditions, leading to less complexity and more organisational support, which also led to an indirect positive impact on the boundary spanning activity within this project. The less complex project environment in combination with the role of individual determinants led in the BBV to a more proactive boundary spanning approach, in which the activities of information/knowledge sharing, relational activities and mediation/facilitating were more emphatically present than in the less proactive ViA15 project.

All in all, these results help to understand complex nature of infrastructure planning, in which the different circumstances lead to outcomes that are often considered as unsatisfactory in the project environment. Moreover, the findings indicate that individuals can also impact these circumstances. In other words, boundary spanning activity can be influenced by individuals within a project organisation. Further research is needed to find ways to impact boundary spanning in such a way that it improves stakeholders satisfaction and that it improves the connection between the project and its environment.

## Recommendations

As become clear in this research, differences in facilitating conditions for boundary spanning, lead to different boundary spanning activities. Research is needed to understand the effect of these different sets of boundary spanning activities on stakeholder satisfaction. This helps to understand why certain project are considered as more successful than others in terms of satisfaction in the project environment. Furthermore, the methods used for this study were not suitable for creating a deeper understanding about conditions as organisational support/feedback and individual determinants. Although the semi-structured interviews gathered some important indicators regarding these conditions, more research on these conditions could contribute to knowledge about the base of boundary spanning activity. These conditions should be explored more by using other intensive research methods. Such a research is also suitable for exploring the relationship between the project organisation and the mother organisation and the impact of this relationship on boundary spanning within this project. Besides this, this study did not include a time variable, whereas infrastructure projects are constantly changing. Ethnographic studies could contribute to the knowledge about the development of boundary spanning through the project process as a whole and what happens when people join or leave organisations. Lastly, this research focused on the boundary spanning activities employed by the project organisation. It could be also useful to learn what happens the other way around. In other words, what activities are employed by the project environment to span the boundary with the project organisation? All this knowledge about boundary spanning in infrastructure planning together, could have an impact on boundary spanning activity, by recruiting the right people, or training people to span boundaries or by creating the right circumstances for boundary spanners to employ certain boundary spanning activities. All in all, this could lead to plans that are better integrated into their environment.

## Reflection

As mentioned in the preface, the research process was more challenging than expected. Besides the circumstances, this also had to do with the research topic. Researching a broad set of boundary spanning activities in relation to wide array of facilitating conditions is complex. It took some time for me to find ways to link all the parts of the research together as a whole. I also found out that it is challenging to frame the interviews in a boundary spanning context, with people who are not familiar with the concept of boundary spanning. Furthermore, the recording of one interview failed, which led to loss of some usable data. Still, this eventually has not affected the process, because it offered the chance to ask that person questions again at a later moment. However, overall I think the data and the analysis of the data led to convincing and useful conclusions that are in line with the initial research aim to explore boundary spanning in this specific context of infrastructure projects.

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# Appendix A: Policy document analysis

| Case | Organisation | Title | Date | Type of analyses |
|---|---|---|---|---|
| ViA15 | Projectbureau ViA15 | Startnotitie | May 2008 | Scanning |
| ViA15 | Projectbureau ViA15 | Folder startnotitie | 05-05-2008 | Scanning |
| ViA15 | Ministry of Infrastructure and Water | MIRT overzicht 2021 | 15-09-2021 | Scanning |
| BBV | Rijkswaterstaat | Tracébesluit / MER Blankenburgverbinding | September 2015 | Scanning |
| BBV | Ministry of infrastructure and Water | Rijksstructuurvisie Bereikbaarheid Regio Rotterdam en Nieuwe Westelijke Oeververbinding | October 2013 | Scanning |
| BBV | Rijkswaterstaat | Blankenburgverbinding: contract en aanbesteding | 18-05-2018 | Reading |

# Appendix A: Code list

| Name | Grounded |
|---|---|
| (gebrek aan) bewegingsvrijhei... | 1 |
| actief maken van omgeving | 1 |
| afname contact in later stadium | 1 |
| afscheid nemen van actoren o... | 1 |
| ander type boundary spanner... | 1 |
| andere opstelling tav RWS, wa... | 2 |
| begin meer participatie | 3 |
| boundary setting | 10 |
| boundary spanner | 7 |
| boundary spanner continue fa... | 3 |
| boundary spanning taak | 2 |
| compromis sluiten | 1 |
| conflict~ | 16 |
| conflict nuance | 1 |
| consensus | 1 |
| coordination/negotiation~ | 15 |
| denken vanuit omgeving~ | 1 |
| directe lijn met stakeholders ip... | 2 |
| eigen straatje schoonvegen: v... | 3 |
| Ensuring continuity~ | 7 |
| ervaring | 1 |
| facilitating interaction~ | 12 |
| formeel overleg | 1 |
| fragmentation gemeentelijke s... | 1 |
| functie~ | 8 |
| gebrek aan bewaken continuity | 1 |
| gebrek aan budget | 5 |
| gebrek aan integratie tussen...~ | 1 |
| Gebrek aan verwachtingsman... | 1 |
| gebruik maken van bestaand... | 3 |
| Gemeente staat niet open voo... | 2 |
| gemeentschappelijk doel | 1 |
| goede samenwerking | 2 |
| Guarding & Isolating~ | 14 |
| hoe later in het project, hoe m... | 1 |
| institutional complexity | 4 |
| institutional conditional factor | 1 |
| institutionele onzekerheid~ | 5 |
| institutionele regeling~ | 4 |
| Interdependency~ | 21 |

