

BREAKING BARRIERS TO COMMUNICATION

*Using boundary spanning activities
to facilitate integration in IRBM projects*

BY MAURICE OOSTERVELD

June 14, 2021

Master Thesis

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Second assessor: dr. M.A. (Margo) van den Brink

in partial fulfilment of the requirements of the Double Degree Master

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MASTER THESIS

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Abstract

Integrated River Basin Management (IRBM) attempts to integrate spatial and temporal scales, along with stakeholder objectives in river management projects. While this does more justice to the complexity and interconnectedness of projects, it also creates new institutional and communicative barriers. Boundary spanning is a useful tool in overcoming these barriers. However, there are knowledge gaps concerning the effectiveness, interrelatedness, and sequencing of boundary spanning activities – this is partly due to low awareness of context significance, and the frequent conceptualisation of boundary spanning as a holistic concept with interchangeable components.

This thesis researched how boundary spanning activities facilitated the integration of objectives during the planning phase of IRBM projects, using a granular approach and qualitative methods. The contextual relations are perceived as boundary types to which boundary spanning activities were applied, namely syntactic, semantic, and pragmatic boundaries. Further, the activities needed to be distinguished too, which are information transferring, translating, coordinating, co-creating, lubricating, representing, and guarding.

These boundary spanning characteristics and their contributions to integration were analysed in two cases within the Belgian Sigmoplan. Droogdokkenpark is the combination of flood defence and an urban greening project, while Beneden-Nete is a comprehensive redevelopment of multiple flood areas and wetlands. In both cases, a method triangulation of interviews and documentary analysis was applied to discover the abovementioned variables.

Information transferring, translating, coordinating, lubricating, and representing have directly affected integration, the variance of which can be explained by contextual factors. Integration is also facilitated by boundary spanning activities shifting discourses, preventing devolvement of boundaries, and facilitating each other. For future research into the effectiveness of boundary spanning activities, granular methods and an awareness of conditional factors such as boundary types should be adopted.

Keywords: Boundary spanning, boundary spanning activities, boundary types, conditional factors, Sigmoplan, Integrated River Basin Management

Preface

Last year, I received the opportunity to contribute to an ongoing research project by focussing my thesis research on boundary spanning in the Belgian Sigmaphan. A year of research, interviews, writing, and endless rewriting helped me gradually narrow down this extensive topic to the thesis that lies before you right now. Drawing to the end of a six-year academic journey, I hereby submit this thesis to finalize the completion of the Double Degree Master: *M.Sc. Water and Coastal Management* at the Carl von Ossietzky University of Oldenburg (Germany), and *M.Sc. Environmental and Infrastructure Planning* at the University of Groningen (The Netherlands).

I would like to start by thanking my supervisors dr. ir. Annet Kempenaar and dr. Margo van den Brink for inspiring me to take on research in this subject area. I thoroughly and genuinely appreciate all your continued support for me personally, and my writing process. It helped me carry this thesis further than I could have imagined a year ago. Annet, thank you for all the time spent reading the endless iterations of this thesis, and for our meetings to discuss improvements, prospects, and everything in between. Margo, I am thankful for all the theoretical nudges and concepts you have introduced me to throughout the process. I am looking forward to all that will follow from this thesis.

A huge word of thanks also goes out to my interviewees and an additional thanks to those who helped me find them. Thank you for making the time to talk to me out of your busy schedules and confusing pandemic work-from-home lives. Your input is invaluable.

In closing, I would like to thank my friends and family for helping get my mind of work when I needed a break and their continued support. A special thanks goes out to my girlfriend and parents. Mom and dad, thank you for listening to me rant when I have hit a roadblock and helping me clear my head on long walks. Shruti, thank you for reading this thesis in its earlier stages, helping me improve it, and helping redesign the figures.

List of Abbreviations

AGNAS	NL	Afbakening van de gebieden van de natuurlijke en agrarische structuur
	GB	Delimitation of the agriculture and nature structure
AG Stadsplanning	NL	Autonoom Gemeentebedrijf Stadsplanning Antwerpen
	GB	Autonomous municipal company for city planning in Antwerp
AG Vespa	NL	Autonoom Gemeentebedrijf voor vastgoed en stadsprojecten Antwerpen
	GB	Autonomous municipal company for real estate and city projects in Antwerp
AMT	NL	De afdeling Maritieme Toegang
	GB	Department of Maritime Access
ANB	NL	Agentschap voor Natuur en Bos
	GB	Agency for Nature and Forestry
INBO	NL	Instituut voor Natuur- en Bosonderzoek
	GB	Institute for Nature and Forest Research
IRBM	GB	Integrated River Basin Management
VLM	NL	Vlaamse Landmaatschappij
	GB	Flemish Land Agency
Vogt	GB	Vogt Landscape Ltd.
VW	NL	De Vlaamse Waterweg
	GB	Flemish Waterways
W&Z	NL	Waterwegen en Zeekanaal
	GB	Waterways and Sea Channel

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1. Introduction

1.1 Background

Similar to other fields of planning, traditional river flood management went through a paradigm transition around the end of the last century. Previously, it focused primarily on realising safety and economic objectives through centralised intervention, command and control planning, direct causality, and the use of objective measurements to evaluate singular objectives in river management plans (Wang et al., 2015). Such projects were realised in a closed system perspective, i.e., in isolation from the project environment and with clearly established sectoral boundaries (Van den Brink et al., 2019). Over time, this paradigm failed to cope with rising challenges such as civil self-organisation, and the increased importance and interconnectedness of issues that require holistic and cooperative solutions (Schoeman et al., 2014; Wang et al., 2015).

Following enhanced understanding of these emerging issues, river management projects increasingly demanded interdisciplinary and cross-jurisdictional collaboration (Meerkerk & Edelenbos, 2017). This led to a new paradigm of *integration* that places more value on human, ecological, and cultural perspectives associated with water: it seeks to incorporate more points of view through an open system perspective (Schoeman et al., 2014). *Integrated river basin management (IRBM)* is one of the paradigms that arose. It consists of the integration of objectives, jurisdictions, and timescales, while seeking to understand the plurality of values that can be created or safeguarded during IRBM projects (World Bank, 2010; Zevenbergen et al., 2013).

While the application of IRBM is aimed at increasing coordination between stakeholders and their objectives (Edelenbos & Teisman, 2013), the concept also introduces a plethora of actors and requires difficult, participative, and multidisciplinary processes (Den Haan et al., 2019). Hence, its implementation in practice faces interrelated barriers that can be summarised as follows:

“At sectoral level, insufficient communication among various responsible agencies and institutions, allied with weak bureaucratic processes for cross-sectoral cooperation, can lead to conflicting sectoral policies at river basin and national levels, again creating obstacles to implementation of river basin management plans and wetland management plans.”

—Convention on Wetlands (2010, p. 19, added emphasis)

So, while an open system, process-focused approach to river basin management is being developed, obstacles to its implementation are crucial. The barriers, highlighted in the quote above, are institutional and communicative barriers. *Institutional barriers* stem from a lack of formal structures and procedures. Examples include limited financial arrangements to establish integrative processes and outcomes, poor discussion and participation frameworks,

and a lack of leadership that can carry, encourage, and guide integration (Jones et al., 2006; Cervoni et al., 2008; Medema et al., 2008; Evers, 2016; Waylen et al., 2018). On the other hand, *communicative barriers* encompass the obstacles in navigating integrative processes. Examples of this include a frequently described difficulty to establish integration as an honest process that does not merely mask trade-offs in social correctness, in addition to predicaments while drawing stakeholders together, keeping them involved, and convincing them to lend support (Jones et al., 2006; Convention on Wetlands, 2010; Waylen et al., 2018). However, even when stakeholder involvement is sufficiently generated, it is still difficult to navigate the discussions themselves, as they involve stakeholders with historical roots in centralised planning (Medema et al., 2008).

This thesis investigates through the lens of boundary spanning how to overcome such barriers and create integration in IRBM projects. Herein, boundaries are perceived as differences between groups created through various factors such as the thought-worlds they stem from, local (cultural) context, and organisational differences (Vivosky, 2009). These can impair not only mutual understanding, interactions, information transfers, but also willingness to cooperate between actors (Emondson & Harvey, 2018). Actions aimed at overcoming boundaries are called *boundary spanning activities*.

1.2 Research Aim

Research into boundary spanning activities frequently focused on their effects but left significant gaps in our understanding. One such gap was a limited understanding of the effectiveness and the interrelations of separate boundary spanning activities (Birkinshaw et al., 2017; Van Meerkerk & Edelenbos, 2017). Another was a limited understanding of the impacts and interrelations created by sequencing activities across a project life cycle (Van Meerkerk & Edelenbos, 2017; Van Osch et al., 2017; Kislov, 2018).

The knowledge gaps were created by a limited awareness of the context in which boundary spanning activities are applied (Dee & Leisyte, 2017). Van Osch et al. (2017) added that another factor was their operationalization as interchangeable pieces of a holistic concept, and a failure to account for the project phase in which they are applied. They used the framework by Ancona & Caldwell (1992) to quantify the expression of boundary spanning activities across phases of a project life cycle. In doing so, they found that these activities cannot be treated interchangeably, and that their distribution across project phases differed between projects that are (un)successful in achieving project objectives. However, as they used a quantitative research strategy they could not explain how separate activities were linked to the successful attainment of objectives in various stages, prompting a reflection that qualitative research should be applied to this topic.

The findings by Van Osch et al. (2017) coupled with gaps in our understanding of the efficacy and interrelations of boundary spanning activities inspired the *central aim* of this thesis:

providing an in-depth case study analysis of how boundary spanning activities are used to facilitate integration during the planning phase of IRBM projects. This had two primary components:

- (1) First, as previously mentioned there was evidence of interrelations and sequencing between boundary spanning activities, although it was not well understood (Birkinshaw et al., 2017; Van Meerkerk & Edelenbos, 2017; Kislov, 2018). Their treatment as interchangeable parts of a holistic concept appeared to contribute to our limited understanding of these variation in efficacy and interrelations across a project's lifecycle. This research, thus, clearly limited the temporal scope to the project's planning phase and thereby aimed to create a demarcated understanding of how boundary spanning activities can be better applied in IRBM projects.
- (2) Second, in order to understand how boundary spanning activities can be applied, it was important to include a contextual analysis of the relations between the actors subject to boundary spanning. This was operationalised as the boundary types that needed to be spanned in order to achieve integrated results. The effects that facilitate integration needed to be linked to their respective boundary spanning activity. Then, the effects of boundary spanning activities were be assessed, while accounting for possible interrelations with other activities and the boundary types.

1.3 Research Design

This thesis applies an intensive case-study approach (Clifford et al., 2014) that focusses on two cases within Sigmaplan. Sigmaplan is a Belgian river management programme that started in 1977 with flood safety as its sole objective (Meire & Maris, 2008). However, its long-term safety standards underestimated climate change, leading to an update in 2005 that coincided with the paradigm of integration in river management, transforming Sigmaplan into an IRBM programme (De Preter, 2016). Herein, using a qualitative case methodology, a granular view of boundary spanning activities is applied to discover how boundary spanning activities are used to facilitate integration. In doing so, the following central research question will be answered:

“How are boundary spanning activities used to facilitate integration during the planning phase of Integrated River Basin Management projects?”

Before answering this question, it was first important to create a framework of boundary spanning activities that included recent scientific insights into the Ancona & Caldwell (1992) framework, and also adopt an appropriate framework to categorise the relations between organisations. These were caught in sub-question (1) and (2), and further developed in *Ch 2. theoretical framework*. Then, to answer the central question it was important to not only look at the impacts of boundary spanning activities, but also foster a degree awareness for the context of the situation in which it was applied. This was accounted for by assessing the boundary

types between the organisations that were subject to the boundary spanning activities, the impacts of the activity applied to span them, and comparative analyses of the two case studies. These were contained in sub question (3), (4), and (5).

- (1) Which boundary spanning activities can be distinguished?
- (2) How can boundary types be categorised?
- (3) What boundaries needed to be spanned in Sigmaplan, in order to achieve integrated solutions?
- (4) Which boundary spanning activities were used and how did they affect the integration of objectives in the Sigmaplan projects
- (5) Which differences and similarities are found between the cases concerning the applications of boundary spanning activities and the effects they have on the integration of objectives?

1.4 Relevance of this research

Through the pursuit of the research questions, this thesis is expected to provide contributions to scientific research, as well as the field of planning and society in general. First and foremost, it adds to theory by analysing how boundary spanning activities can be applied within IRBM programmes. Value is added to the debate by using a *granular view* of boundary spanning activities within a *fixed temporal scope*. A granular view is a reductionistic approach wherein it examines the individual components that make up a whole (Rosenberg, 2012). It refers to this thesis' focus on individual boundary spanning activities, as opposed to the holistic view that treats boundary spanning activities as interchangeable parts of boundary spanning.

A granular view in a fixed temporal scope is important because, based on Van Osch et al. (2017), boundary spanning activities show varying efficacies in different phases of projects, but *how* these activities are applied in a specific project phase is relatively unknown. Here, qualitative research is used to answer this 'how' question for the planning phase of IRBM projects. Such a development could improve the relational understanding between actors during the *planning phase* and determine which boundary spanning activities can be applied effectively. This would contribute positively to the efficacy of boundary spanning choices in IRBM projects, thereby creating societal benefits through improving cross-boundary relations within projects.

The second contribution this thesis makes is in combining boundary types (Carlile, 2004) with boundary spanning activity literature (Ancona & Caldwell, 1992). Both lines of inquiry stem from organisational sciences (Arena et al., 2017; Dee & Leisyte, 2017), but boundary types latched on to boundary object literature and became popular in science & technology studies, and boundary spanning activities instead became popular in policy and management literature.

Boundary types are used in a line of inquiry that limits the purpose of boundary spanning to overcoming problems in relation to information processing and sharing knowledge (Arena et al., 2017). They place such knowledge transfers in a structured context and use it as a common ground for interprofessional practices. The downside is that its ability to recognise and describe (inter-organizational) stakeholder interactions is limited (Jakobsen & Filstad, 2020), while interprofessional practice itself shows that competences can be combined and integrated in ways that go beyond knowledge transfers.

Boundary spanning activities instead fit into a line of inquiry that addresses interactions across (organizational) boundaries (Dee & Leisyte, 2017). Aforementioned issues are a limited understanding of their interrelations, varying efficacy, and the influence of the project life cycle (Birkinshaw et al., 2017; Van Meerkerk & Edelenbos, 2017; Van Osch et al. 2017; Kislov, 2018). These gaps fit into a systemic issue where the literature lacks an awareness of the context in which activities are being performed (Dee & Leisyte, 2017).

This thesis' main focus concerns the boundary spanning activities and the benefits of the synthesis are understood from this perspective. Carlile's (2004) boundary types offer a simple, frequently used conceptualisation of inter-organizational relations that have clear theoretical implications. This can offer contextual insights into the applications, interdependencies, and outcomes of boundary spanning activities. A successful combination of these two lines of inquiry may further show that awareness of the inter-organizational environment is important to understanding boundary spanning activities, and create incentive for the lines of inquiry to intersect.

Third, the research conducted for this thesis will generate knowledge on Sigmaplan that is under-researched from a planning perspective; much of the research about Sigmaplan comes from ecological fields and focusses on mapping system interactions and development impacts (examples: Maris & Meire, 2017; Peeters et al., 2016; Schepers et al., 2017; Smolders et al., 2018). In tackling the topic of boundary spanning within Sigmaplan, this thesis answers a call for research on the relations between actors and the application of boundary spanning in projects (Vikolainen et al., 2015).

Lastly, Sigmaplan is one of four projects that will be analysed and compared through the project '*Spatial Designers as Boundary Spanners*' within the knowledge initiative '*Smart Urban Regions of the Future*' (NWO, 2020). This thesis, the gathered data, and the presence of its author within this research project provides insights into boundary spanning in Sigmaplan from an organisational perspective that focusses on the activities performed.

1.5 Thesis structure

This thesis contains five further chapters. Chapter 2 uses and combines international academic literature on IRBM, boundary spanning activities and boundary types, in order to establish the conceptual framework used to analyse the cases. Subsequently, Chapter 3 outlines the methodology adopted to assess the cases, explaining the research design, case selection, data collection methods, and method of analysis. The findings are presented in Chapter 4, where the types of boundaries between organisation and the benefits of utilised boundary spanning methods are thoroughly described. Chapter 5 then links these findings back to the research questions, discussing the findings and their place in the wider academic debate on boundary spanning. Following this, Chapter 6 will conclude the thesis by highlighting the most important information in the context of the research objectives and questions, providing concluding thoughts, as well as implications and recommendations for future research.

2. Theoretical framework

2.1 Integrated River Basin Management

The introduction addressed the development of Integrated River Basin Management (IRBM) as a concept derived from rising challenges in water management, and in this section, a light will be cast upon an issue in the utilization of IRBM as a concept. *Integration*, a core component of IRBM, is subject to a degree of multi-interpretability that results in different perceptions of its meaning. These differences can be found across different projects and contexts, which is further complicated by a plethora of researchers that describe the same phenomena in different words (Voulvoulis et al., 2017; Giakoumis, 2019).

The multi-interpretability makes it important to define how integration is interpreted within this thesis, in order to accurately portray the findings. In literature, the understanding of what an integrated approach in IRBM means can be divided into three distinct perspectives (Rijke et al., 2012):

- (1) The first interpretation is that it concerns the *integration of spatial scales*. This is a systems approach to river management, where integration focuses on unveiling the relations between various units across spatial scales (Rijke et al., 2012). An example of this is the coordination of interventions among the local, regional, national, and international scale (World Bank, 2010; Zevenbergen et al., 2013)
- (2) A second perspective is that IRBM contains and understanding and balance of the *short-term and the long-term costs* (Rijke et al., 2012; Zevenbergen et al., 2013). It seeks to integrate temporal scales, by combining current demands for short-term planning, with the extreme events and future changes that require long-term planning (Zevenbergen et al., 2008).
- (3) The final perspective considers integration to be about the *alignment and balancing of multiple objectives and functions* (Rijke et al., 2012). It aims to simultaneously address the societal needs and objectives (e.g., safety, transportation, economical) through participatory and open process (Panten et al., 2018), while also accounting for the interconnectedness between functions of water and land use (Zevenbergen et al., 2013)

IRBM is thus understood as a concept that encompasses these types of integration in river systems, culminating in an integrated and coordinated approach that manages rivers while considering the interactions between land, water, and other resources, as well as the relevant goals and views of stakeholders in society (Zevenbergen et al., 2016; Panten et al., 2018). As such, IRBM is inherently an *inter-organisational* form of collaboration that improves decision-making, increases trust and commitment between actors, enables learning, and improves the awareness of the interconnectedness of issues.

Within this thesis, the definition of integration follows the third perspective: *the integration of objectives and functions*. This perspective best describes integration on the project level in Sigmaplan following the actualisation in 2005. The integration of spatial scales and timescales are safeguarded on the programme level through basin-wide objectives. However, the project level focusses on the integration of present and future needs that go beyond the pre-existing safety objective, through integrating objectives and functions (Tractebel Engie, 2016).

2.2 Boundary spanning

2.2.1 What is boundary spanning?

The integration of objectives and values is created through an open system perspective (Schoeman et al., 2014) that requires participative and multidisciplinary processes (Den Haan et al., 2019). This introduces a plethora of diverse actors into planning processes, highlighting the importance of overcoming communicative barriers between them. Boundary spanning, a concept derived from intra-organisational research, can be used to overcome barriers between actors (Visovsky, 2009). While boundary spanning is derived from intra-organisational research, a systematic literature review by Tang et al., (2018) shows that boundary spanning concepts such as boundaries and boundary spanning activities are applicable to an inter-organisational context, where they play an important role in managing organisational relations, tensions, and information transfers (Marrone, 2010; Qiu & Haugland, 2019). This thesis will build a theoretical framework where boundary spanning, and its components are applied to an inter-organisational environment.

Boundary spanning literature considers *boundaries* as the differences between groups that are created through various factors such as the thought-worlds they stem from, local (cultural) context, and organisational differences (Visovsky, 2009). When boundaries remain unspanned they can form communicative barriers by impairing mutual understanding, interactions, and knowledge transfers, distorting meanings, and decreasing trust and willingness to collaborate (Emondson & Harvey, 2018). Such boundaries can be found between professional and organisational settings, where they are believed to help maintain group identity and the professionalisation of sectors. They can also be found between hierarchical layers and between groups with different values and objectives.

Within the field of boundary spanning, research can focus on different parts of boundary spanning: some look at the accuracy of information transmitted across boundaries as boundary spanning (e.g., Visovsky, 2009; Warner et al., 2010; Abraham et al., 2015; Alexander et al., 2016; Birkinshaw et al., 2017), whereas others also include interactions between groups (Edelenbos & Teismen, 2013; Van Osch et al., 2017; Delozier, 2018; Emondson & Harvey, 2018). Furthermore, boundary spanning can be split into a horizontal and vertical component. Horizontally, boundary spanners work across sectors, contexts, organisational subunits, belief

systems, etcetera, whereas vertically, the boundary spanner typically facilitates interaction between hierarchical layers within an organisation (Birkinshaw et al., 2017).

Every person affiliated with a project can be a boundary spanner. However, vertical boundaries are most effectively spanned by management staff within the project, and horizontal boundary spanning activities are more likely to be carried out by team members (Van Osch et al., 2017). These boundary spanners are often defined as those “who are especially sensitive to and skilled in bridging interests, professions, and organisations” (Webb, 1991, p. 231, in Van den Brink et al., 2019). Furthermore, boundary spanners tend to be identifiable through the following characteristics: they exist within or between multiple groups (Levina & Vaast 2005; Visovosky, 2009; Pelletier et al., 2018), they have a reputation within both groups, have knowledge about both groups (Pelletier et al, 2018), tend to have personal abilities (Kislov, 2018), and inclination towards the role (Levina & Vaast 2005; Visovosky, 2009).

This thesis focuses on both horizontal and vertical cross-boundary interactions, perceiving boundary spanners to perform boundary spanning activities to facilitate interaction, and the transfer of information and knowledge, between the organisations in a project environment. The usage of such boundary spanning activities allows for the integration of knowledge and the creation of new knowledge, while helping groups communicate perspectives that stem from their differences. Boundary spanning literature shows a large focus on the positive effects of boundary spanning (Van Meerkerk & Edelenbos, 2017; Tang et al., 2018). A summary of these effects found during exploratory research for this thesis is shown in Table 1.

Effect	Author
<i>Increased performance</i>	Van Meerkerk, 2014; Pelletier et al., 2018
<i>Reach better decisions or outcomes</i>	Edelenbos & Teismen, 2013; Emondson & Harvey (2018)
<i>Increased trust</i>	Van Meerkerk & Edelenbos (2017); Pelletier et al., 2018
<i>Sustainable relationships</i>	Van Meerkerk & Edelenbos (2017)
<i>Increased commitment</i>	Pelletier et al. (2018)
<i>Gain legitimacy</i>	Van Meerkerk & Edelenbos (2017); Edelenbos & Teismen (2013); Emondson & Harvey (2018)
<i>Information sharing</i>	Visovosky (2009); Van Meerkerk (2014); Alexander et al. (2016); Meerkerk & Edelenbos (2017); Pelletier et al. (2018)
<i>Translation</i>	Alexander et al. (2016); Van Meerkerk & Edelenbos, (2017)
<i>Common understanding</i>	Pelletier et al. (2018); Emondson & Harvey (2018)
<i>Avoid litigation</i>	Edelenbos & Teismen (2013)
<i>Merging self-interest into joint action</i>	Edelenbos & Teismen (2013)
<i>Innovation</i>	Alexander et al., (2016); Emondson & Harvey (2018)
<i>Risk perception: present & future</i>	Emondson & Harvey (2018)

Table 1: Positive effects of boundary spanning activities

While understanding the positive aspects of boundary spanning in IRBM is important, it is equally important to be aware of criticisms. Opponents of boundary spanning point towards its insufficient utilisation in practice and the lack of democratic legitimacy, accountability, and transparency, as well as a prevalence of informal interactions that can be influenced by unacknowledged power relations (Edelenbos & Teismen, 2013). This focus on positive results also contributes to a limited understanding of the effectiveness of boundary spanning activities and the interrelations of these activities (Birkinshaw et al., 2017; Van Meerkerk & Edelenbos, 2017; Van Osch et al., 2017; Kislov, 2018).

2.2.2. Boundary spanning in Integrated River Basin Management

Boundary spanning and its activities will be applied to IRBM projects within this thesis. The increasing complexity of river management projects has been acknowledged since the end of the 20th century, and water challenges such as surpluses, floods, shortages, and pollution control, are now understood to require interventions through interdisciplinary and cross-jurisdictional collaboration (Van Meerkerk & Edelenbos, 2017). Furthermore, the mutual dependency between projects and their context has gained importance. Projects are understood to influence other (non-)governmental activities and processes of self-organisation within the project environment, whereas the project environment became more adept at combatting projects that conflict with their interests (Edelenbos & Teismen, 2013). The increasing importance of cross-jurisdictional and cross-sectoral collaborations, as well as interactions between projects and their environment led to a switch from closed system perspective, where projects are separated from their environment to an open system perspective where projects are embedded in the project environment (Birkinshaw et al., 2017). The subsequent rise in the number of stakeholders and objectives is a driving force for the increasing complexity (De Roo & Silva, 2010), creating a higher need for boundary spanning and its associated activities within water management projects.

2.3 Boundary Spanning Activities for IRBM

The boundary spanning activities performed by boundary spanners are highly diverse and important to cross-boundary management. They are defined here as a set of activities that link organisations to their external environment, either through information or knowledge transfers, or knowledge creating interactions. Before delving further into the activities, a note needs to be made that the Ancona & Caldwell (1992) framework on which this thesis' conceptualisation of boundary spanning activities is build, stems from intra-team boundary spanning. However, their categorisation of boundary spanning activities as information searching, coordination, and representation has been applied inter-organisationally with changes to their scope, definition, and target actors (Marrone, 2010; Tang et al., 2018). This shows these boundary spanning activities can be applied to inter-organisational context as well. Additionally, the Ancona & Caldwell (1992) framework is an older framework that,

while it is frequently used in academic literature with over 3000 citations, does not cover the full range boundary spanning activities that may be found in practice (Kalkman, 2020). For the purpose of this thesis, their three activities will be redefined for an inter-organisational focus, and other activities will be included to fill gaps based on newer insights.

2.3.1 Information Transferring

The *information transferring* activity is based on information searching, where the boundary spanner scans within the project environment and intra-organisationally for knowledge, expertise, technical information, threats, opportunities, and contextual information (Ancona & Caldwell, 1992; Van Osch & Steinfield, 2016). Ancona & Caldwell (1992) initially defined it as a project team's intra-organisational search for, and acquisition of, beneficial information across boundaries (Ancona & Caldwell, 1988). It is a largely horizontal form of boundary spanning that aims to increase the awareness of a project team concerning opinions, information, and developments in the project environment (Van Osch & Steinfield, 2016). Carlile (2004) reconceptualised information searching as an information transfer, performed by any actors and in any direction, on both the team and organisational level (Marrone, 2010). These insights are used to redefine this activity for an inter-organisational environment, and the term information transferring is adopted because of the implied directionality and scope within information searching.

Information transferring can be divided into four sub-activities using Ancona & Caldwell (1988). The first of these sub-activities is *modelling*, which is the act of mapping stakeholders in the project environment. This results in an early identification of potential allies and troubles. Second, we find *transfer* activities, aimed at collecting information and resources. Here, specific information required for current tasks and decisions is searched and presented to an organisation. Incorporating insights from Carlile (2004), this sub-activity is expanded to incorporate outgoing flows of information as well. Third, there are *scanning* activities, which is the untargeted monitoring of the project environment. By scanning, boundary spanners attempt to detect contextual changes, new threats, and opportunities, and failing assumptions, in order to increase the awareness of potential changes. Lastly, the boundary spanners also attempt to directly gather *feedback* concerning the satisfaction of stakeholders with project progress, team, process, and the product (Van Osch et al., 2017).

Within this thesis, information transferring thus encompasses the search for, and transfer of information by organisations. Nonetheless, this activity presupposes that when information is transferred, it can be understood by the recipient. Carlile (2004) moves beyond the notion that information can always be understood as intended by another group, by incorporating *translating* as a boundary spanning activity necessary to interact across thought-worlds.

2.3.2. Translating

Translating is included in this framework to fill the gap left by information transferring. Information transferring presupposes that knowledge sought by boundary spanners can be reduced to readily transferrable information that can be transferred by putting information into terms that are familiar to recipient (Deng, 2013). However, this does not apply when context is an important aspect of the information (Carlile, 2004; Maaninen-Olsson, 2008). Differences in thought-worlds, experiences, and assumptions can reduce the understanding of context-dependent information. Boundary spanners can help stakeholders express their worldview through interpreting their meanings, helping another group to understand contextual differences, and translating the original meanings so they can be understood by others who do not share the same worldview (Deng, 2013; Safford et al., 2017). Translating is a valuable resource to organisations since it allows them to understand information from outside their own scope of understanding. This can highlight opportunities and problems that other groups perceive (Emondson & Harvey, 2018).

2.3.3 Coordinating

The third boundary spanning activity in this framework is *coordinating* (Ancona & Caldwell, 1992). With this activity a boundary spanner attempts the “facilitation of effective decision-making and design implementation through cross-boundary strategizing, planning, and evaluation” (Van Osch & Steinfield, 2016: p. 211). While this activity stems from intra-organisational research, it is also applied by interdependent entities on the organisational level to coordinate cross-organisational goals, efforts, and learning (Marrone, 2010; Tang et al., 2018). Something that can, however, be noted from its definition is that coordinating aims at facilitating decision-making and implementation, but *not* the process of co-creating goals through interaction between stakeholders (Van Osch et al., 2017). It also assumes that stakeholders are willing to coordinate. These gaps are closed by introducing co-creating and lubricating, respectively in *Section 2.3.4: Co-creating* and *Section 2.3.5: Lubricating*.

Coordinating itself is aimed at aligning, negotiation, and monitoring the various tasks and activities taking place in a project environment (Van Osch & Steinfield, 2016). This is done through three sub-activities. First, *coordinating* between interdependent stakeholders in the project environment is used to help organisations synchronise and review the inputs and outputs of their individual processes to proceed towards a joint goal (Marrone, 2010). Secondly, *negotiation* is a sub-activity performed in order to synchronise the agendas of interdependent stakeholders, determining the inputs each stakeholder will contribute, in order to reach a project output (Ancona & Caldwell, 1992). Lastly, *reviews* are routine deliberations organised by the boundary spanner in order to gather input on the satisfaction of outputs from stakeholders (Van Osch & Steinfield, 2016).

2.3.4 Co-creating

Coordinating, as defined by Ancona & Caldwell (1992), is an attempt by the boundary spanner to help groups move towards a (joint) target together, using a suitable, negotiated pace and inputs. However, this neglects the process of co-creating objectives and outputs that surged after the communicative turn in planning, which have been explained to be important to IRBM (Edelenbos & Teismen, 2013). Therefore, co-creating is added to in framework as an activity that can close this gap.

Co-creating will be researched as *Research by design*. This is done to maintain a clear demarcation with other activities such as lubricating and coordinating. In an initial exploration of Sigmaplan cases it was also found that research by design has been applied or was sought to be applied within Sigmaplan (Vlaams Bouwmeester, n.d.; AG Stadsplanning & W&Z, 2011; Lombaerde, 2011; Sigmaplan, 2012). However, it is a difficult concept to identify in practice due to its plurality of uses. Therefore, a clear definition of research by design is necessary. In this thesis it is defined as a method used to investigate the spatial qualities, potential problems, and opportunities of a project area, through creating an *interdisciplinary design process* that can be participated in and understood by a wide audience, while simultaneously generating new insights and knowledge about the project (Roggema, 2016a; 2016b). It can be found in practice as a design methodology used to explore the potential and desires that different stakeholders wish to express in space (Coppens & Oosterlynck, 2008), while linking spatial issues across sectors by involving stakeholders (RES, 2020). Within these processes, designers take the role of boundary spanners, helping to create accessible and discussable (non-)verbal design outputs (Roggema, 2016b).

Similar to the other boundary spanning activities, research by design creates positive effects that could contribute to the successful enactment IRBM. It is useful for framing shared goals, defining problems, and exploring aspects of future implementations with an open and interdisciplinary view (Van der Linden & Daamen, 2018). These can increase the adaptivity of plans by instilling a degree of reflexivity (RES, 2020), because identifying these variables creates a greater awareness of (changing) contextual conditions, by viewing issues through multiple viewpoints (Roggema, 2016b). Furthermore, designers acting as boundary spanners were found to play an important role in managing different interests. They safeguard stakeholder interests and the enhancement of spatial quality, which help protect and amplify the integration of objectives (Busscher et al., 2019).

2.3.5 Lubricating

Similar to the previous section, *lubricating* is added as a boundary spanning activity to fill a gap left by *coordinating*. Solely classifying the efforts towards achieving a common target neglects the requirements for successful coordinating, because in practice not all stakeholders in a project environment are willing to co-create or coordinate. Birkinshaw et al. (2017)

inductively found that boundary spanners perform deliberate boundary spanning activities to increase the willingness of stakeholders to cooperate, which could not be classified in the Ancona & Caldwell (1992) typology. While this activity shows promise in filling gaps in the current understanding of boundary spanning activities, it has received limited attention in literature.

Lubricating, as described by Birkinshaw et al. (2017), consists of three sub activities. The first activity is *creating equilibration procedures*, by helping different stakeholders hold equal footing during processes. Secondly, stakeholders' biases are based on perceiving an unequal status quo in projects, believing their own contributions and objectives to be valued as lesser. The boundary spanners attempt to make stakeholders aware of their equal footing by *signalling a shift from the status quo*. And lastly, boundary spanners will directly question and *challenge assumptions* when they are outed, allowing stakeholders to reflect on their own biases. This activity was found to improve relations between actors and increase their perceived influence on the process (Birkinshaw et al., 2017).

Each of the sub-activities is aimed at tackling and reducing the (sub)conscious biases of stakeholders that reduce their willingness to work together. In planning, these biases are a continuation from 20th century planning, where a technical rationale prevailed. The communicative turn in planning reduced the influence of the technical rationale during the late 20th century, but research into the utilisation of communicative practices lead to conflicting results (Brand & Gaffikin, 2007). Brand & Gaffikin (2007) found that power relations influence how stakeholders' inputs are valued within processes, and that experts who invite comments and inputs can ignore these during later phases. This continuation of practices counterproductive to collaboration can be relevant for IRBM, as it is a form of planning that still receives criticism concerning its planning processes. Dutch (Busscher et al., 2019) and Belgian (Boone et al., 2018) case studies show that although IRBM attempts to integrate values, safety is likely to be the top priority. For this reason, lubricating could be important to foster a willingness to collaborate within the project environment.

2.3.6 Representing

Representing is a boundary spanning activity that increases the visibility, awareness, and favourability of a project within an organisation (Van Osch & Steinfield, 2016). Here, the boundary spanner spans hierarchical boundaries between a project unit and senior managers within the same organisation. Van Osch et al. (2017, p. 211) themselves describe representational boundary spanning activities as:

“lobbying for the team up the hierarchy in order to create favourable impressions amongst senior managers, hence, it is a largely vertical form of boundary spanning.”

It is important to emphasise here that this is only side of the representational boundary spanning activities established by Ancona & Caldwell (1992). Their description was based on

(Ancona 1988), which phrased representing as a combination of “representing the group in extremely positive terms when resources are needed and in a less positive light if that is required” (Ancona & Caldwell, 1988, p. 477). The definition of representing by Van Osch et al. (2017) only focuses on the positive representing. The difference between the positive and negative representing can be explained by considering the differences among projects concerning the degree of representing required.

On the one hand, there are projects where interest from senior management is naturally high. Examples of these are flagship projects, or projects that are important due to political circumstances. Senior managers within a project organisation want to be informed of such projects regularly, making positive representing unnecessary. However, this interest is a double-edged sword that becomes harmful when it is too high. This creates a need for boundary spanners to engage in *guarding*, which is the act of decreasing interest by presenting the project in a less positive light, which will be explored in the next activity *Section 2.3.7: Guarding* (Van Meerkerk & Edelenbos, 2017).

On the other hand, there are projects that do not naturally gather a high degree of attention from senior management and can benefit from positive representing (Van Meerkerk & Edelenbos, 2017). In inter-organisational research, representing is enacted similarly, but it instead targets clients, and central branches above a respective organisation (Marrone, 2010). This boundary spanning activity is usually performed by project managers (Van Osch & Steinfield, 2016), and this is what is meant by ‘representing’ in this thesis. Its targets will be referred to as senior management. The difference between guarding and representing as boundary spanning activities is displayed in *Figure 1*.

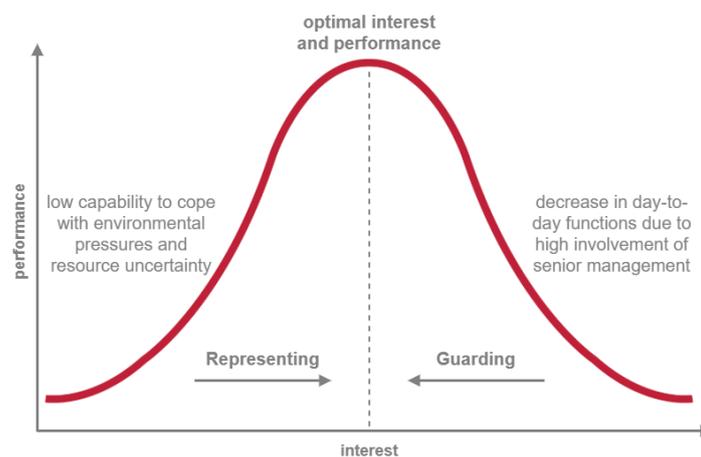


Figure 1: Author’s visualisation of the effect of representing and guarding activities within projects

Representing, as described above, is a strategic activity that benefits both senior management and project teams. It helps senior managers to: allocate resources more efficiently through increased knowledge; present projects to external clients; gain an overview of the process and progress of projects (Van Osch & Steinfield, 2016); and create innovation within the parent organisation through awareness of projects and external circumstances (Alexander et al.,

2016). Representing can be performed through creating positive discourse about a project (*talking up*) or by active lobbying for resources as a *persuasion* strategy. These can increase the interest in a project (Ancona & Caldwell, 1988; 1992). This helps by: increasing the potential to deal with strong external threats through organisational support (Van Meerkerk & Edelenbos, 2017); increasing project resources and the security thereof (Alexander et al., 2016; Van Osch & Steinfield, 2016); increasing potential for innovation through security of resources (Alexander et al., 2016); and increasing the legitimacy and prestige of organisations (Marrone, 2010; Van Osch & Steinfield, 2016).

2.3.7 Guarding

The previous activities were aimed at increasing flows of information, visibility, and coordination. The boundary spanner, as a guard, aims to protect a project from an overload of inquiries and carelessness concerning information. In order to guard the boundary, the boundary spanner will decrease or maintain the permeability of boundaries (Kislov, 2018). Guarding serves to isolate an organisation from their environment or senior managers, preventing disturbances that negatively impact it. These activities are performed when interactions with the project environment led to a negative project performance (Dietrich & Brøde, 2010; Kislov, 2018). The choice to guard can be made based on three factors: (1) capability of an actor to share (Dietrich & Brøde, 2010; Van Meerkerk & Edelenbos, 2017), (2) the intent of involved actors (Ancona & Caldwell, 1988; Alexander et al., 2016), (3) and the risks of spreading information (Ancona & Caldwell, 1988; 1992; Alexander et al., 2016; Curnin & Owen, 2014).

The vertical form of guarding is shown in *Figure 1*. When senior management is too involved in a project and interfering with the day-to-day activities of the team this can lead to stunting innovation capabilities. The boundary spanner distances the project intra-organisationally to *prevent overexertion* (Van Meerkerk & Edelenbos, 2017). However, guards also prevent overexertion when there is an overload of request from the external project environment and interested parties. Examples include denying/postponing requests from media, researchers, and stakeholders (Kislov, 2018). Secondly, they also show selectivity in opening boundaries, based on the perceived intent of involved actors (Ancona & Caldwell, 1992; Alexander et al., 2016). Guards *assess the intent* of actors and decrease the permeability of boundaries when they believe an involved party to harbour wrong intentions (Alexander et al., 2016), preventing the wrongful release of information or (Curnin & Owen, 2014). Lastly, they also prevent the release of information when there is the risk of backfire or misinterpretation (Ancona & Caldwell, 1992).

2.3.8 Overview of boundary spanning activities

Building onto the Ancona & Caldwell (1992) framework, seven boundary spanning activities have been defined for an inter-organisational environment. *Information transferring* (2.3.1) is defined as a cross-organisational transfer of information. However, some context-dependent information needs to be transferred through *translating* (2.3.2), by interpreting the meaning, to be understood. *Coordinating* is a cross-organisational review, negotiation, and discussion of different inputs and outputs created by the interdependent organisations. This ignores the *co-creating* (2.3.4) of outcomes that accompanies IRBM (Edelenbos & Teismen, 2013) and the need to create willingness to successfully draw stakeholders into processes (*lubricating* 2.3.5). *Representing* (2.3.6) focusses on increasing visibility, awareness, and favourability of a project with central branch organisations or clients (Van Osch & Steinfield, 2016), but neglects the negative of effects of their involvement. Interference, when their involvement is too high, can be avoided through *guarding* (Section 2.3.7). All of these activities, as well as a brief overview of their contents, are summarised in Table 2 below.

BSA	Sub-activities
<i>Information transferring</i>	Modelling: mapping stakeholders within the environment
	Information/resource transfer: collecting information and resources
	Scanning: untargeted monitoring of the context
	Feedback-seeking: assessing stakeholder perceptions
<i>Translating</i>	Interpretation: Transfer of meanings across organisations with contextual differences that influence the understanding of information
<i>Coordinating</i>	Coordinating: synchronising inputs and outputs towards a joint goal
	Negotiating: determining the inputs and outputs each stakeholder can and will produce towards a joint goal
	Review: routine review of stakeholder satisfaction
<i>Representing</i>	Persuasion: lobbying to preserve or increase resources
	Talking up: speaking about the project in positive terms to create excitement
<i>Guarding</i>	Prevent overexertion: assess capability to share and protect stakeholders from overexerting their capacity
	Assessing intention: protect from malintent
	Isolation: prevent (untimely) release of information
<i>Lubricating</i>	Equilibration procedures: ensure equal footing between stakeholders
	Signalling shift: show that the status quo of inequality is being tackled
	Challenging assumptions: that hinder willingness to collaborate
<i>Co-creating</i>	Research by design: using a participatory and reflexive design process

Table 2: Overview of boundary spanning activities (BSA)

2.4 Boundary Types

The boundary spanning activities between organisations are performed across boundaries. Based on contextual conditions, boundaries can be fundamentally different. A commonly used framework to categorise the differences between boundaries is created by Carlile (2004). Within this framework, there are three different types of boundaries, and their classification is based on the degree of complexity involved in spanning the boundary. The three boundary types are: syntactic, semantic, and pragmatic boundaries. Boundary types are frequently utilised in Science and Technology Studies, where they are linked to boundary objects that are needed to facilitate flows of information. These boundary objects are used to “support overcoming knowledge boundaries and thus support coordination among different communities of practice by providing common ground” (Star & Griesemer, 1989, p. 393, in Abraham et al., 2015, p. 4).

2.4.1 Syntactic Boundary

A *syntactic boundary* exists between groups that are familiar with, or similar to, each other. The differences and interdependencies between the groups are known and understood, which makes interaction and information transfers between groups relatively simple processes without need for interpretation (Maaninen-Olsson et al., 2008). Such differences exist between fields and practices that use different vocabulary but share a common worldview and goals (Smulders et al., 2014; Abraham et al., 2015). Boundary spanners help create commonly understood words for collaboration and translate information so it can be understood by either group (Carlile, 2004; Smulders et al., 2014). As a boundary spanning activity this category of interaction is described as *information transfer* activities.

2.4.2 Semantic Boundary

The *semantic boundary* is more complicated than a syntactic boundary. It similarly requires a transfer of information because there is a different use of words between groups that share a semantic boundary. However, with a semantic boundary not only the words differ, but also the thought-worlds that they stem from (Smulders et al., 2014; Emondson & Harvey, 2018). Such boundaries exist when contextual differences and dependencies between groups are not well understood (Maaninen-Olsson et al., 2008). The groups must then be helped to understand where contextual differences and their relations to the usage of words come from. A boundary spanner must be able to *interpret* the meaning of concepts and interactions and *translate* them in order to avoid misinterpretations. This must be done in manner that is understandable for groups that give different meanings to these concepts and interactions, and in doing so the boundary spanner helps bridge their differences (Smulders et al., 2014). Helping groups from different thought-worlds interact is important, because they will likely interpret information differently and be able to see different problems and opportunities within the same case (Emondson & Harvey, 2018).