Interview vragen:

| Name | Grounded |
|---|---|
| interne spanning (lack of co...~ | 1 |
| Kans door tolproject dichter o... | 1 |
| knowledge & information ex...~ | 19 |
| lack of organisational support~ | 3 |
| lang proces tot echte verander... | 2 |
| macht van Rijkswaterstaat | 1 |
| mediation | 2 |
| meekoppelen ipv integraal | 1 |
| meekoppelen regionale projec... | 1 |
| mogelijk verlies informatie bij... | 4 |
| moment betrokkenheid~ | 8 |
| motivatie individual determin... | 3 |
| motivation loss | 1 |
| na eindbesluit geen contact m... | 1 |
| naarmate project vordert min... | 1 |
| omgevingsinitiatief | 1 |
| omgevingsmanagement uitbe... | 1 |
| onrust in organisatie door rec... | 1 |
| open voor interactie | 1 |
| Persoonlijk netwerk boundary... | 1 |
| politiek stabiel, continuiteit | 1 |
| politieke druk~ | 8 |
| politieke onzekerheid~ | 5 |
| positief over eindresultaat | 1 |
| project als catalysator voor int... | 1 |
| project doorgang dankzij prov... | 4 |
| Project is erg duur | 1 |
| provincie eigen verantwoordel... | 1 |
| reactief | 2 |
| regionaal verkeersdoel | 1 |
| relational capacity | 2 |
| relationship building | 5 |
| role ambiguity~ | 2 |
| Rotterdam gangmaker, maar e... | 1 |
| Shared working, relationship b... | 1 |
| social network~ | 1 |
| stakeholders | 4 |
| stakeholders corrigeren elkaar~ | 1 |
| technisch doel~ | 3 |
| technische doel bereiken door... | 1 |
| verschuiving naar directe omg... | 1 |
| verschuiving van meedenken... | 1 |
| verwachtingsmanagement (G... | 4 |
| voordeel verlies contact uit ver... | 1 |

# Appendix B: Interview questions

- In welke fase of fases van het project was u betrokken? Welk jaar?
- Zou u uw rol binnen het project kunnen omschrijven?
- Dit onderzoek gaat over de integratie van ruimtelijke ontwikkeling binnen infrastructuurplanning. Zou u deze integratie kunnen definiëren?
- Er ligt nu een Tracébesluit en het project is in uitvoer. Maar het is ook ooit ergens begonnen. Kunt u dat 0 alternatief omschrijven? het plan waar het allemaal mee begon.
- Uiteindelijk wil ik er achter komen wat de invloed van boundary spanning op integratie was. Boundary spanning betekent als het ware dat je over een grens heen werkt. In dit geval tussen die van infrastructuurplanning en de ruimte. Ik zoek naar gedrag dat er aan heeft bijgedragen dat er ruimtelijke componenten in het project zijn gekomen. Hoe werden die ruimtelijke componenten in het project gebracht? Of hoe werd dit geprobeerd. Wie waren daarbij betrokken? Wat voor activiteiten vonden er plaats?
- En hoe moet ik die activiteiten plaatsen? Informatie uitwisseling, bouwen en onderhouden van relaties, onderhandelen/coordineren verschillende belangen, faciliteren van interactie, bemiddelen tussen partijen etc.)
- Kunt u het effect van Boundary spanning op het uiteindelijke Tracébesluit duiden? Heeft het geleid tot een meer integrale oplossing vergeleken met het 0 alternatief?
- En ziet u tijdens het project dan ook een bepaalde ontwikkeling? Dat in de ene fase een bepaalde activiteit meer prominent aanwezig is en in een andere fase een andere activiteit? Hoe verandert dit gedurende het project proces?
- Heeft dit ook invloed gehad op de mate van ruimtelijke integratie in het eindproduct?

# Appendix C: Ethical considerations

| **Principle** | **Actions taken** |
|---|---|
| Justice | Being transparent about the goal of the research and its findings. Furthermore, the research aim is pure, because it is an attempt to explore boundary spanning in infrastructure projects, in order to eventually improve the link between the project and its environment. |
| Beneficence/Non-maleficence | No organisations or individuals are harmed or brought in discomfort by this research. No one has been discredited. Statements about cases or organisations are made carefully in order to not offend any organisation or individual. |
| Respect | The names of respondents are not mentioned in the thesis in order to protect their privacy. Furthermore, the respondents were free to respond to the statements they made after the interviews or to the questions that were asked. |