2.4.3 Pragmatic Boundary

Pragmatic boundaries are the most complex. They exist between groups that have differences in terminology (syntactic) and where the ideology stems from different thought-worlds (semantic). However, with pragmatic boundaries the groups also hold competing interests, and there is a differing evaluation of the importance of issues (Carlile, 2004; Abraham et al., 2015). This boundary leads to a low willingness to collaborate and share knowledge or resources, because competing ideas about which issues to prioritize or focus cause a rift between the groups (Abraham et al., 2015; Emondson & Harvey, 2018).

When spanning a pragmatic boundary, acknowledging the differences in knowledge and context is no longer sufficient to create mutual understanding. The boundary spanner is then required to create a deeper understanding of how groups are interconnected, affect each other, and how working together can lead to a more satisfying result for the parties involved (Maaninen-Olsson et al., 2008). The boundary must be bridged by increasing willingness to cooperate, building common interests, and deepening the understanding of the consequences of actions and choices for other groups (Smulders et al., 2014). These activities *transform* knowledge and interests, because groups gain an understanding of the situation from multiple perspectives and agree on a shared interest or shared perspective of issues (Maaninen-Olsson et al., 2008). Bridging pragmatic boundaries is important because the competition of interest between stakeholders stems from the local and professional contexts, which are important to an integration of perspectives into developments (Smulders et al., 2014). On the other hand, when pragmatic boundaries are left unattended, they can lead to path dependence within an organisation and also the clustering of sympathetic (rival) organisations (Emondson & Harvey, 2018).

2.4.4 Relation between boundary types and activities

Table 3 shows the relation between the syntactic, semantic, and pragmatic boundary types, and three boundary spanning activities classified as information transfer, translation, and transformation (Carlile, 2004; Maaninen-Olsson et al., 2008). The information transfer and translation activities have been used to adjust the framework by Ancona & Caldwell (1992) to a present day, inter-organisational environment. They thus hold the same meaning as the information transferring and translating activities described in this framework. Transformation activities are understood as evolving interests and knowledge through interaction, where groups gradually move towards or perceive shared interests (Maaninen-Olsson et al., 2008). This bears similarity to the underlying idea of co-creating, where the demarcation was instead limited to research by design for the practical feasibility of research. Unfortunately, coordinating, lubricating, representing, and guarding have not interacted with boundary type literature. While boundary type literature places its boundary objects and boundary spanning activities in a structured context using boundary types, they also limit the

purpose of cross-boundary interactions to information processing and knowledge sharing (Arena et al., 2017). Interprofessional practice itself shows that cross-boundary interactions can go beyond such knowledge transfers, causing boundary type literature to be unable to recognise and describe stakeholder interactions (Jakobsen & Filstad, 2020). Therefore, the interaction between boundary types and a wide range of boundary spanning activities in this thesis may result in an enhanced understanding of interactions across boundary types.

Types	Information transfer	Translation	Transformation
Pragmatic	×	×	×
Semantic	×	×	
Syntactic	×		

Table 3: Requirements to cross boundary types (by author, based on Carlile, 2004)

2.5 Project life cycle

This research aims to understand the effects of boundary spanning activities during the planning phase of the IRBM projects. For this, the phases of a project need to be defined. There are many versions of the project life-cycle model (Turner, 2007), but the one utilised divides projects into four main phases: *initiation*, *planning*, *execution*, and *closure*. Within this view the project concludes when the endresult is delivered to the client, thus excluding the operation and management of the project. Figure 2 below shows the phases sequentially.

The planning phase is chosen as the object of study because it contains a wide range of stakeholders and organisations engaged in interactive processes (Turner, 2007; Watt, 2014). This gives the opportunity to study a wide range of inter-organisational relations and boundary spanning activities. It is deemed a more suitable choice over the initiation, execution, and closure phases because they have a comparatively lower number of organisations involved, contain predominantly intra-organisational discussion, occurred over a decade ago, or have not happened yet. (AG Vespa, 2020a; 2020b; 2020c; 2020d; 2020e; 2020f; 2020; 2020h; RSV, 2020)

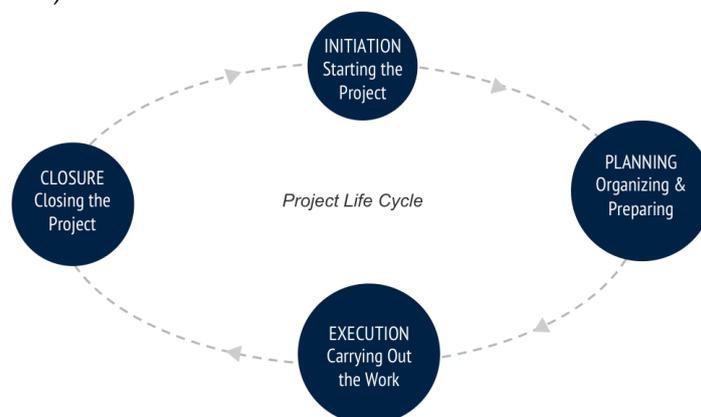


Figure 2: Project Life Cycle (Mavenlink, 2020)

A project's life starts with the *initiation* (also referred to as the conceptualisation or definition phase) phase. Within this phase, there is a focus on defining the mission of the project, as well as its necessity, relevance, and criteria for success (Turner, 2007; Watt, 2014).

The initiation is followed by the *planning phase*, which is the focal point of this research. It should not be confused with planning and/or design processes; although these are a part of the planning phase, they are continuous processes that can be re-considered in later phases. During the planning phase, scope management, resource management, and risk management are critical (Turner, 2007; Watt, 2014). The general objectives defined during initiation are developed in greater detail during *scope management*, by identifying specific interventions, tasks to complete, and sequencing the required these tasks (Turner, 2007). *Resource management* is achieved through budgeting resources and determining quality standards. Lastly, *risk management* concerns itself with threats in the project environment. An attempt is made to reduce the probability and/or the impact of known threats, through stakeholder identification and communication (Watt, 2014).

When a project is sufficiently planned to start development, it enters the *execution* phase. At this point control has to be exerted over the multiple simultaneous physical and non-physical processes that lead to a satisfactory realization of the project plan (Watt, 2014). The final phase in the project life-cycle is the *closure* phase. The project outcome is presented to the client and stakeholders, and intra-organisational documentation has to be readied. These include the release of project resources, but also a reflection on learned lessons that can be transmitted within the organisation (Turner, 2007; Watt, 2014).

2.6 Conceptual model

Concluding the theoretical section, it is believed boundary spanning activities can contribute to overcoming barriers to the integration of objectives faced in IRBM projects. To further the understanding of boundary spanning activities, this thesis aims to find how they are used to facilitate this integration.

Based on the theoretical groundwork laid out, the main question is demarcated to the planning phase and split into two components. First, the relations to which boundary spanning activities are applied. The actors that will be observed are organisations, and the relations between are conceptualised as syntactic, semantic, and pragmatic boundaries (Carlile, 2004). Second, the boundary spanning activities are separated into 7 activities: information transferring, translating, coordinating, co-creating, lubricating, representing, and guarding.

The conceptual model illustrates how the titular boundary spanning process is understood to work (*Figure 3*). Boundary spanning activities are applied to span the boundary between two organisations, and the type of boundary influences the outcome of these activities. Based on

the type of activity and boundary, integration may be positively or negatively impacted, and other boundary spanning activities can be influenced (interrelations).

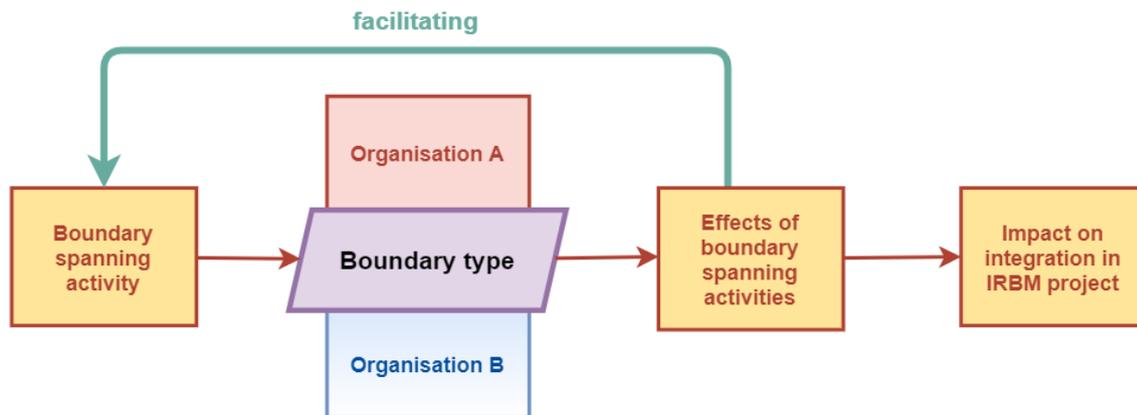


Figure 3: Author's visualisation of the conceptual model

The model will be harkened back to in the next chapters. The methodology section relates the findings from different methods to the relations depicted in the model. The result and discussion section will also follow the structure of the model. In these sections, boundary spanning activities, boundary types, effects, and interrelations are kept together because they are important to the story of this thesis. The result section will therefore be divided into themes that show interrelated boundaries and boundary spanning activities, before linking the effects and impacts to the boundary types and activities using figures nascent of the conceptual model to clarify the arguments.

3. Methodology

3.1 Research Design

In order to identify how boundary spanning activities influenced integration in IRBM, two broad categories of research design were first considered: an *extensive* and *intensive* research design (Clifford et al., 2014). An *extensive research design* would have been suited to statistical testing of the aforementioned relation, with the analysis of quantitative data (McGreggor, 2018). Previous quantitative research illuminated a relation between the usage of boundary spanning activities in different phases and successfully achieving project objectives (Van Osch et al., 2017). However, quantitative methods were not suitable to describe *how* this relation works. Additionally, to the best knowledge of the author there was no research available on the relationship between boundary spanning activities and successful achievement of the integration objective in IRBM. Thus, there was no theoretical groundwork on which to base a quantitative study of this phenomenon. This thesis research also aimed to tackle a ‘how-question’, for which an *intensive research design* fitted best, because it allowed for a range of perspectives describing the relationship between boundary spanning activities and the integration objective (Clifford et al., 2014; McGregor, 2018).

Within qualitative research, five main approaches were compared for operationalisation in this thesis, resulting in the choice to explore the central question through a multiple-case, case study research. Based on the goal of this thesis, ethnography, grounded theory, phenomenology, and narrative research could be excluded, while case study research offered a suitable depth and research focus (Creswell & Poth, 2017). Case studies can be defined as “an empirical method that investigates a contemporary phenomenon (the “case”) in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident” (Yin 2018, p. 50).

There were several reasons for the usage of case study methodology. First, case studies allowed for the identification of sequences of events and their effects. Here, an increased capability to achieve integration in IRBM was explored as an outcome of boundary spanning activities during the planning phase. Case studies allowed a range of perspectives from different stakeholders on the relationship, which was important to sufficiently describe boundary spanning activities and their impacts (Mills et al., 2010; Flyvbjerg, 2011). Secondly, the importance of contextual conditions on the success of boundary spanning activities has been established as an important topic. Case study methodology allowed for a high degree awareness to these contextual conditions (Taylor, 2014; Yin, 2018). Examples of contextual conditions in boundary spanning are existing stakeholder relations, the presence facilitating conditions, and the personality traits and abilities of boundary spanners. Due to the vastness of contextual conditions, not all could be researched within the scope of this thesis. Therefore, the focus was placed on the relation between organisations characterised as *boundary types*.

While a case study could include any number of cases, this thesis research explored the planning phase with two typical cases. The choice between a single case study design and a multiple case study design was made based on an assessment of the benefits. Single cases required lower time-investment and costs, allowing for greater depth. However, the *multiple-case design* was chosen because it allowed for a convergence of findings and a better answer to generalisability criticisms (Gustafsson, 2017). The convergence of findings was employed by first reviewing results within cases and then comparing between cases. An additional degree of validity was gained because the cases were chosen based on a theoretical foundation that invites different outcomes (Gustafsson, 2017). Here, an urban-rural distinction served as the theoretical foundation for case selection. The cases' presumed difference in the number of stakeholders and views (OECD, 2019) was understood to lead to more difficult integration in urban projects, and relatively less difficult integration in rural projects (De Roo & Silva, 2010). Lastly, it allowed for a stronger response to the common criticisms that case studies suffer from limited generalisability (Flyvbjerg, 2006; Taylor, 2014). Using multiple cases increased validity for theory-building, as it grounded discussion in multiple distinct empirical observations (Gustafsson, 2017).

Through these choices, summarised in *Table 4*, this thesis was believed to create sufficient external validity to extrapolate the following findings:

- (1) The link between boundary spanning activities, the boundary types they were applied to, and their impacts could be extrapolated to the planning phase of other IRBM projects.
- (2) Determine that the application of a granular view on boundary spanning activities can enhance our understanding of their interrelations and effectiveness.

Section	Method choice	Details
3.1: <i>Research design</i>	Intensive Qualitative Case study	Multiple-case, case study as a research design, with a case selection based on a rural-urban distinction
3.2: <i>Case study selection</i>	Sigmaplan	Belgian IRBM programme
	Droogdokkeneiland	Urban - Antwerpse Scheldekaaien, <i>Planning phase 2010-2016</i>
	Beneden-Nete	Rural – Grote en Kleine Nete <i>Planning phase 2011-2018</i>
3.3: <i>Data collection framework</i>	Interviews	In-depth and targeted
	Documents	Broad, available, stable, unobtrusive, exact, and efficient
3.4: <i>Data analysis</i>	Document analysis	Skimming, reading, and interpreting
	Coding	Interviews and documents in ATLAS.ti v8

Table 4: Summary of research approach

3.2. Case Selection and Demarcation

3.2.1 Case Context: Sigmoplan

This case study research focussed on Sigmoplan, a Belgian river management programme that started in 1977 with the ambition of increasing flood safety near the river Scheldt. The Scheldt starts in France, crosses through Belgium, and flows into the North Sea through the Netherlands. As such, it was divided into several areas based on geographical and political boundaries. Sigmoplan focussed on the *Sea Scheldt*, the Belgian part of the Scheldt under tidal influence, following a flood on the 3rd of January 1976 that increased awareness about the increasing tidal range of the river Scheldt (Meire & Maris, 2008). This was substantiated by measurements ranging from 1901 till 2010 showing consecutive rise in tidal range each decade (Figure 4). In the latest measurement, ranging from 2000-2010, the average tidal range in the Sea Scheldt was almost 5.5 meters at its peak between Antwerp and Tielrode, compared to 4.2 meters a century before (Kuijper, 2013).

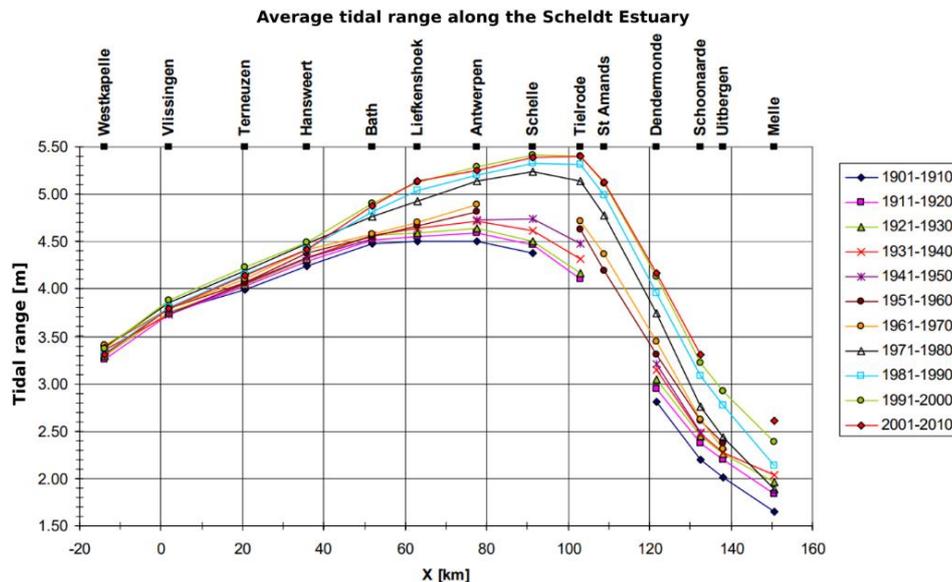


Figure 4: Tidal range development in Scheldt estuary 1901-2010 (Kuijper, 2013)

At its inception, Sigmoplan aimed solely to protect residents from storm surges resulting from tidal influences (European Environmental Agency, 2016), by achieving uniform safety standards through heightening and reinforcing dikes (Maeghe, 2001). However, the safety standards determined at the time proved to be insufficient in the early 2000s due to an underestimation of the rate of climate change progression (De Preter, 2016). This realisation coincided with criticisms that the approach to Sigmoplan was *sectoral*; it considered neither the interrelatedness of issues nor the practical complexities of river management, leading to a shift towards an integrative approach. In the context of IRBM, this form of integration fits in the category: alignment and balancing of multiple objectives and functions (Rijke et al., 2012). Furthermore, considering long-term perspective and its delineation to the Sea Scheldt basin, an integration of spatial and temporal scales can also be found in the programme.

The integrative approach was formalised in 2005 with a rebranding of Sigmaplan as the Actualised Sigmaplan (Meire & Maris, 2008). Henceforth, Sigmaplan would, barring other objectives stemming from stakeholders, integrate a minimum of three core objectives (Maris et al., 2014):

- (1) *Safety*: Protecting people and companies from the Scheldt (Sigmaplan, 2020a)
- (2) *Nature*: The restoration of the Scheldt ecosystem with a focus on wetlands and tidal nature, but also the possibility of local-specific measures (Sigmaplan, 2020b).
- (3) *Accessibility*: This includes not only the connection of people to the river, characterised as recreation (Sigmaplan, 2020c), but also the economic role of Scheldt. The economic focus allows development that respects local economies, navigability, and agriculture (Sigmaplan, 2020d).

After the actualisation, a series of projects were started in the ensuing years. This included previously completed projects that became insufficient following reassessment of the safety standard (De Preter, 2016). Previously, projects were conducted primarily by engineers from Vlaamse Waterweg, whereas going forward there was a need to cooperate between organisations with to satisfy all objectives. *Figure 5* shows the scope of the actualised Sigmaplan, as well as the status of its current projects.

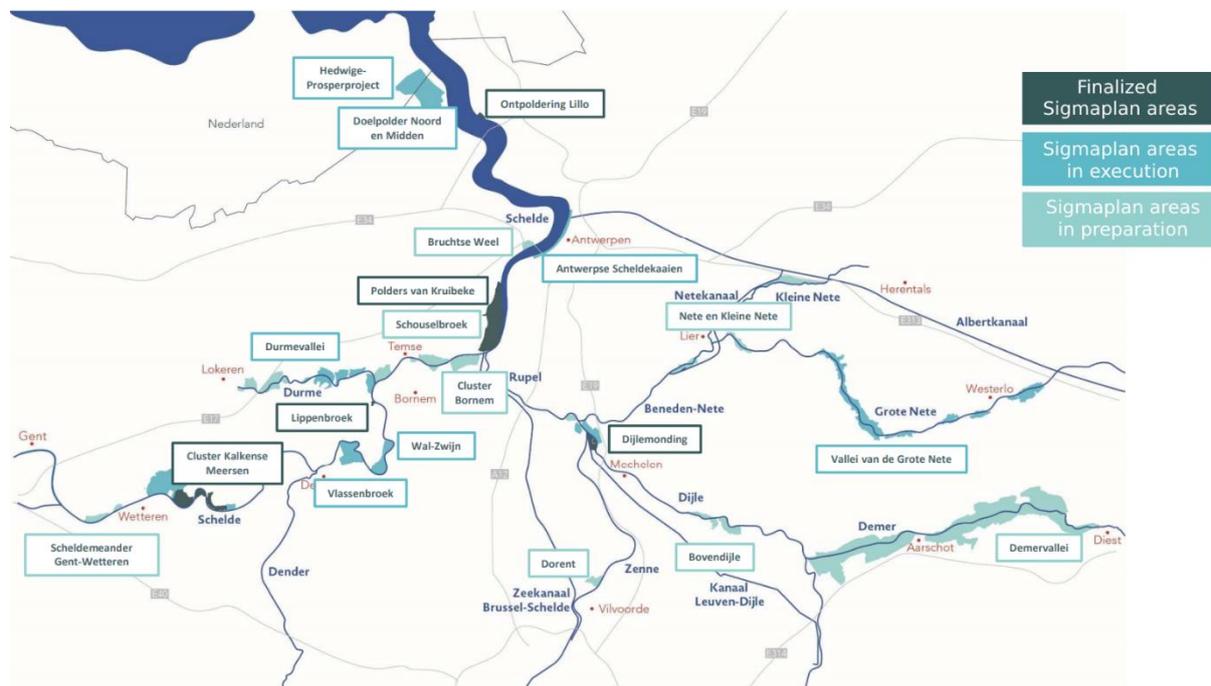


Figure 5: Overview of projects within the actualised Sigmaplan (Dauwe & De Preter, 2021)

3.2.2 Case Selection within Sigmoplan

The case selection focussed on the projects started after 2005, resulting in two cases: 'Antwerpse Scheldekaaien' and 'Grote en Kleine Nete', selected based on theoretical differences and practicalities. First, a theoretical urban-rural distinction safeguarded the benefits of cross-case comparison (Gustafsson, 2017), because it was expected that the difficulty of integration differed between a rural and urban project. Generally, rural projects showed lower numbers of stakeholders and perspectives (OECD, 2019), resulting in a lower degree of complexity (De Roo & Silva, 2010). Hence, a rural case could be presupposed to require less effort to integrate objectives and harmonise visions, compared to an urban case (Slocum & Kline, 2017). Additionally, while exploring the cases a difference in defined objectives became clear. Antwerpse Scheldekaaien aimed to integrate flood safety with the redevelopment of public domain, which allowed for residential, heritage, commercial, industrial, and touristic perspectives (AG Stadsplanning & W&Z, 2011; Sigmoplan, 2020e). On the other hand, Grote en Kleine Nete aimed to integrate nature objectives with flood safety (Sigmoplan, 2020f). Between these cases, this could indicate differing applications of boundary spanning activities due to both dissimilar objectives and complexity, increasing generalisability by accounting for both ends of the theoretical urban-rural division.

Secondly, the choice for these cases was also based on practicalities. While Sigmoplan had successfully completed a multitude of projects since 1977, it did not become an IRBM programme till 2005. The cases could thus be limited to projects that started after 2005 and have finished their planning phase. Under these conditions, Antwerpse Scheldekaaien and Grote en Kleine Nete appeared the most suitable cases, because they showed a strong distinction of a highly urbanised area and a rural area. Furthermore, both cases accrued attention and sought stakeholder interaction during their process, thus showing a commitment to utilising boundary spanning to integrate objectives (Lombaerde, 2011; Opvolgingscommissie, 2015; Sigmoplan, 2012; Vlaams Bouwmeester, 2010; n.d.).

When Antwerpse Scheldekaaien and Grote en Kleine Nete were selected it became apparent these were not an appropriate unit of research. This was because they were large projects that consisted of a total of ten zones. Each of these zones were demarcated during the initiation phase, and then planned and designed separately under a common framework of guiding principles (AG Vespa, 2010). Since each subproject had its own process and stakeholders they were chosen as the appropriate unit of analysis.

Figures 6a and 6b show the timeline followed for subprojects in the Antwerpse Scheldekaaien and Grote and Kleine Nete, respectively. For the former, it was decided to focus on *Droogdokkenpark*, because this was the project that most recently exited the planning phase (AG Vespa, 2020c). For the latter, only *Beneden Nete* had finished its planning phase during

the case selection period in the summer of 2020 (RSV, 2020). The subprojects will be further described in *Section 4.1.1 The Droogdokkenpark Project* and *Section 4.2.1 The Beneden Nete Project*.

PROJECTS	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
DROOGDOKKEN	Initiation				Planning						Execution			
Kattendijk & Rijsluizen	Initiation										Planning			
Bonapartedok & Loodswezen	Initiation										Planning			
Schipperskwatier & Centrum	Initiation										Planning			
St. Andries & Zuid	Initiation				Planning						Execution			
Nieuw Zuid	Initiation										Planning			
Blue Gate Antwerp	Initiation													

Figure 6a: Time planning of subprojects in Antwerpse Scheldekaaien (by author, based on AG Vespa, 2020a; 2020b; 2020c; 2020d; 2020e; 2020f; 2020g; 2020h)

PROJECTS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Varenheuvel-Abroek	Initiation				Planning										
Mondingsgebied Grote Nete							Initiation		Planning						
BENEDEN-NETE IN LIER	Initiation				Planning						Execution				

Figure 6b: Time planning of subprojects in Grote en Kleine Nete (by author, based on RSV, 2020)

3.3 Data Collection Framework

Yin (2018) described six common methods of data collection in case study research. These are documents, interviews, direct observations, participant-observations, physical artifacts, and archival records. From these six methods, four were not used. This included both types of observation, which could not be used because the cases' planning phases were already finished. Physical artifacts were also not used, because non-physical evidence (e.g., opinions and experiences) was necessary to investigate the relations between stakeholders and the impacts of boundary spanning activities. Lastly, precedent in research showed archival records were more suited to pursue quantitative estimations such as costs or time impacts, which was not necessary to answer the research question.

Following the comparison, two case study research methods were utilised: interviews and documentary research.. They were chosen because they are feasible and useful within the scope of this research, and capable of minimizing each other's weaknesses. This practice of using different data collection methods is *method triangulation*, a process that strengthened construct validity by allowing discovery of converging evidence from multiple methods (Yin, 2018). It also decreased the influence of the researchers' biases on the results (Bowen, 2009). The steps taken in the collection process were visualised in *Figure 7* below, and the strengths and weaknesses of both methods, as well as their intersection, were detailed in *Appendix 1*.

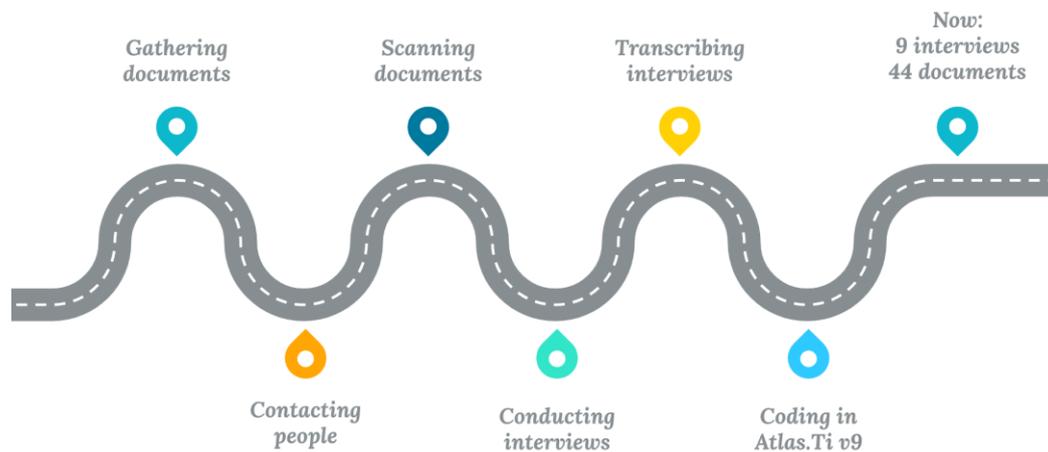


Figure 7: Data collection and analysis process

3.3.1 Semi-structured interviews

One of the data collection methods applied in this study were semi-structured interviews. Interviews were established as one of the most important methods in case studies that attempt to answer a how-question or why-question, because they can establish explanations concerning the influence of key events, as well as subjective perceptions on the influence of key events (Yin, 2018). The method was considered a great fit for this thesis research because it aims to answer a how-question that links key events to an outcome. Interview data does not only stem from the spoken word, and non-verbal requirements also yield helpful insights in analysing the data. Therefore, all interviews were transcribed at the earliest convenience to retain as much non-verbal information as possible. An additional benefit of interviews is that they allow targeted inquiry, delivering precisely the information needed to answer the research questions (Yin, 2018).

Nine interviews were held from 13th October 2020 till 4th November 2020 (Table 5). The interviewees were selected based on the organisation they were affiliated with and their position therein. For the purpose of this thesis, organisations were sought out that represented key interests, performed an important function, or acted as a mediator within the cases. These persons were identified through news articles, contact pages, and documents such as process descriptions and meeting minutes, culminating in an extensive list of individuals. The first interviews per case were then held with people in central positions within the organisations responsible for coordinating their respective projects. This allowed for a calculated selection of further interviewees through snowballing, by asking the respective project managers who should be contacted next while cross-examining it with the prospective candidate list prepared beforehand.

All methods have shortcomings, and through understanding them their impact can be reduced. Appendix 1 summarises how method triangulation with documentary research reduced the four key weaknesses of interviews: (1) external factors can influence responses,

(2) the researcher can influence responses, (3) questions may be misinterpreted, and (4) recollections of events may be skewed or insufficient (Yin, 2018). Method triangulation was applied to overcome two of these weaknesses. First, while interviews were understood to have an issue of reflexivity, where the interviewer can influence the results, document analysis is unobtrusive. Project documents were written without intervention of the researcher and for different purposes and could therefore be cross-examined with interviews to detect reflexivity issues. Secondly, *recollection* of events may be distorted, but documents were stable and can be accessed to review factual information. They were helpful in clarifying for instance names, dates, and details surrounding events (Bowen, 2009). However, two weaknesses remained. Both misunderstandings and response bias stem from the disconnect between interviewers and the self-reporting interviewee. To minimize the influence these weaknesses had on the data collection procedure, interviews were transcribed interviews before conducting further interviews wherever possible. This created an opportunity to review questions, answers, and make choices concerning the effectiveness of questions' phrasings; this helped reduce bias and establish better communication.

Case	Organisation	Role	Date	Meeting platform	Time
DD	Institute for Nature and Forest Research (INBO)	Senior Researcher	13 th Oct 2020	Google Meet	13:00–13:34
DD	AG Stadsplanning	Project Manager	13 th Oct 2020	Google Meet	20:30–21:28
DD	Vogt Landscape Ltd.	Head of London Office	16 th Oct 2020	Zoom	17:27–17:58
DD	Stedelijk Wijkoverleg	Communication Coordinator	23 rd Oct 2020	Google Meet	14:00–14:35
BN	Vlaamse Waterweg (VW)	Engineer & Project Manager	27 th Oct 2020	Skype	10:00–10:59
BN	Vlaamse Landmaatschappij (VLM)	Grondenbank Manager	29 th Oct 2020	Google Meet	13:30–14:00
BN	Province Antwerp	Process Management Team	30 th Oct 2020	Google Meet	11:45–12:19
DD	AG Stadsplanning	Programme Manager	30 th Oct 2020	Google Meet	14:11–14:57
BN	Agency for Nature and Forestry (ANB)	Project Manager	4 th Nov 2020	Google Meet	15:10–15:46

Table 5: Key information of interviews conducted (DD: Droogdokkenpark; BN: Beneden-Nete)

3.3.2 Documentary research

The second method of data collection utilised was documentary research; the systematic procedure of reviewing or evaluating documents, in order to extract meaning, gain understanding, and develop new knowledge (Bowen, 2009). The definition of a document had been altered over the decades, but in its most basic description documents were understood

to be “a record of an event or process” (McCulloch, 2011, p. 249, in Tight, 2019, p. 9). Commonly used documents could be personal messages, reports and announcements of events, internal and public documentation, formal studies, and news articles (Yin, 2018), but it also included oral statements and visual materials that can be presented as evidence (Tight, 2019).

The documents collected were predominantly official government reports, either downloaded from the government website, public databases, or specifically requested from organisations. Supplementary documents were reports and presentations published by other organisations or private individuals also associated with the cases. The documents catalogued in *Appendices 2 and 3* were selected because they met one or more of the following criteria:

- (1) They described the interactions, coordination strategies, or specific agreements.
- (2) They contained factual information that could be used to prepare for interviews, corroborate events, or provide insight into (end) results of processes.
- (3) They were suggested during interviews or electronic communication exchanges with representatives of involved organisations.
- (4) They were considered a boundary spanning activity (e.g., information transferring) or directly described a (potential) boundary spanning process.

Applying *documentary analysis* in this manner yielded various benefits (*Appendix 1*). A large variety of documents have been made available for public domain and were unaltered since their publication, providing a precise and stable recollection of events that serves as data that can be accessed unobtrusively (*Appendices 2 & 3*). Furthermore, through documentary research a broad range of data was covered through skimming, providing the researcher with an efficient method of data collection (Bowen, 2009; Yin, 2018).

The application of documentary analysis installed five weaknesses into the data collection process, four of which were reduced through method triangulation. Documents could have been hard to retrieve, and access to necessary data could be withheld. Interviews helped create personal connection with people who were involved in the planning process, allowing for new opportunities to discover and access documents. Another issue that arose was that *reporting bias* should be expected in a document. It could have been presented from a viewpoint that was not supported by everyone involved, and cross-comparison with interviews could help uncover such biases. The fourth weakness was that details presented in the document may be *insufficient* for the purpose of the research project, as it was not created for this purpose. However, interviews provided an opportunity to fill data gaps. Finally, *biased selectivity* could be present in the document selection, meaning that the documents available intentionally provided distorted information (Bowen, 2009; Yin, 2018).

3.4 Method of Analysis

Analysis is a way to make sense of situations and phenomena by taking them apart, trying to understand it, and giving meaning to it within a framework used to understand the world (Taylor, 2014). Within this thesis research, two methods of data collection yielded data for the analysis.

Interview data has been analysed through interpretation, assisted by qualitative data analysis software. In order to minimize bias in interpreting interviews, these deductive codes were created based on the theoretical framework and applied in ATLAS.ti v9. (Frey, 2018) Furthermore, based on themes in the documents and interpretation of the interviews, inductive codes for effects and results have been added based on the documentary analysis and interview findings. A full list of the codes applied can be found in *Appendix 4*.

Interviews proved useful in providing and supplementing data for several aspects of the conceptual model (see *Figure 3*). Firstly, they helped confirm boundary spanning activities involved, their types, and the presence of organisations found in documents. They also helped expand upon each of these by identifying (un)successful activities and providing first-hand accounts of events and subjective perceptions. Secondly, the interviews provided a deeper insight into how boundary spanning activities were performed across inter-organisational relations, resulting in a better overview of their effects. Lastly, the interviews provided a comprehensive understanding into whether or not the effects were perceived to create and/or enable *integration* and demonstrated of how this integration did (not) occur.

Documentary analysis was performed through a procedure executed in three steps. *Superficial examination* of the data was used to find the range of topics covered in a document, then *thorough examination* was applied to understand the topic and place it in its context, after which the data could be *interpreted* and *coded* using the same scheme as the interviews in ATLAS.ti v9 (Bowen, 2009; Frey, 2018).

Documentary analysis was firstly used as preparation and corroboration for the interviews, as they allowed for a preliminary identification of the organisations involved and initial ideas of which boundary types, boundary spanning activities, and effects could be found; these could then be discussed and/or expanded upon during the interviews. Secondly, the documents provided an additional insight into (potential) effects of boundary spanning and practical examples thereof, which were also discussed during the interviews. Finally, the use of documents also allowed for a confirmation of integration. It could thus be established if certain objectives or goals that were included through boundary spanning, did in fact make their way into planning and design outputs.

Interpreting documents was important to the results, however the weaknesses of documents as a source requires transparency (Bowen, 2009; Tight, 2019). Therefore, on top of accounting for the reasons the documents were chosen in *Section 3.3.2*, metadata of the documents is

transparently included in the overview in *Appendices 2 & 3*. This covers the publication date, in-text reference or publisher, retrieval data, the title of the document, and where possible an access link.

3.5 Ethical considerations

First and foremost, in my conduct I observed the principles for ethical research laid out by the in the Dutch Code of Conduct for Research Integrity, and its principles of honesty, scrupulousness, transparency, independence, and responsibility, are applied throughout this thesis research (NWO, 2018). Additionally, due to the interview-based nature of the methodology, specific attention has been paid to the Dutch *National Code of Ethics for Research in the Social and Behavioural Sciences involving Human Participants* (National Ethics Council for Social and Behavioural Sciences, 2018). This code draws attention to the ethical considerations regarding informed consent, data protection, privacy, and harm minimization. For each of these topics *Appendix 5* details choices made in this research that were derived from Hammersly (2018), Hay (2014), and Gulbriun et al. (2012). Furthermore, *Appendix 5* also included a reflection on the data collection in light of the COVID-19 pandemic, as was recommended for researchers by the WHO (2020).

4. Results

Following the outlined methodology, a series of raw data was first collected. In analysing the results, a variety of themes emerged naturally. These themes were clustered based on the purpose of the boundary spanning activities, each of them comprising of a set of actors with their own unique interrelations

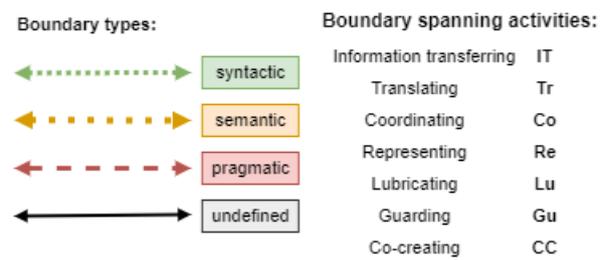


Figure 8: Legend to figures in the results section

that were largely independent of the other themes (Table 6). This mirrored the execution of inter-organisational relations, as the themes below were carried out by separate working groups that contain stakeholders from multiple organisations (Bogaert et al. 2012; Tractebel Engie, 2016). For example, in Droogdokkenpark the stakeholder relations (and many of the stakeholders) involved in public consultation did not exist in extra-project coordination. Consequently, the boundary spanning activities across two themes did not interact, meaning that the representation of boundary spanning activities in themes is tantamount to clusters of activities. Describing the activities within their cluster highlighted their relevant interrelations.

The results were presented in three sections. The first two sections focused respectively on the Droogdokkenpark and Beneden-Nete case, starting with the background of the case, then a description of case itself, followed by the activities described in their relevant themes. The data was supported using figures, for which a legend is shown in Figure 8. Each of the cases also had a distinct set of organisations involved in the planning phase. Appendices 7 & 8 contain a detailed account of these organisations' background and roles. The third section instead draws the boundary spanning activities from the first two sections together. Focussing on displaying the relation between boundary spanning activities and boundary types, and their observed effectiveness and outcomes across the cases.

Theme	Cases	Purpose of the boundary spanning activity
<i>Intra-project coordination</i>	DD BN	Influencing day-to-day operations, timeline management, budget, and the project objectives outcomes
<i>Extra-project coordination</i>	DD BN	Spanning boundaries between organisations inside and outside of the project area.
<i>Design</i>	DD	Improving the quality of the design; facilitating the inclusion of objectives through design
<i>Agriculture</i>	BN	Facilitating the integration of land consolidation; facilitating the integration of agricultural objectives into project objectives
<i>Public consultation</i>	DD BN	Managing the relations, collaboration, and information flow between citizens and organisations
<i>Nature</i>	BN	Maintaining, expanding, and/or improving the nature objectives and their integration in the projects

Table 6: Description of themes in results (DD: Droogdokkenpark; BN: Beneden-Nete)

4.1 Case 1: Droogdokkenpark

4.1.1 The Droogdokkenpark Project

The first of the two cases that were researched is *Droogdokkenpark*. The area was located in the city of Antwerp along the river Scheldt. It formed the northern end of an elongated zone that spanned a length of over five kilometres called the Scheldt Quays. The area had a rich history tied to the early growth and development of harbour activities in the city of Antwerp. During the 19th Century, increasing maritime activity led to demand for a more efficient shipping route and a larger harbour. This created need for a large-scale river straightening project, through which the Scheldt was extended to a width of 350m on top of which an additional area of 100m inland from the Scheldt was cleared. Over time, the growth of maritime traffic caused a northwards expansion of the harbour away from the city. These developments created a rift between the river Scheldt and the social cohesion within the city that left the Scheldt quay area derelict (AG Stadsplanning & W&Z, 2010). Besides the abandonment of the area, 19th Century engineers made miscalculations while developing the Scheldt Quays, causing deterioration of the structural integrity of the Scheldt quay area (Sigmaphan, 2017).



Figure 9: Project zones in Antwerpse Scheldekaaien Programme, with Droogdokkeneiland marked in red on the left (AG Stadsplanning & W&Z, 2010)

The programme *Antwerpse Scheldekaaien* or *The Scheldt Quays in Antwerp* (Figure 9) tied together Sigmaphan objectives with the aforementioned issues. It aimed to stabilise the quay wall, heighten it to 9.25m TAW¹ in accordance with the safety objective, and redevelop the quay area into prominent public space it once was (AG Stadsplanning & W&Z, 2010; AG Vespa, 2020f). During the initiation phase, the project partners Vlaamse Waterweg (Formerly W&Z) and AG Vespa (formerly AG Stadsplanning), used thematic studies to establish their respective roles, objectives, and interests, culminating in an organisational agreement (Stuurgroep Scheldekaaien, 2010). They also hired PROAP-WIT Architects to create a conceptual design of the area using intensive public engagement, in order to create guiding principles for the development of the area. This masterplan, titled '*Between City and River*',

¹ The Belgian datum level (TAW) equals the mean lower low water (MLLW) at Ostend.
So, 9.25m TAW is 9.25m above the MLLW at Ostend.

created six guiding principles (*Appendix 6*) and led to the division of the programme into the seven projects, which are indicated with separate colours in *Figure 9*.

One of the seven zones was Droogdokkenpark, indicated with red in the far right of *Figure 9*. It is a 14.6-hectare former harbour area on the northern end of the Scheldt quays, situated between two sluices (Kattendijksluis and Royerssluis) that connect the Scheldt with the harbour. This derelict zone was re-envisioned to become an urban river park due to its unique position in the bend of the Scheldt, providing a panoramic view of the city, river, and landscape (AG Stadsplanning & W&Z, 2010). An overview of organisations involved in the project can be found in *Appendix 7*.

The Droogdokkenpark projects' planning phase directly followed the masterplan created during initiation phase, and started with a design competition won by Van Belle & Medina and Vogt Landscape (Vlaams Bouwmeester 2010). They were chosen because their concept showed great respect to the existing qualities of the area, by intertwining Droogdokkenpark with its existing natural characteristics and cultural history (Vlaams Bouwmeester 2011a; 2011b).

The design team then created a preliminary design with ecological input from the institute for Nature and Forestry research (INBO) (Van Ryckegem, 2012a; 2012b), managing to integrate Droogdokkenpark with its estuarine nature and surrounding projects. This was followed by an environmental impact screening by Antea (2012), who concluded that the projects' impacts were negligible, and that there were no knowledge gaps in the themes of soil, water, flora, fauna, landscape, architectural heritage, archaeology, and the human dimension. An exemption for the environmental impact reporting procedure was therefore given.

In the year 2013, the zoning plan for the newly designed Droogdokkenpark was put forth for consideration. However, the project was instead shelved indefinitely after a mayoral change following the 2012 municipal elections. Patrick Janssens of the social-democratic party (SP.A), who had started the Antwerpse Scheldekaaien programme, was replaced

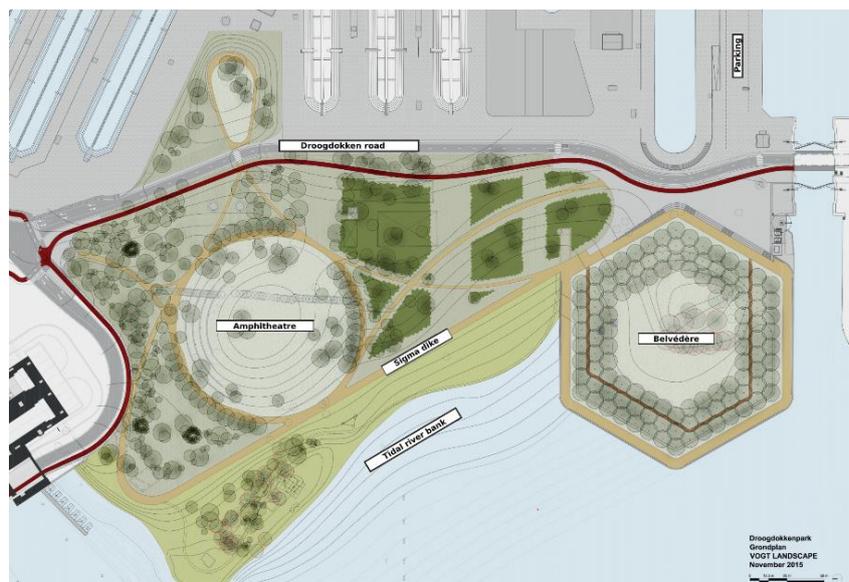


Figure 10: Droogdokkenpark project (Adapted from Vogt Landscape, 2015)

by nationalist-conservative (N-VA) Bart de Wever. The shift in political climate reduced the urgency of the Antwerpse Scheldekaaien and saw its budget reallocated. During the following

three years, the project team secured a new budget, albeit lower than hoped for, to continue planning Droogdokkenpark and create the design shown in Figure 10. The zoning plan for this design was created by Sweco and accepted in 2017, starting the execution phase.

4.1.2 Boundary types and activities

Design

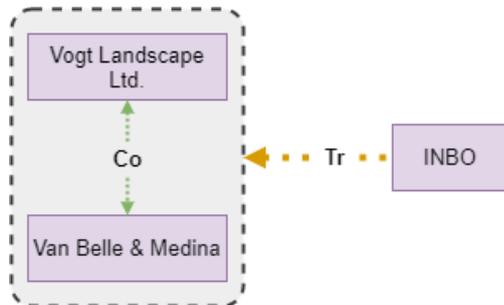


Figure 11: Design relations

The first thematic relation pertained to the *design* process (Figure 11). During the planning phase a design competition was organised, for which Van Belle & Medina, a local architecture firm, approached Vogt Landscape and proposed to form a team. On a design level, the organisations understood each other well, indicative of a *syntactic* boundary. Consequently, they coordinated the

design together from the initial proposal till the final result. This boundary was promptly spanned through *negotiating* and *coordinating* the division of labour; Vogt Landscape was designated to work on the park and its landscape integration, while Van Belle & Medina created, redesigned, and repurposed buildings. Van Belle & Medina's familiarity with the project area and its contribution to integrating local knowledge into the result was evidently noticed by other professional stakeholders.

"The proposal by Van Belle & Medina and Vogt departs from a great respect for the existing quality of the place, and also maintains the existing character of the site."

—Vlaams Bouwmeester (2011b, p.5, translated by author)

This integration of local knowledge was achieved by prominently displaying the cultural history of the city through architectural elements. They also created new values that tie into current demand, namely: the creation of a hospitality industry, a museum, and a youth centre (AG Stadsplanning, 2012). The combined vision of the team was one that integrated nature, an urban park, and the cultural heritage of the city (Vlaams Bouwmeester, 2011b).

A flaw in the selection of the design team was noted later by Vlaamse Waterweg – development of nature is one of the three objectives of the actualised Sigmaphan, but Droogdokkenpark did not require ecological expertise in its design contest (Vlaams Bouwmeester, 2010), jury report (Vlaams Bouwmeester, 2011a), or final decision (Vlaams Bouwmeester, 2011b). Furthermore, the ecological value of Droogdokkenpark was scarcely mentioned in the project definition (AG Stadsplanning & W&Z, 2011). Therefore, Vlaamse Waterweg contracted the Institute for Nature and Forestry Research (INBO) to advise the design team regarding options to increase the ecological value of Droogdokkenpark.

The information was initially supposed to be communicated through *information transferring*, but there were *semantic* boundaries between the perspectives of the design team and the ecological researchers. The primary difference being their views on how to realize nature. From an ecological perspective it was interesting to develop indigenous nature, and let natural succession take its course, in contrast, the design team envisioned planting a combination of indigenous and exotic nature. Another issue was a *knowledge gap* in the design team, wherein they did not fully understand the components and impacts of an estuarine ecosystem with a high tidal range. Across multiple meetings, the senior researcher from INBO used *translating* as a boundary spanning activity to explain their ecological perspective and the characteristics of an estuarine ecosystem. Translating firstly helped integrate the ecological perspective into the plan, which can be found through an increased natural succession and the choices to plant indigenous species. The activity also improved the design teams' understanding of estuarine areas and the tidal ranges. Notable resultant changes were the removal of walking routes and pavement areas that fall within the tidal range because this increased safety and operation costs, and also the land-inwards movement of the Sigma dike in order to compensate nature loss from the creation of the Belvédère.

Intra-project coordination

The entirety of the Antwerpse Scheldekaaien process was conducted as a collaboration between AG Vespa and Vlaamse Waterweg. AG Vespa aimed to create public space that provided accessibility to river, and Vlaamse Waterweg aimed to achieve the Sigmaplan objectives. During the initiation phase, they worked with PROAP-WIT Architects, who identified guiding principles for the process, as well as numerous unnamed independent advisors that conducted investigations into relevant themes. While originally diametrically opposed on thematic issues such as the financial exploitation of the quay area and usage of mobile flood defence, these differences were solved through the thematic studies and created guidelines during the initiation phase. This led to a politically agreed upon strategy and division of roles, preventing a pragmatic boundary during the planning process.

At the start of the Droogdokkenpark planning phase, Vlaamse Waterweg and AG Vespa understood their mutual dependency. Neither party could achieve their goals separately and they had already established a beneficial common ground to depart from. Another significant factor in their collaboration was that they managed to reduce the ideological differences between the project leaders, because Vlaamse Waterweg project engineer appointed to overlook the dossier during the planning phase studied alongside the AG Vespa project manager at university. The collaboration between AG Vespa and Vlaamse Waterweg thus fell in the hands of two individuals who departed from a common background and shared a mutual interest in urban development. This helped create a commonality between organisations with a *semantic boundary*, allowing AG Vespa and Vlaamse Waterweg to span the boundary by *coordinating*. While spanning this boundary contributed to process efficiency,

it was not found to contribute to integration. Instead, integration resultant from this relation was found to stem from the division of labour itself. More specifically, the agreement to let AG Vespa, the organisation more experienced with integrated area management, collaborate with all the relevant stakeholders. However, this agreement was the result of negotiation during the initiation phase that culminated in an agreement signed before starting the planning phase.

Besides the relation between AG Vespa and Vlaamse Waterweg, the hierarchical nature of AG Vespa also played an important role in the development of the project. AG Vespa ultimately fell under the Mayor of Antwerp, and Vlaamse Waterweg was commissioned by the Minister of Mobility and Public Works. The hierarchy shaped the planning phase in two ways:

- (1) When *disagreements* between these project partners could not be resolved by themselves, they *escalated to a political level*. The Mayor and Minister negotiated based on the interests of their respective organisation, political party ideologies, and the entirety of project dossiers that are open for discussion at that time. While this gave definitive directions for the projects, it did not result in integrated solutions. Instead, it led to either-or solutions with trade-offs made across dossiers.
- (2) The *relation between AG Vespa and the Mayors* was prone to *instability*; Antwerp's Mayors were recurrently elected at a 6-year cycle, which changed the political colours of the Mayoral office during Droogdokkenpark project. Such a shift happened during the planning phase, when the Mayoral office changed its political colours from the democratic-socialist SP.A to the nationalist-conservative N-VA. The first Mayor, Patrick Janssens, was in office till 2013, and believed that spatial planning could be used to improve society and the health of the urban environment. Antwerpse Scheldekaaien programme (including Droogdokkenpark) was one of Mayor Janssens' ways to do so. During this period there was a large amount of political interest in Droogdokkenpark, and stakeholders' interests could be well-integrated due to a high available budget.

This changed in 2013, when Bart de Wever (N-VA) entered the Mayoral office. The political objectives radically changed and the Droogdokkenpark budget was reallocated to other policy areas. During the next three years, *representing* was used by the programme manager to advance the project. Boundary spanning through *persuasion* had to be applied in order to navigate the newly erected *pragmatic* barrier. This led to several changes to accommodate the new political ideology and the financial restriction. There was decreased integration through the removal of Van Belle & Medina's contributions: architectural elements, heritage, and cultural elements. However, there was also an integration of mobility and parking into the project: the project was no longer allowed to remove any existing parking spaces without compensating them.

Extra-project coordination

This theme contained the interaction with three projects that (in)directly impacted the development of Droogdokkenpark: Kattendijksluis, Het Eilandje, and Royerssluis. A

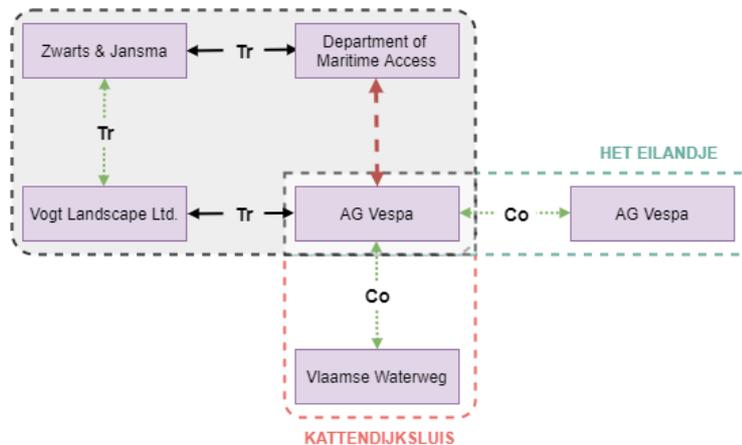


Figure 12a: Boundary spanning in external coordination

visualisation of the boundary spanning processes with their respective project coordinators can be found in Figure 12a, and Figure 12b displays the positioning of the project areas.

Kattendijksluis formed the southern boundary of Droogdokkenpark. It was a sluice that ceased to be functional in 1990

until it went through renovation during the development of Droogdokkenpark (AG Stadsplanning & W&Z, 2010). This renovation was coordinated by a separate project group from Vlaamse Waterweg and had to be coordinated with AG Vespa, which was already known during the initiation phase. This resulted in an iterative design process with the help of PROAP - WIT architects. This process helped explore integration opportunities between the projects that were acceptable for both parties. During the planning phase, the boundary had thus evolved to a *syntactic boundary*, where parties enacted a satisfactory agreement. Boundary spanning activities were thus limited to *coordinating* outputs, which was stated to lead to integration and add value to the projects, because professional actors were able to discuss and negotiate detail-level outputs.

Het Eilandje, a large-scale development programme, planned the implementation of infrastructure for 8000 new residents and 6500 employment opportunities across a part of the city known as 'Het Eiland'. This programme was undertaken by a separate team from AG

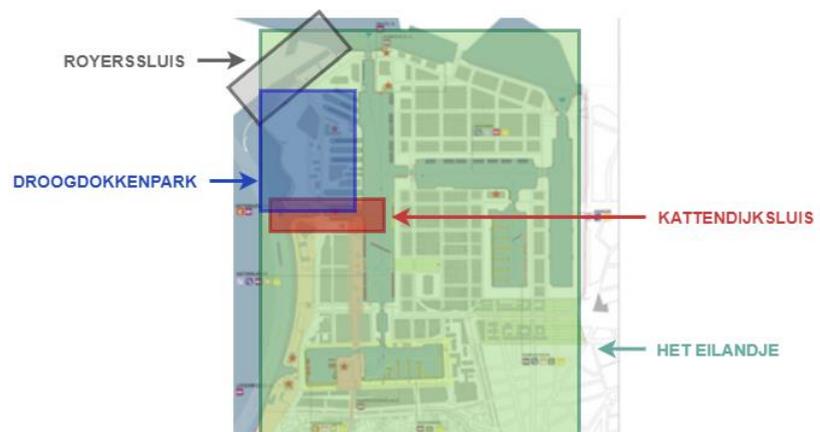


Figure 12b: Relative position of projects spanning in external coordination

Vespa and encompasses Droogdokkeneiland as shown in Figure 12b (AG Stadsplanning & W&Z, 2010). The boundary between the two teams within AG Vespa was described as easily navigable. All team members, including the programme managers, worked in the same building with a work culture of informal discussion of projects. Due to the small size of the planning cell of AG Vespa, there was a lot of natural exchange across a *syntactic* boundary

that allowed for an exchange in experience concerning project development, but also allowed for an awareness of the contextual developments around Droogdokkenpark. Het Eilandje was further ahead in its process, and due to the awareness of their developments, Droogdokkenpark could integrate itself complementary.

A more difficult process during the planning phase was *coordinating* with *Royerssluis*. It demarcated the northern boundary of Droogdokkenpark and was planning a renovation and expansion. The process was planned by a team from the Department Maritime Access, a Flemish organisation with the task to maintain access to vital ports. Royerssluis was an important project with a strong economic function, where the spatial integration, coordination, and spatial optimisation was low on the agenda. This *pragmatic* boundary was originally intended to be spanned through negotiation between AG Vespa and the Department Maritime Access, but this broke down. The actors failed to discuss the size of the expansion, the increased width of the sluice, and spatial integration in the transition zone between the Royerssluis and Droogdokkenpark. After the discussion broke down, the actors had to agree on a new methodology for discussion.

It was decided that Maritime Access would commission Zwarts & Jansma landscape architects to negotiate with Vogt Landscape on the behalf of AG Vespa. These actors succeeded in *translating* the objectives and issues from the project teams and circumvented the aforementioned pragmatic boundary by *coordinating* with each other in a common language as landscape architects. They managed to focus the discussion on detail level interventions that could be implemented through design to accommodate both parties. This had the effect of enabling the discussion, creating the opportunity to integrate three themes. First, mobility was an important topic for Royerssluis because they use the Droogdokkenroad for maintenance transport. Detail-level design for its position and turn radii, as well as removing obstacles, allowed to optimise space for Droogdokkenpark without reducing Royerssluis' accessibility. Secondly, spatial integration of the projects became possible by designing the transition zone to allow for impact future developments. Lastly, it resulted in a compact design of Royerssluis, allocating more space for the development of Droogdokkenpark.

Public consultation

The last thematic relation concerned the interaction between the general public and professional stakeholders, particularly AG Vespa and the designers Vogt Landscape and Van Belle & Medina (Figure 13). During the initiation phase AG Vespa and Vlaamse Waterweg discussed with civic organisations how they could best organise participation (Stuurgroep Scheldekaaien, 2007). It was then decided that for Droogdokkenpark, located in an area which has almost no residents, people who were present in the initiation phase would be actively invited. The turnout showed a tendency towards individuals who were educated and interested in planning projects. This created a situation where professional stakeholders and the general public communicated easily and held similar concerns. Furthermore, because the stakeholders were not inhabitants or daily users of the area, similar to other stakeholders their relationship with Droogdokkenpark was that of an outside observer. These conditions indicated a syntactic boundary.

Between these stakeholders, *information transferring* was conducted during information sessions and sounding board meetings. Information sessions were most common. During these sessions, project information and designs were displayed to the stakeholders to create awareness and also feedback. People were divided into groups of 10 for focus group discussions. These sessions and discussions were moderated by Stedelijk Wijkoverleg, who then transferred information to AG Vespa and the designers. Additionally, there was a sounding board meeting (Grontmij, 2013), where insights from the design team were discussed with selected members of the public.

Information transferring was described to have two effects. First, it used local knowledge to judge if designs would be appreciated by the future users. However, it was noted that the integration of public opinion was limited due to an absence of knowledge that stems from social cohesion. Finally, the activity succeeded in its core objective of creating support, as described by Stuurgroep Scheldekaaien (2007). Citizens being together and interacting with the project led them to value it more, which also created an insight into the different sensitivities within the local context. This helped prevent conflict because alternatives and negative effects could be considered while making decisions.

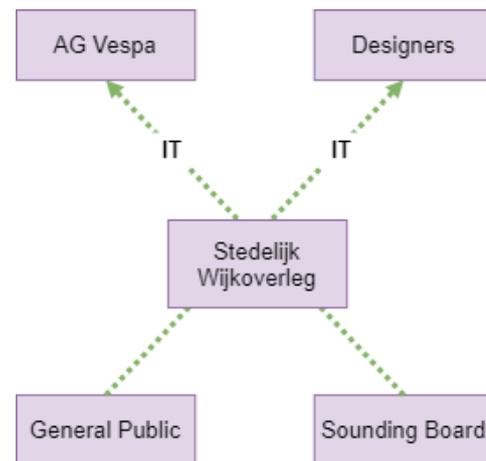


Figure 13: Public consultation relations

4.2 Case 2: Beneden-Nete

4.2.1 The Beneden-Nete Project

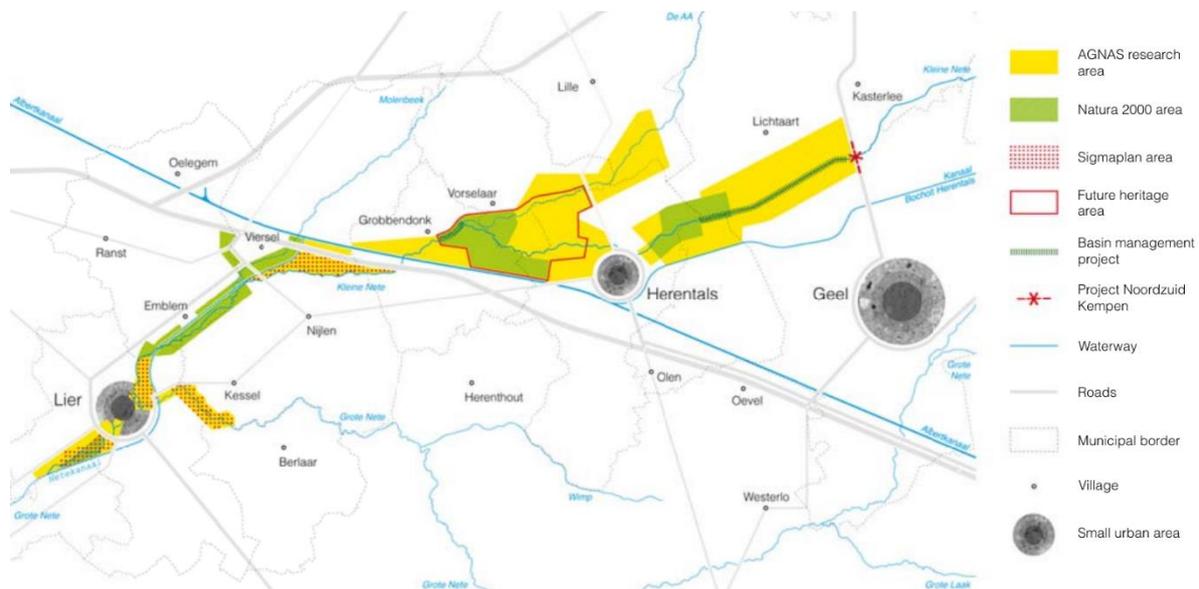


Figure 14: Projects developing in Kleine-Nete during the start of Sigma Cluster Nete and Kleine Nete (Opvolgingscommissie, 2013)

The second case that has been analysed is the project *Beneden-Nete*. This was one of the three areas developed within the Sigmoplan cluster 'Nete and Kleine Nete', located in the valley of the Kleine Nete river. This valley was part of the Province of Antwerp, east of the eponymous city, and over the last three decades it became hotspot for government activity from various sectors. *Figure 14* showed different goals and programmes that the Flemish government allocated to the Kleine Nete Valley during the start of the Beneden-Nete planning phase in 2011. This included: a river basin management programme, Sigmoplan, Natura 2000 development zones, and places for cultural heritage protection. Additionally, designated nature and agricultural areas (AGNAS areas) were under investigation for various future government ambitions (Opvolgingscommissie, 2012; VLM, 2017).

The plurality of government objectives and programmes precluded an important characteristic of the area – it suffered from project fatigue and decaying relations between governmental actors and local stakeholders. Local stakeholders suffered from poor coordination between projects before 2011, when government actors became criticised for sectoral policy implementations that disregarded other developments (VLM, 2017). The lack of coordination created a higher need of land availability for each programme, and landowners and land users were often consecutively affected by government actions, thus creating high cumulative impacts (VLM, 2017). This was particularly relevant for Sigmoplan, which created several flood control areas during the 1980s, but had to adjust them following the new safety standard (Departement Omgeving, 2019). The Beneden-Nete project thus started in a context of poor relations with local stakeholders and lacking extra-project coordination.

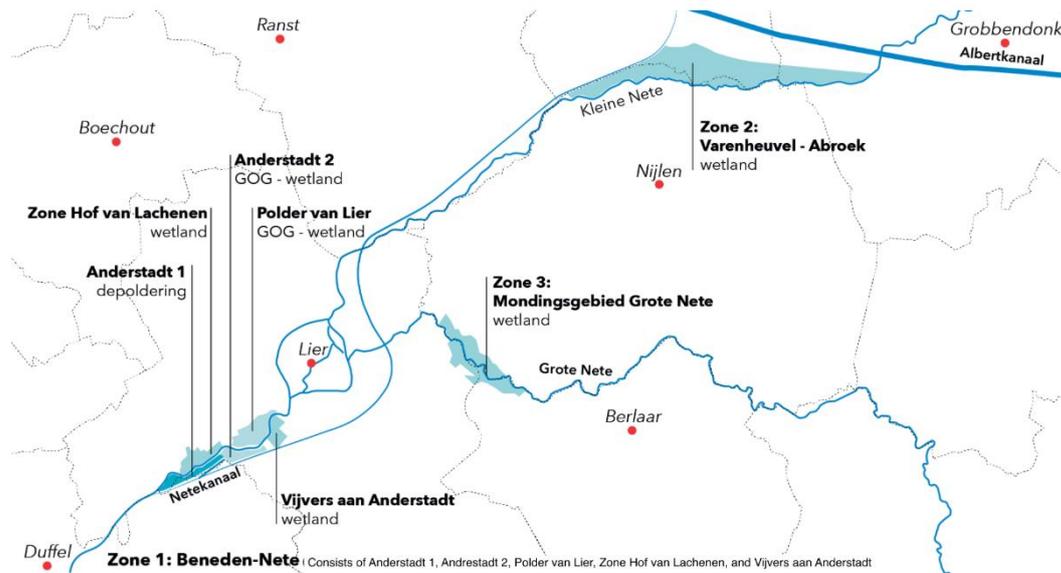


Figure 15: Sigma projects in the Nete Valley (Sigmaphan, 2020g)

On the 28th of April 2006, the Flemish government chose the series of Sigmaphan projects that should be ready for execution in 2015, which included Varenhevel-Abroek and Beneden-Nete, from the cluster Nete and Kleine Nete (Departement Omgeving, 2019). The cluster is depicted in Figure 15. It showed the projects Beneden-Nete, Varenhevel-Abroek, and also Mondingsgebied Grote Nete, which was added in 2014 following a governmental decision (De Kleine Nete, 2020).

Beneden-Nete was located between the cities of Lier and Duffel, a historically flood prone area primarily used for recreation, nature preservation, and flood control, and to a lesser degree, agriculture (Tractebel Engie, 2017a; Departement Omgeving, 2019). The area had previously been subject to a 1980 Sigmaphan project in Kleine Nete, during which the flood control area Polder van Lier was created. The 1980 development areas had been successful so far and opened forty times during the Cyclone Egon in 2017. However, the actualised Sigmaphan's projections indicated that during this century the current flood control areas would become insufficient to buffer the impacts of climate change (De Preter, 2016).

In 2011, when Beneden-Nete was primed to begin its planning phase, where only three out of the eventual five zones were to be developed: Polder van Lier, Anderstadt I, and Anderstadt II. However, the cumulative impact of projects on local stakeholders, lack of coordination between governmental actors, and animosity between agricultural users and governmental actors reached its peak around that time. The project therefore became unable to continue without procedural change. At this time, Flemish Governors received a new task called a *coordination assignment*. Kleine Nete falls in the jurisdiction of Governor Cathy Berx, who received three tasks: coordinate decision-making processes when needed, mediate between stakeholders at request, and establish discussion platforms for governmental and non-governmental stakeholders (Flemish Government, 2011). This led to the establishment of two

discussion structures that encompassed the Kleine Nete projects. A process management committee for discussions between project and programme managers, and a follow-up commission to present and discuss finding of the process management committee with local governments and civil society organisations. An overview of the organisations involved in the project can be found in *Appendix 8*.

Throughout the discussion process, several changes were made to the Beneden-Nete project. Ecological objectives shifted towards Beneden-Nete from other zones, resulting in an additional 25 acres of wet nature in two new zones: Hof van Lachenen and Vijvers aan Anderstadt (Departement Omgeving, 2019). The reimagined project thus contained five zones. On top of the aforementioned, Anderstadt I would be returned to river through *depoldering*, and Anderstadt II and Polder van Lier would become larger flood control areas with wet nature. Following discussions, Beneden-Nete project thus comprised of five areas that were developed by the *Vlaamse Waterweg* and *Agentschap voor Natuur en Bos (ANB)* as the comprehensive Beneden-Nete project (*Figure 16*), for which the landscape design and integration was conducted by *Tractebel Engie* and concluded in 2016.

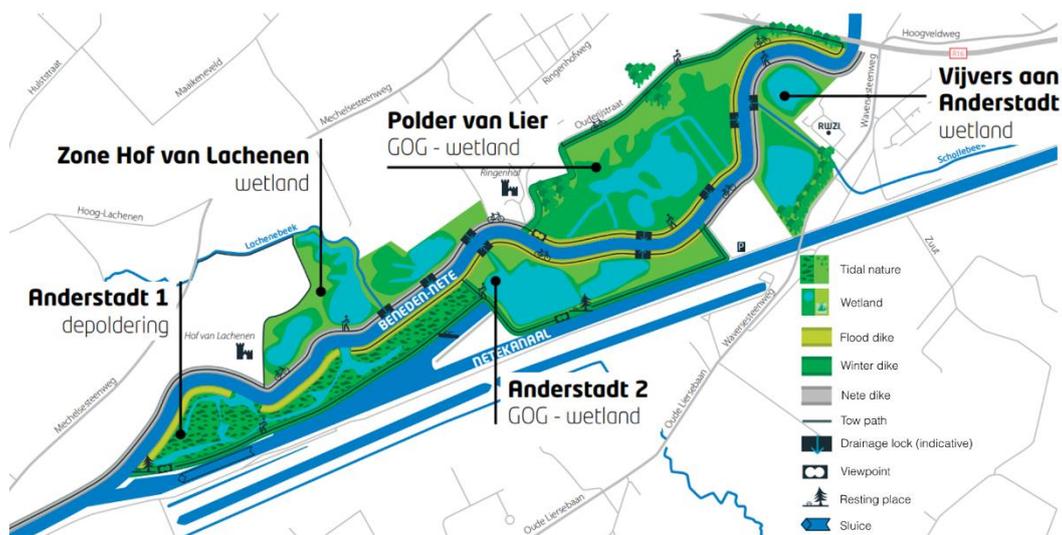


Figure 16: Finalised design of Beneden-Nete (Sigmoplan, 2020b)

Based on this design, an environmental impact report and zoning change processes were started by Tractebel Engie and the Department for the Environment respectively. The environmental impact process went smoothly because no negative impacts were envisioned that were not compensated for elsewhere, leading to a partial report exemption (Tractebel Engie, 2017b). The zoning change process, however, is an iterative process that comprises of multiple iterations and phases of feedback between stakeholders. Regardless, the zoning change request that was accepted by the government in 2019 (Departement Omgeving, 2019) does not differ from the schematic first presented in 2016 (Departement Omgeving, 2016). The execution phase started after the approval of the zoning plan in 2019 but may be postponed since various local residents started a legal dispute concerning the zoning plan at the Council of State (De Kleine Nete, 2020).

4.2.3 Boundary types and activities

Intra-project coordination

Within the coordination of project deliverables two important actors were encountered. Vlaamse Waterweg and Agentschap voor Natuur en Bos (ANB); they tackled the development of actualised Sigmoplan objectives in Beneden-Nete together, as they have in many other recent Sigmoplan projects. Before the actualisation, Vlaamse Waterweg used to be the sole agency that developed Sigmoplan, and afterwards it maintained responsibility for the safety objectives. On the other hand, ANB became more relevant after the actualisation and played a strong role in the development of nature objectives.

While the boundary spanning analysis focussed on the planning phase, their prior history offered important insights into their boundary type. When Beneden-Nete started in 2011, the Actualised Sigmoplan had been operationalised for five years, which meant that both organisations had time to learn how to work in tandem. The members of both organisations steadily became understanding of the importance and need for each other's objectives. Consequently, in analysing the boundary between Vlaamse Waterweg and ANB it was found there was a strong motivation to achieve safety and nature objectives simultaneously. This occurred because they learned to understand the importance of both objectives and that their combination strengthens projects.

Following this standing collaboration, the interviewees from Vlaamse Waterweg and ANB noted that their communication was open and transparent, and that individuals connected well on a personal level too. The project leader from ANB (Personal communication, 04-11-2020, translated by author) stated: "we are perfectly attuned to each other's method of thinking". Noticeably, the distribution of tasks in Beneden-Nete was achieved by dividing the zones. If there were water-bound engineering interventions within a zone, Vlaamse Waterweg took responsibility for project coordination and development, and worked to achieve both safety and nature objectives. Alternatively, when there were no water-bound engineering tasks, ANB undertook the project coordination and development roles, and committed the zone towards nature objectives.

The relation between the two organisations was thus characterised by an understanding of the boundary between each other's



Figure 17: Intra-project coordination relations

worldview and premade conventions on how both worldviews can be represented within the project (Figure 17). This was indicative of a *syntactic boundary*. Within the project, *translating* was performed through safety objectives, which were understood by both parties to be rigid and easily calculable, whereas nature objectives could be fulfilled in different ways and were more malleable. Both parties actively used these safety objectives to explain and understand the potential to fit nature objectives around them. Using safety standards to translate allowed

engineers from Vlaamse Waterweg to support nature goals. They were understood to have moved from a perspective that focusses solely on waterway infrastructure and safety, incorporating and carrying nature goals in both Beneden-Nete and other Sigmaphan projects.

Extra-project coordination

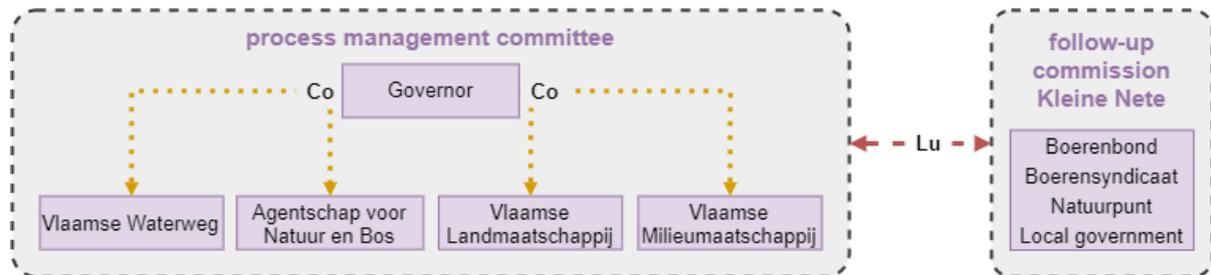


Figure 18: Extra-project coordination relations

As explained in the background section, an important contextual development in the Valley of the Kleine Nete was the discordant relation between agrarians and central government project developers, including Vlaamse Waterweg and ANB. This became a problem for the development of all projects in Kleine Nete, including Beneden-Nete. Thus, ensued the intervention of Gov. Cathy Berx following the new coordination assignment. Two new discussion structures were created that each represent a boundary spanning activity. These activities are shown in *Figure 18*.

First, the process management committee aimed to bring together project and programme managers from central government agencies developing projects in the Kleine Nete. It was envisioned to increase coordination and awareness across different central government organisations, who were each fulfilling sectoral objectives without considering possible symbioses, conflicts, and cumulative impacts between themselves. The process management committee was designed by Gov. Cathy Berx's team to enable *coordinating* between these actors. During the first years, this new coordination structure was very helpful to the project leaders; not only did it increase their insight into potential opportunities and symbioses, but it also allowed for the discussion of preliminary solutions and changes to ongoing and upcoming projects (VLM, 2017). This led to a better understanding of the opportunities to reduce the impact on agrarians.

The second discussion structure was a follow-up commission for the Kleine Nete. This included representatives of all municipal governments, civil society organisations, and other interest groups. *Lubricating* was installed in this commission in two ways. First, it contained a fair composition of stakeholders, selected to create an open and honest discussion, in a format that allowed fair and equal opportunities to provide input (Berx, 2014). The fairness and transparency of this structure was actively communicated through a publicly accessible website, where summaries of all meeting documents were indexed, indicating a shift from the status quo to outside observers.

Solutions reached within the follow-up commission firstly, added value by reducing projects' spatial claims, by increasing alignment and awareness between projects. Spatial claims also shifted, because governmental objectives were redistributed into zones where they had less impact. Beneden-Nete received two new nature areas, Hof van Lachenen and Vijvers aan Anderstadt. These were created to relieve the burdens on agrarians, and because Natuurpunt recommended they were better suited to achieve the nature goals (Flemish Government, 2012). Additionally, the follow-up commission created stronger stories for projects by bonding organisations together. This allowed them to pull in subsidies from previously unattainable angles, and reinvest them into impacted stakeholders, sustainable practices, and local initiatives. The follow-up Commission also helped all project organisations gain support from the numerous organisations involved in the follow-up commission, who then became important allies (Berx, 2014).

Finally, an interesting outcome of the follow-up commission is a series of projects that integrate local government ambitions into existing projects through the development of adjacent areas. The landscape park Pallieterland was integrated with Beneden-Nete, a suggestion by the city of Lier as seen in Figure 19. It became a recreation area that enhanced the story of Beneden-Nete, by creating a backyard for the city of Lier with an urban play area (Berx, 2018; Berx, 2019), a zone for tourism, recreation, regional nature development, landscape and heritage (Opvolgingscommissie, 2015), and city gardens that were planned to be removed as a consequence of the Beneden-Nete development (Departement Omgeving, 2019; Berx, 2019).

Agriculture

Within the theme of agriculture, there was a sequence of boundary spanning activities that took place, each supporting the following, and helping overcome the strained relations between project organisations and agrarians. The emotional attachment to lands, cumulative impacts on agrarians, and other historical issues in Kleine Nete Valley started the Beneden-Nete projects with a *pragmatic boundary* between the project organisations and agrarians. Four relevant actors can be found here: The Vlaamse Waterweg, Agrarians, Boerenbond, and Vlaamse Landmaatschappij. Boerenbond was the civil society organisation representing the farmers, and Vlaamse Landmaatschappij (VLM) served as the governmental actor facilitating and conducting land acquisition, while also mediating between agrarians and project

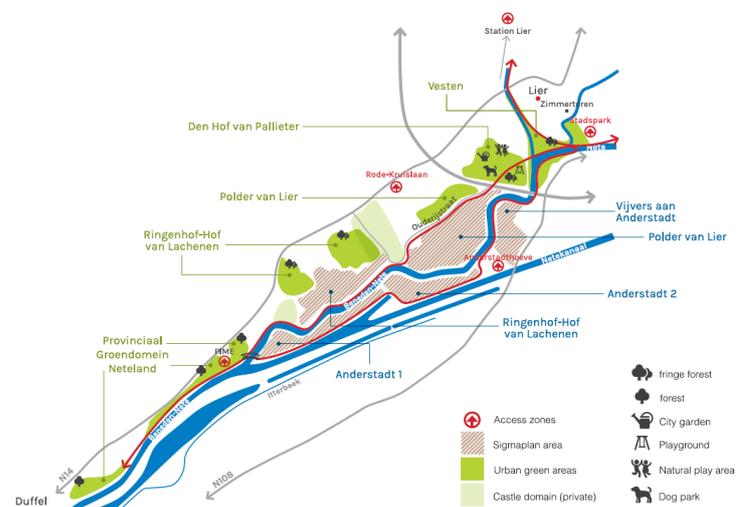


Figure 19: Landscape park Pallieterland (Stad Lier, 2016)

organisations. The sequential boundary spanning activities, shown in *Figure 20*, was started by Vlaamse Waterweg *transferring information* to local agrarians. They disclosed the project, expected impacts, and impacted individuals. This summoned Boerenbond to discuss on behalf of its constituents and enabled VLM to approach individuals.

VLM acted as a boundary spanner between Vlaamse Waterweg and the agricultural users; it did so sequentially by first *transferring information* between the parties. Important concerns from agrarians were that they would be underpaid, someone in their community would be treated unfairly, or that they would be treated unfairly compared to other agrarians. The VLM therefore engaged individual farmers to explain the economic dimension of supporting measures available through Sigmoplan, and how these could help individuals. This helped farmers get a better insight into the acquisition process, and how supporting measures were used to determine fair compensations. Simultaneously, VLM gathered information through a voluntary questionnaire, where they assessed the types of agrarian businesses, willingness of farmers to trade or sell, their future business intentions, and desires to maintain their heritage.

The investigation into the personal circumstances helped farmers understand that VLM wanted to facilitate a fair and effective process, which created legitimacy and allowed for continuing cooperation during the process.

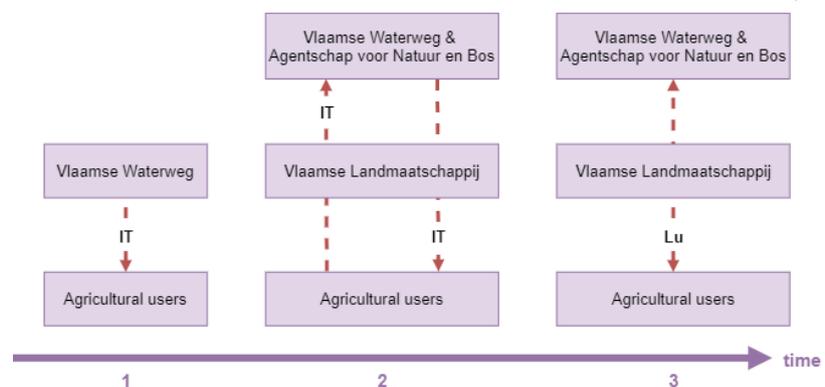


Figure 20: Agriculture relations

The final stage of boundary spanning was *lubricating* through usage of the Sigmoplan landbank and supporting measures. The local landbank for Beneden-Nete consisted of land that VLM acquired outside of the project area, available for trade with agrarians inside the project area. Based on individual agrarians' circumstances, the supporting measures were used to compensate for ownership, movement, and transferring rental status, based on the size and value of their land. This allowed VLM to treat individual agrarians equally, relative to their personal and business circumstances. Working with agrarians in a fair manner over a certain period of time created trust and support which allowed the project to continue.

"There is not a single agrarian that will turn around from opposition to cooperation within half a year; that requires time and many conversations."

— VLM (personal correspondence, 29-10-2020)

Above all, these measures created worthwhile alternatives, allowed agrarians to sell or trade their land, and provided them with the opportunity to maintain their patrimony and business outputs. This enabled the realisation of the project, even though it had a significant impact on,

and conflict with, agriculture. Such individualised solutions allowed for the integration of agrarians' needs and perspectives into the project on a basis of equality and fairness.

Nature

Relations with stakeholders involved in achieving nature objectives were maintained by ANB. This was an interesting scenario because there was not only a boundary between the local organisations (Natuurpunt Wielewaal and Polder van Lier) and ANB, but also between the local organisations themselves (Figure 21). Natuurpunt functioned as a donation- and volunteer-based NGO that aimed to protect local nature in Kleine Nete through its regional branch (Natuurpunt Wielewaal), but also observed the pursuit of macro-level objectives by the Flemish government through senior officials in its central office. Polder van Lier, on the other hand, was an older organisation that used to regulate groundwater for agriculture in the area, but has since transitioned to landscape maintenance. These local organisations considered each other as competition, and held *pragmatic* boundary. When ANB became aware of the tensions between these organisations, they realized that neither could be involved without also involving the other. They therefore used *lubricating* by treating both local parties as equal partners, and giving them their place and appreciation within the context of Beneden-Nete. While this did allow the project to continue, it did not improve the relation between Natuurpunt Wielewaal and Polder van Lier. Lubricating did not harm the project, but also did not provide any positive results for integration.

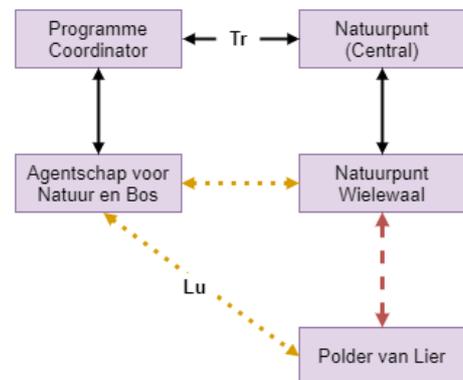


Figure 21: Nature relations

The relation between ANB and Natuurpunt Wielewaal showed a *semantic boundary*. While they wished to work together, and Natuurpunt Wielewaal welcomed the development of nature goals in the parts of Anderstadt they operated (Natuurpunt, 2020), there was an initial disconnect between employees from ANB and the local volunteers from Natuurpunt Wielewaal. In conversation, ANB encountered moments where volunteers did not understand the entirety of the Sigmaplan story being created, and were reluctant to discuss it. The team from ANB reported this to their programme coordinator, followed by him *translating* the content and issues to the central branches of Natuurpunt, who then communicated this to local volunteers from their side. This proved effective in gathering cooperation from all local volunteers, whose input allowed to access to local knowledge, resulting in the addition of the zone *Vijvers aan Anderstadt* for the creation of wet nature.

Public consultation

Between the project organisations and the local citizens, we find the last thematic relation (Figure 22). The boundary type showed *semantic*



Figure 22: Public consultation relations

characteristics, where there was a clash of thought-worlds on both sides. Vlaamse Waterweg (personal communication, 27-10-2020) stated that Beneden-Nete is “an existing flood control area receiving an update to safety, with a nature objective, which is very difficult to grasp for locals”. They consequently encountered NIMBY-ism and reflected that they were unable to describe the added value in a manner that grasped citizens.

The project organisations spanned the boundary between themselves and citizens through *information transferring*. These were applied in two directions:

- (1) *Vlaamse Waterweg and ANB opened up to receive feedback and local knowledge from citizens* during information sessions, hosted a public website, and invited citizen participation with newsletters. While the objectives for Beneden-Nete were rigid, the feedback from citizens led to amplified awareness about historical context and the usage of areas, the detection of emerging sensitivities, and moreover, the integration of citizens concerns the project itself. There was a change to object-level design to accommodate local objectives. Consequently, newly planted trees in the Polder van Lier were used as a traffic noise pollution barrier and citizens also informed the location of recreational infrastructure. Most importantly, citizen concerns about the effects of increasing groundwater levels on their gardens and basements were addressed through a series of tests conducted by Vlaamse Waterweg, leading to small changes that mitigate this risk.
- (2) *Vlaamse Waterweg and ANB attempted information transferring concerning the project, its status, and implementations throughout the projects*. This was done by presentations at information meetings and newsletters; the latter were sent out six times during the planning phase, but largely comprised of the same information and described the procedural challenges relevant at that point in time (Vlaamse Waterweg, 2011; 2014a; 2014b; 2015). In Vlaamse Waterweg (2016; 2018) and Tractebel Engie, (2017a) there was a change to the formula, where the project organisations instead focused on responding to public issues. These were the same issues described in the paragraph above. It did, however, prove ineffective, and both Vlaamse Waterweg and ANB stated they do not believe the citizens will be fully convinced of the value of the project until they can see the result with their own eyes. Another result of its lacking effect is that, although this issue had been addressed, the owner of a nearby castle is currently suing the project at the Council of State over negligence of groundwater levels (De Kleine Nete, 2020).

4.3 Spanning boundaries for integration

4.3.1 Information transferring

Information transferring was found in both cases. Its observed effects shown in *Figure 23*, are based on a syntactic boundary in Droogdokkenpark, and a semantic and pragmatic boundary in Beneden-Nete. In Droogdokkenpark, information transferring was used to cross a *syntactic* boundary in both directions between AG Vespa and the general public. This gave the former access to *local knowledge*, thereby contributing to the integration of local knowledge. Furthermore, it also created an understanding of *local sensitivities* and *project ownership* that facilitated the overall process, but were not found to increase integration.

Beneden-Nete instead showed the application of two-directional information transferring to a semantic and pragmatic boundary. Across the semantic boundary, it was used in communication between Vlaamse Waterweg and local citizens. It contributed to integration by creating an *understanding of local sensitivities* and *local problems*, which were then addressed through additional research and object-level implementations. Simultaneously, it also provided *insight into individual preferences* and *the historical context and day-to-day usage* of the project area. However, when the resulting integration was relayed back through information transferring, citizens were unsatisfied. The zoning has thus been contested at the Council of State, citing the same concerns addressed by Vlaamse Waterweg based on the aforementioned local problems.

Finally, Beneden-Nete also had the application of two-directional information transferring across a *pragmatic* boundary between the project teams and agrarians. The activity was used to facilitate supporting measures available through Flanders institutional framework (*Section 4.3.4: Lubricating*). By transferring information from agrarians, an insight into *local sensitivities* and an *understanding of individual preferences* was gained, while also creating *trust* and *legitimacy* through interaction. All four of these effects supported the ensuing process of integration. Transferring information about the project to the agrarians instead led to *mobilising and identifying stakeholders, creating legitimacy, understanding of intentions, and creating knowledge of supporting measures* that enabled the equal treatments between agrarians. Through iterative interaction over time, this formed a prerequisite trust basis that allowed stakeholders to use lubricating.

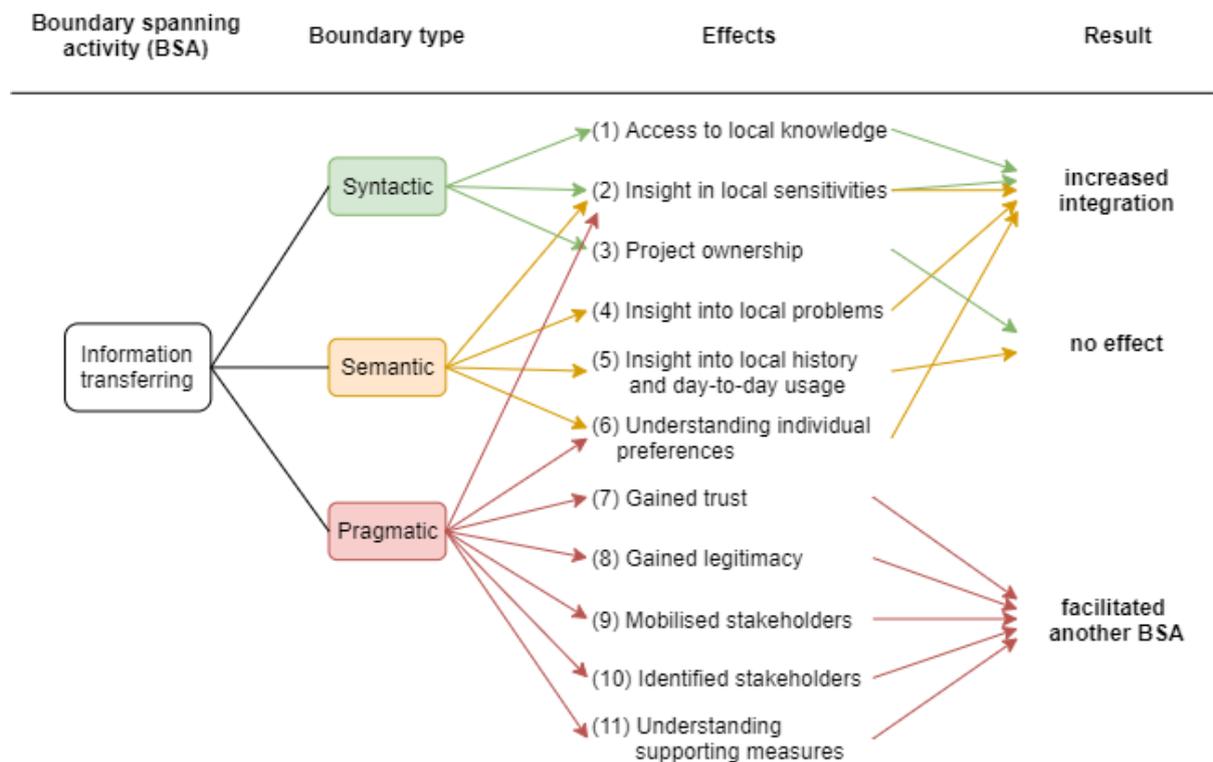


Figure 23: Observed effects and results of information transferring

4.3.2 Translating

Translating has been applied to a semantic and pragmatic boundary in Droogdokkenpark, and a syntactic and semantic boundary in Beneden-Nete. An overview of the observed effects was shown *Figure 24*. In Droogdokkenpark, a new relation was formed between INBO and Vogt Landscape with the intention of integrating nature objectives. A semantic boundary existed between them, stemming from their different thought worlds concerning ecological design. Translating was therefore performed by a senior researcher from INBO, which created an understanding of *ecological perspectives* and *ecological concepts*, enabling communication between the actors and integrating local-specific ecological perspectives in the design.

In Beneden-Nete a formerly semantic boundary between Vlaamse Waterweg and ANB turned syntactic over time by translating through a mutual understanding of safety objectives. The observed effects of translating on the syntactic boundary were that it *enabled communication*, created an *understanding of the synthesis between nature and safety*, and *instilled a mutual belief* that goals were carried on both sides. However, it demonstrated a long-term effect of translating across a semantic boundary. Over time, the safety objectives turned from a common point of reference into something that is instilled in actors' mindsets, taking the characteristics of a boundary object by spanning a boundary without a boundary spanner (Abraham, 2015).

The remaining two instances of translating both occurred through the inclusion of external actors. The Droogdokkenpark discourse between AG Vespa and the Department Maritime

Access was translate and shifted towards landscape architects. Here, translating issues *shifted them into a spatial discourse* that *enabled communication* and allowed mutually agreeable results to be created. In Beneden-Nete, an inbound conflict across a semantic boundary was escalated and translated through upper-management of ANB and Natuurpunt. This occurred by *shifting discussions* to upper-management actors who share opinions on the overall goals of Sigmoplan. They then discussed the collaboration between lower-level actors, by communicating based on relations between the central organisations and pre-existing agreements. Agreements made between the higher-level actors then *enabled communication* on the lower levels.

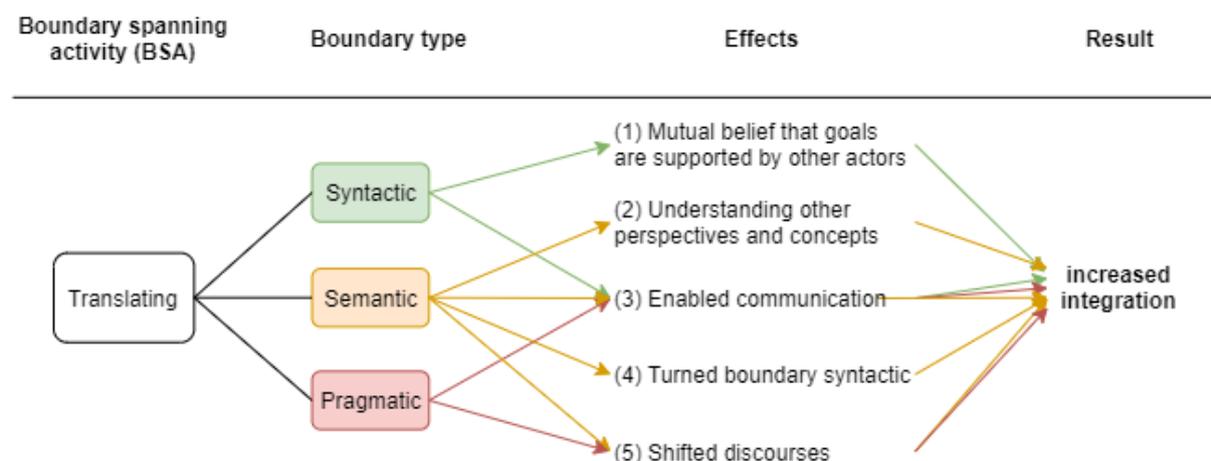


Figure 24: Observed effects and results of translating

4.3.3 Coordinating

Coordinating has been applied multiple syntactic boundaries in Droogdokkenpark, a semantic boundary in both Droogdokkenpark and Beneden-Nete, and a pragmatic boundary in Droogdokkenpark (Figure 25). It made up the largest share of boundary spanning activities in Droogdokkenpark, but not in Beneden-Nete. A commonly observed effects of coordinating across the syntactic boundaries was that it served to *create and continue discussion* about the roles, inputs, and outputs of stakeholders. This naturally led to a better understanding of each other's objectives, the importance thereof, and thereby more integration. It also created clear *divisions of labour* based on organisational expertise, the *sharing of information*, and *awareness of contextual developments*.

Beneden-Nete displayed the effects of coordinating across a semantic boundary, through the boundary spanning efforts in its process management committee. Here, it *created discussion* and *feedback opportunities*, and an *awareness of other projects, contextual developments, potential symbioses, and cumulative impacts*. These new understandings were vital in creating integration within and between projects, but also showed that coordinating can lead to more integrative forms of cooperation over time. In 2017 the process management committee and follow-up commission adopted the slogan "from coordination to co-production" (RLKGN, 2017, p. 1),

where they aimed to establish integrated projects based on information gained through coordinating.

Interestingly, the positive effects of coordinating across a syntactic or semantic boundary were not found when political actors coordinated. Coordinating between the Ministry and Patrick Janssens’s mayoral office (semantic), as well as Bart de Wever’s Mayoral office (syntactic), instead led to *political agreements*, where *trade-offs* across separate project dossiers defined *singular objectives* within the project instead of integration. Finally, when AG Vespa and the Department Maritime Access attempted to use coordinating to cross a pragmatic boundary the discussion broke down. This resulted in *conflict* and a *low willingness to collaborate*. However, it also facilitated *translating*, because this coordinating activity defined the role of Vogt Landscape and Zwarts & Jansma as a proxy for integration.

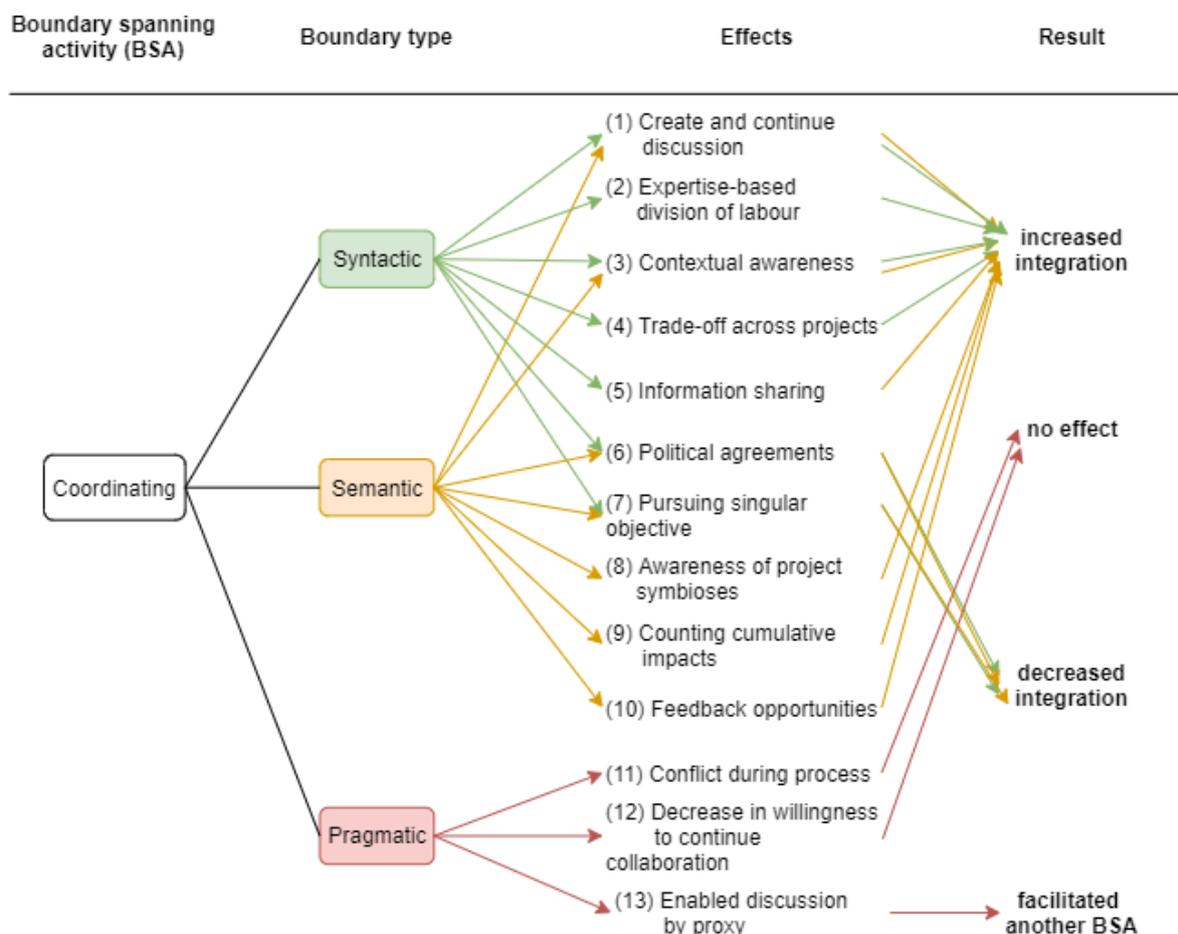


Figure 25: Observed effects of coordinating

4.3.4 Lubricating

Lubricating was found three times in Beneden-Nete, twice with a pragmatic boundary and once with a semantic boundary (Figure 26). The follow-up commission applied lubricating to achieve and communicate an equal footing of stakeholders across a pragmatic boundary. This enabled the *discussion* process by *improving relations among actors* and *creating awareness of local*

sensitivities. The project coordinators were then able to *reduce and shift the spatial claims* of projects through a newfound coordination. Beyond changes to the existing projects, the discussion also encouraged *forging alliances* between actors to create stronger stories and improved funding opportunities, leading to the development of *new, integrated projects*.

A second instance of lubricating a pragmatic boundary comprised of the supporting measures that facilitate land consolidation. The Flanders’ institutional framework of supporting measures for Sigmoplan was used to *create equal footing* and *respectively equal outcomes for land-owners*. This helped integrate individual agrarians’ needs into the project by providing reasonable and respectively equal compensation with a variety of options that suit their individual needs. Creating this equal footing prevented a disparity in benefits between community members, thereby preventing destabilising local relation, and *allowing willingness and trust* to grow over time.

Finally, lubricating displayed a *preventative* function, when applied to the semantic boundaries between ANB and the Polder van Lier and Natuurpunt. These boundaries were anticipated to devolve into pragmatic boundaries with open conflict if treated carelessly. Lubricating did not contribute to a better relation between the actors or advance integration, but it did succeed in *preventing conflict*, which allowed translating between ANB and Natuurpunt.

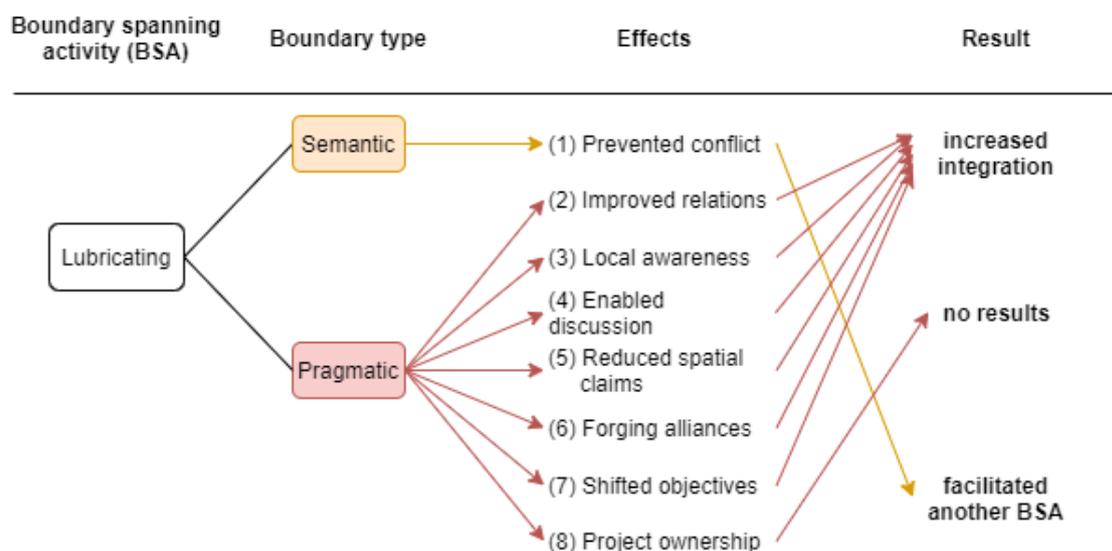


Figure 26: Observed effects of lubricating

4.3.5 Co-creating

Co-creating, defined as research by design, was not found within the planning phase of either case. However, the initiation phase of Antwerpse Scheldekaaien did use a participatory research by design process. This process created the overarching guidelines and political agreements for Droogdokkenpark.

4.3.6 Representing

Only one instance of *representing* has been found (Figure 27). The programme manager of Droogdokkenpark used it to span the pragmatic boundary between AG Vespa and the mayoral office. At the start of this activity, the project was stopped, and its budget was reallocated. The boundary spanner closely mirrored the political agenda of the N-VA in the project, which created vested interests for the N-VA in developing Droogdokkenpark as it would help them achieve their political ambitions.

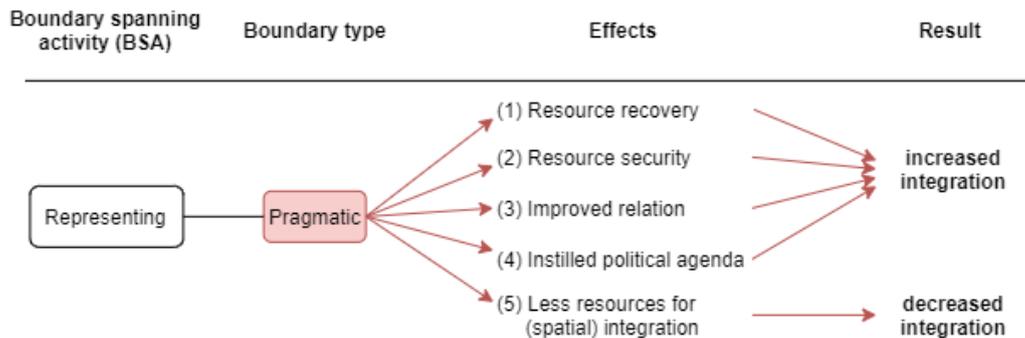


Figure 27: Observed effects of representing

The activity both positively and negatively impacted integration. Positive effects included: *recovering project resources, renewing resource security, creating better relations between AG Vespa and the Mayoral office, and orienting towards the N-VA political agenda.* The first three effects secured existing integration, and the fourth enabled the integration of car mobility and parking as project themes. The negative impact that decreased integration stemmed from the *lowered available budget* for spatial integration and the integration of objectives. These diminished resources led to the removal of architectural elements from the final design.

4.3.7 Guarding

Guarding was described as the antithesis to representing. It can be used to decrease involvement from stakeholders inside and outside the organisation, when they create negative impacts (Dietrich & Brøde, 2010; Kislov, 2018). Neither these activities nor negative impacts from inquiries were mentioned by interviewees.

5. Discussion

The boundary types and boundary spanning activities, found in Droogdokkenpark and Beneden-Nete, are now discussed in the context of existing literature and used to answer the research questions. In doing so, the order of the research questions and conceptual model are followed.

First, boundary types found in projects are discussed with their theoretical implications (*Section 5.1: A complex web of boundaries to span*). This allows a challenge to the initial assumption that an urban project is inherently more complex than rural project, which provides input for the cross-case comparison and answers the research question:

- (3) What boundaries needed to be spanned in Sigmaplan, in order to achieve integrated solutions?

Afterwards, in *Section 5.2: Lessons for IRBM* the findings from *Section 4.3* are summarised, abstracted, and compared between the cases where possible in order to answer the research questions:

- (4) Which boundary spanning activities are used and how do they affect the integration of objectives in the Sigmaplan projects?
- (5) Which differences between the cases are found concerning the applications of boundary spanning activities and the effects they have on the integration of objectives?

The findings used to answer these questions are reflective of the boundary spanning activities found within the scope of this research, but this does not exclude that other boundary spanning activities could have been performed.

The section continues with the main research question, by describing the identified uses of individual boundary spanning activities, as well as strategies that combine activities, and comparing and contrasting them with relevant literature. Finally, the discussion is concluded with a reflection on the data and process (*Section 5.3: Reflection*).

5.1 A complex web of boundaries to span

The boundaries described in the results, the relations between actors, and relative proportions of boundary types are visualised in *Figure 28a & 28b* for both Droogdokkenpark and Beneden-Nete. An initial assumption, based on OECD (2019) is that the urban Droogdokkenpark project contains more stakeholders and views, leading to a higher degree of complexity (De Roo & Silva, 2010). However, when examining the proportion of boundary types, this assumption does not hold up. Boundaries can be ranked in terms of difficulty and effort required to span them (*Table 3*). Syntactic boundaries are the easiest to span, implying familiarity (Maaninen-Olsson et al., 2008) or a common worldview and goals (Smulders et al., 2014; Abraham et al., 2015). Conversely, pragmatic boundaries are the most difficult, because they imply competing interests and opposing ideological world-views (Carlile, 2004; Abraham et al., 2015).

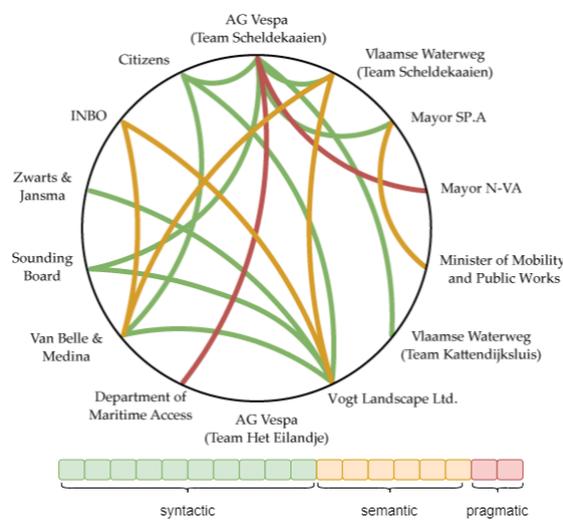


Figure 28a: boundary types in Droogdokkenpark; relation between actors and proportional bar

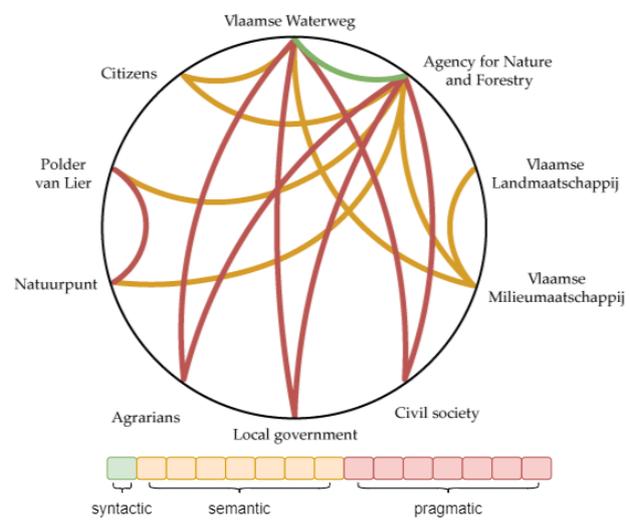


Figure 28b: boundary types in Beneden-Nete; relation between actors and proportional bar

As shown in the proportion bar in *Figures 28a & 28b*, Droogdokkenpark displays a higher share of syntactic boundaries than Beneden-Nete, while also having fewer semantic and pragmatic boundaries. This implies that boundary spanners in the rural Beneden-Nete project had to span more complex boundaries than the boundary spanners in Droogdokkenpark, providing an interesting contradiction to the previous assumption that urban projects are inherently more complex (OECD, 2019).

Based on the results, several explanations can be offered for the relatively higher complexity of boundaries in Beneden-Nete. Firstly, site-specific characteristics play a role: while Droogdokkenpark is part of a highly urban redevelopment project, it is located in a low-density area with few inhabitants nearby. The population density changed over the course of the project due to the development project Het Eilandje, but citizens' place attachment remained limited. The absence of long-term social relations and informal meanings, shows that length of residency influences the complexity of local actors' boundary types. Secondly, Beneden-

Nete started with a turbulent project environment, where cumulative impacts from a lengthy series of central government projects created resistance (VLM, 2017). Lastly, there was also a difference in the processes themselves. Droogdokkenpark's planning phase followed a 4-year initiation phase with intensive stakeholder management, workshops, and interactive design processes, whereas Beneden-Nete started the engagement with its historically disenfranchised stakeholders during the planning phase. These stakeholders, i.e., the agrarians, their civil society representatives, and local governments are where the pragmatic boundaries stem from. In Droogdokkenpark, preventative boundary spanning within the initiation phase had its impacts on the planning phase. Stakeholders and themes with indications of conflict were pacified and pragmatic boundaries did not arise from them. The two pragmatic boundaries observed in the results instead stem from instability in the project environment: a sudden change to the Royerssluis project and a shift in the Antwerp's political orientation.

In analysing these last two characteristics, a case should be made for preventative boundary spanning during the initiation phase that focusses on creating shared visions, particularly when pragmatic boundaries can be expected (AG Stadsplanning & W&Z, 2010; Emondson & Harvey, 2018)

5.2 Lessons for IRBM

The findings concerning the boundary types and boundary spanning activities can now be combined to answer the fourth and fifth research questions. *Table 7* shows which different boundary spanning activities were used and how they are found to affect integration in both cases. Unfortunately, the application of boundary spanning activities drastically varies between both cases, providing only one point for direct comparison. This in itself shows the potential of a granular research strategy (Van Osch et al., 2017) that also takes into account contextual factors (Dee & Leisyte, 2017) through boundary types. Analysing the individual boundary spanning activities along with the boundary types they are applied to, shows that varying outcomes are not directly comparable and can potentially be explained by the boundary type or other contextual factors. As an example, *Table 7* shows three different outcomes from information transferring across three different boundary types. Further contextual factors will be addressed in *Section 5.2.3 The importance of context*.

The boundaries can be spun in a variety of different ways, but boundary spanning activities show different effects based on the context to which they are applied (Dee & Leisyte, 2017), such as the activities' interrelations or sequencing (Birkinshaw et al., 2017; van Meerkerk & Edelenbos, 2017; Kislov, 2018), or the respective project phase (Van Osch et al., 2017). In comparing the effects of individual boundary spanning activities on integration, they are found largely consistent when applied to the same boundary type. These findings imply future research should consider and test boundary types as a potential explanatory factor for the varying efficacy of boundary spanning activities.

Exceptions to the aforementioned are found with representing across a pragmatic boundary and coordinating across a semantic boundary. For the former, a single instance of representing both positively and negatively affected integration. The latter instead concerns separate applications of coordinating across syntactic and semantic boundaries, which showed either positive or negative impacts on integration. This contradiction is based on the type of actors that performed the activity. The negative impacts only arose when political actors oversaw a wide variety of different dossiers. They negotiate using multiple dossiers and spread their objectives across them. This decreases integration by spreading and trading objectives across different projects, instead of combining them within a single project.

Droogdokken	BOUNDARY SPANNING ACTIVITY (BSA)	BOUNDARY TYPE		
Beneden-Nete		Syntactic	Semantic	Pragmatic
LEGEND	Information transferring	↑	↓	↔
↑ positive impact on integration	Representing			↑ ↓
↓ negative impact on integration	Coordinating	↑	↓	↔
↔ facilitated other BSAs	Translating	↑	↑	↑
	Lubricating		↔	↑
	Co-creating			
	Guarding			

Table 7: Overview of the usage boundary spanning activities and their effect on integration.

5.2.1 Using boundary spanning activities

Information transferring is conceptualised in two different ways. The first perceives it as gathering information (Ancona & Caldwell, 1992; Van Osch et al., 2017) and the second considers it to cover both ingoing and outgoing flows of information (Carlile, 2004). The findings of this thesis support Carlile’s (2004) conceptualisation of information transferring for an inter-organisational environment, because across all three boundary types, organisations were found to iteratively use ingoing and outgoing information transferring. This type of information transferring is believed to solely be successful in spanning syntactic boundaries (Carlile, 2004; Maaninen-Olsson et al., 2008). This is partially supported by this thesis’ findings as its application to a semantic boundary was ineffective, due to difference in thought-worlds (Smulder et al., 2014; Emondson & Harvey, 2018). Semantic boundaries require translating (Deng, 2013; Safford et al., 2017), so interpretation of the meaning behind information can fail when using information transferring (Emondson & Harvey, 2018). While the transfer of information did add new local objectives to the projects, their execution and/or communication was not received well by the local citizens. However, the use of information

transferring on a pragmatic boundary shows that it can be used beyond a syntactic boundary as a facilitative condition. Iterative information transferring interactions can facilitate boundary spanning processes by creating trust.

Translating is used to successfully create integration across all three boundary types. An interesting parallel is found in its application across semantic and syntactic boundaries. It helps express world-views between stakeholders on either side of the semantic boundary (Deng, 2013; Safford et al., 2017), but results show in the long-term the boundary can thereby become syntactic, where translating occurs passively through boundary objects (Abraham et al., 2015). This creates an evaluation of outcomes and objectives through each other's perspective. Moreover, across both the semantic and pragmatic boundary, it shows an ability transfer a discussion to a different discourse; then the discussion can be solved between actors that engage using these translated perspectives (Coppens & Oosterlynck, 2008; RES, 2020).

Coordinating shows the most distinct uses. Firstly, in a political arena, while it can be used, it does not lead to integration. Instead, it creates trade-offs across both a syntactic and semantic boundary. Secondly, it can be used to create integration across both a syntactic and semantic boundary. However, it shows more potential when applied to a semantic boundary, because it facilitates understanding contextual differences, dependencies, and thought-worlds (Maaninen-Olsson et al., 2008; Smulders et al., 2014; Emondson & Harvey, 2018) – this helps build sustainable relationships among organisations and creates further integration in long-term processes. Lastly, coordinating is found to be unsuccessful at spanning a pragmatic due to differences in the evaluation of outcomes between organisations (Carlile, 2004; Abraham et al., 2015). Instead, it allows the opportunity to create a discussion framework, showing that coordinating can be used as a facilitative activity on a pragmatic boundary.

Lubricating is understood to be applicable to a pragmatic boundary, where it creates willingness for organisations to work together (Birkinshaw et al., 2017). While this thesis' results support this use of lubricating, it is also shown to have a preventative function. When a semantic boundary is expected to create a clustering of rival organisations, conflict, and thereby a devolvement to the more complicated pragmatic boundary (Emondson & Harvey, 2018), lubricating can be used preventatively.

Representing has only been found across a pragmatic boundary, although this does not exclude its potential application on syntactic and semantic boundaries. Interestingly, while the pragmatic boundary is understood to require a transformation of knowledge (Maaninen-Olsson et al., 2008), representing was instead used to signal that the projects' direction would follow the elected officials' respective political ambitions. Furthermore, observed impacts such as increasing the potential for innovation through resource security (Alexander et al., 2016; Van Meerkerk & Edelenbos, 2016) and increasing legitimacy (Van Osch & Steinfield, 2016), suggest it can be better be applied to prevent devolving boundaries; however, the results could not corroborate or verify this precautionary suggestion.

5.2.2 Boundary spanning strategies

Besides direct effects of boundary spanning activities, three facilitative applications were found. Recognizing the knowledge gap of interrelations between boundary spanning activities (Birkinshaw et al., 2017; Edelenbos, 2017), these combinations deserve special attention as applications of boundary spanning because they can help uncover repeatable interrelations and strategies through future research.

First, it has already been discussed that *translating* can shift discourses from one set of organisations to another. However, during the process between AG Vespa and the Department Maritime Access this activity was preceded by *coordinating*. This example shows two interdependent organisations failing to negotiate, instead resulting in a discussion process between two landscape architects. Coordinating can thus create agreements that support and allow for translating.

A second combination of boundary spanning activities is found within the engagement of agrarians in Beneden-Nete. In a highly discordant context, *lubricating* was meant to create a fair and equal process, but a degree of trust was a prerequisite for this process. Two directional *information transferring* served to keep stakeholders involved, while building trust over time, so that the lubricating activity could be performed. These findings show that information transferring can be used to build trust through continued stakeholder engagement

Finally, the discussion framework created by Cathy Berx in Beneden-Nete also sequences two boundary spanning activities. It aims to unify central government organisations in a context of sectoral, closed system projects. First, *coordinating* was performed in a discussion structure to generate context awareness, open discussion, and initial ideas for symbioses among these organisations. The same organisations then entered a *lubricating* discussion structure with other representatives from local and regional organisations. Coordinating thus laid a foundation for lubricating, by creating contextual awareness and an understanding of interdependence among organisations.

5.2.3 The importance of context

In light of the findings of this thesis, a note needs to be made pertaining to the influence of conditional factors on boundary spanning activities and the strategies outlined previously. While the data collection was not created to capture these conditions, by using a granular view on boundary spanning activities a variety of different conditional factors inductively proved important for boundary spanning between organisations. In order to avoid foregoing the importance of these factors, they have been categorised and explained in *Appendix 9*. This table uses a framework of boundary spanning conditions by Van den Brink et al. (2019). Within the framework, there are four distinct types of conditions listed as follows:

- (1) *Environmental characteristics* are related to the composition of the interdisciplinary, multi-sectoral, and multi-organisational environment that boundary spanners operate in. Relevant components include dependency, the degree of stability, and the dynamics and relationships between organisations.
- (2) *Organisational support and feedback* consist of the psychological support and assurance given by upper levels of management in an organisation, as well the empowerment of employees to make their own day-to-day decisions.
- (3) *Role definition and stressors* consist of two components. First, role definition refers to the formalisation of a boundary spanning role within an organisational context. Second, the role stressors are characteristics of the formalised roles that influence a boundary spanners ability to perform it. This consists of a mismatch between expectation and demand (*role conflict*), a mismatch between demand and the spanner's abilities (*role overload*), and the degree of freedom a boundary spanner has to perform actions (*role autonomy*).
- (4) *Individual determinants* are a boundary spanner's individual abilities, including their motivation, experience, social-emotional competences, and cognitive abilities.

Reflecting on the cases of Droogdokkenpark and Beneden-Nete the following observations on conditional factors are noteworthy. First, some additions can be made to the existing categories set out by Van den Brink et al. (2019). (1) *Organisational support* should include the ability to *escalate issues to a higher hierarchical level*. This prevents conflict, deteriorating boundary types, and can also be used circumvent boundaries between stakeholders. Difficult decisions are brought to a political level, as seen between AG Vespa and Vlaamse Waterweg, or discussed between upper management of different organisations, as seen between ANB and Natuurpunt. (2) *Individual determinants* should include *personal relations*, as shown by the personal connection between project managers from AG Vespa and Vlaamse Waterweg in Droogdokkenpark. (3) *(inter-)Organisational culture* and the *size of organisations* can contribute to coordinating, because with an open culture and smaller organisations boundary spanning can happen in informal arenas.

Beyond the existing categories, the cases show that external influences may also impact boundary spanning. An additional category of conditions should be considered to reflect the institutional and political dimension. (4) *The institutional framework* can be utilised to enable boundary spanning – this was for instance seen when Cathy Berx created a discussion structure in Beneden-Nete, as well as when the senior researcher from INBO used existing national and EU policies to communicate the importance of understanding estuary nature to Vogt Landscape. (5) *Ongoing political debates* influence the freedom of boundary spanners to make decisions, as well as support from upper-management. The 2013 Mayoral change in Antwerp constricted the ability of the project to move forward, while political escalation was constrained due to large-scale discussions about the Ring of Antwerp project.

5.3 Reflection

An initial topic of reflection is the methodology of this thesis. During the data collection and analysis, it was noteworthy that the interviews tended to focus on significant and successful events, causing a loss of the smaller and unsuccessful activities that could have added more nuances and intricacies to the results. A further issue in data collection lies in the use of project managers interviews for snowballing. For both cases, the initial interviews with them were pushed back. Snowballing was thus done via mail contact, which resulted in a smaller circle of interview candidates compared to later suggestions during the interviews themselves. While this did limit the usefulness of snowballing, a sufficient spread of people across the different organisations was found to discuss inter-organizational relations.

During the data collection a shortcoming of both the selected cases became clear. During both projects there were larger, simultaneously ongoing projects that demanded the attention of some of the interviewees. Examples of this include: Varenheuvel-Abroek in the case of Beneden-Nete, and the Ring road of Antwerp and St Andries and Zuid for Droogdokkenpark. This was anticipated to a certain extent and was tackled through method-triangulation and preparedness for the interviews. Regardless, decreased recall about less significant and older events was notable during the data collection process.

Finally, the content itself has room for reflection as well. The biggest issue lies in researching solely the planning phase. During the process it became clear that many existing relations were moulded by interactions during the initiation phase. Taking a multi-phase perspective could have helped in identifying long-term strategies that combine boundary spanning activities across phases. In comparing boundary spanning activities, the boundary spanners themselves were pushed to the fringes of this research over time. The individual characteristics, and cross-comparisons thereof, were originally deemed worthwhile additions. They could, for instance, explain why some boundary spanning activities did not work. Nonetheless, it was excluded due to practicalities of thesis size, time, and the additionally required in-depth analysis of individual characteristics.

6. Conclusion

This thesis aimed to research boundary spanning activities through a granular view, hoping to yield qualitative data that explains how they are used to facilitate integration in IRBM projects (Van Osch et al., 2017). Researching in this manner was believed to simultaneously foster additional understanding of the effectiveness, interrelatedness, and sequencing of boundary spanning activities (Birkinshaw et al., 2017; Edelenbos, 2017; Kislov, 2018).

The question concerning how boundary spanning activities are used was limited in scope: this was done by focussing on organisations, choosing the planning phase as a temporal demarcation, and thereafter explained as a two-part question. It focussed on the relations to which boundary spanning activities are applied, and the effects they create in the context of that respective relation. The relations were typified as syntactic, semantic, and pragmatic boundaries (Carlile, 2004). For the boundary spanning activities, the framework by Ancona & Caldwell (1992) was expanded to include information transferring, translating, coordinating, co-creating, lubricating, representing, and guarding (*Table 2*).

By using the listed concepts in the outlined research strategy, a variety of effects were found (*Table 7*). The direct effects on integration can be split into positive, mixed, and negative effects. This research added to available knowledge on the varying efficacy of boundary spanning activities by researching both boundary types and boundary spanning activities. Using existing literature and relevant factors described during the interviews, varying efficacies of boundary spanning activities were found and analysed between different boundary types. It showed that using information transferring, coordinating, or translating on a syntactic boundary, translating or coordinating across a semantic boundary, or applying translating or lubricating to a pragmatic boundary, yields *positive effects* for integration. *Negative effects* are instead found when using information transferring on a semantic boundary, or when political actors coordinate across a syntactic or semantic boundary. *Mixed effects* were only found when representing across a pragmatic boundary, leading to both positive and negative effects on integration.

Beyond the results, the methodology of this thesis has implications for the future of boundary spanning research. First, the aforementioned combination of boundary spanning activities and boundary types opens up interesting avenues for research. The knowledge gaps concerning boundary spanning activities fit into a systemic issue where research lacks awareness of the context in which they are performed (Dee & Leisyte, 2017). The usage of boundary types as a conditional factor provided several explanations for varying efficacy based on the type of boundary and other contextual circumstances. Including this concept led to a greater contextual awareness and resulted in further recommendations of conditional factors that should be considered when analysing boundary spanning activities. Future research should therefore consider the addition of conditional factors to boundary spanning

activity analyses, and test if the link between efficacy and conditional factors such as boundary types holds up across larger datasets.

Second, it is known that boundary spanning activities can have interrelations or be sequenced over time, but these interrelations and sequences are not well understood (Birkinshaw et al., 2017; van Meerkerk & Edelenbos, 2017; van Osch et al. 2017; Kislov, 2018). Through the granular, qualitative research strategy used in this thesis, which treats each activity as individual components of boundary spanning and looks to understand how they contribute to integration, three *facilitative* uses of boundary spanning activities were found. In spanning a pragmatic boundary, coordinating is found to lay the foundation for translating, and iterative information transferring is shown to build the trust required for lubricating. Across a semantic boundary, coordinating was found to create a holistic understanding of regional context that was needed for a lubricating discussion structure. Furthermore, it showed that boundary spanning activities such as lubricating can have a *preventative* function, avoiding devolvement of boundary types. These interrelations and functions that go beyond direct effects show that granular, qualitative research strategies can help fill gaps in our understanding of the relations between boundary spanning activities. Future research should adopt such a research strategy to discover interrelations, and test if they can be framed as repeatable strategies.

Using these recommendations and findings, it is believed that a better understanding of the effectiveness, interrelatedness, and sequencing of boundary spanning activities can be created in scientific research, while a decrease in conflict and awareness of the potential applications of boundary spanning activities can be created for practice.

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Appendices

Appendix 1 – Benefits of method triangulation

		Benefits from triangulation	
Interviews	STRENGTHS	Targeted: Focus directly on topic	Provides more project-specific that can be discussed
		Insightful: provides personal views, perceptions, attitudes, meanings, and explanations	Interviews can add these insights to documentary evidence
	WEAKNESSES	Response bias: various conditions may influence answers	Documentary evidence can be cross-referenced with interviews to find biases
		Reflexivity: researcher themselves influences answers	Documents are unobtrusive
		Misunderstanding questions	-
		Recall: memory can be distorted	Documents are unaltered after certain dates and stably keep records of past events
	Documentary analysis	STRENGTHS	Stable: repeated review is possible
Unobtrusive: data exists independent of case study			Can mitigate reflexivity issues from interviews through cross-referencing
Exactness: may contain accurate names, references, and details			Find the correct spelling for phenomena, events, etc. mentioned by interviewees
Broad: wide range of data that allows for unintended findings			Discover information that can be discussed with interviewees
Efficiency: low time requirement with skimming			-
Availability: many documents are in the public domain			-
WEAKNESSES		Retrievability: can be hard to find	Interviewees can mention useful documents
		Access: may be withheld	Creating relationships through interviews may increase access
		Reporting bias: information may be distorted due to the author and purpose of document	Interviewees perspectives on events can be used to uncover biases in the documents
		Biased selectivity: range of documents available can intentionally provide distorted ideas	-
		Insufficient detail: documents are produced for other purpose than research	Interviewees can be asked to elaborate on data gaps

By author, based on Bowen (2009) & Yin (2018)

Appendix 2 – Documentary research table (Droogdokkenpark)

In-text reference or publisher ¹	Publication date	Retrieval date	Title of the document	Link
AG Stadsplanning & W&Z	23/05/2006	07/10/2020	Project redevelopment Scheldt Quays – Collaboration agreement open call	Here
Stuurgroep Scheldekaaien (2007)	18/12/2007	07/10/2020	Communication principles Scheldt Quays – Proposal to the Steering Group Scheldekaaien 18 th December, 2007	Here
AG Stadsplanning	03/2009	05/10/2020	Quays on the tables – Antwerp citizens think, dream, and talk about the redevelopment of the Scheldt Quays	Here
AG Stadsplanning	2010	03/10/2020	Strategic project Scheldt Quays – progress report 2010 (final)	Here
AG Stadsplanning & W&Z (2010)	12/2010	31/08/2020	Masterplan ‘Between city and stream’	Here
Vlaams Bouwmeester (2010)	12/2010	03/11/2020	Guidelines for the design contest for the Droogdokkenpark in Antwerp	Not publicly available
AG Stadsplanning & W&Z (2011)	01/2011	03/10/2020	Design Droogdokkenpark projectdossier	Here
Vlaams Bouwmeester (2011a)	04/2011	03/11/2020	Jury report concerning the design contest of the Droogdokkenpark in Antwerp	Not publicly available
Vlaams Bouwmeester (2011b)	05/2011	03/11/2020	Final decision concerning the design contest of the Droogdokkenpark in Antwerp	Not publicly available
AG Stadsplanning (2012)	2012	05/10/2020	Future vision for the Droogdokken site	Here
Antea (2012)	27/06/2012	03/10/2020	Request for exemption environmental impact reporting duty for the zoning plan (RUP) Droogdokken island	Here
AG Stadsplanning	03/2012	12/09/2020	Zoning plan (RUP) Droogdokkenpark – Process notes	Here
Stad Antwerpen	13/09/2012	04/10/2020	Information moment Droogdokkenpark pre-design	Here
AG Stadsplanning & W&Z	13/09/2012	04/10/2020	Redevelopment Scheldt Quays pre-design Droogdokkenpark: Info-moment 13 th September, 2012	Here
INBO	04/2012	04/10/2020	Ecological design advice Droogdokkenpark	Here
INBO	12/08/2012	04/10/2020	Advice concerning the Droogdokkenpark in Antwerp	Here
AG Stadsplanning	28/11/ 2013	04/10/2020	Zoning Plan (RUP) Droogdokeneiland explanation	Here
Sweco (2016)	09/2016	03/10/2020	Exemption dossier Droogdokkenpark – Motivated research for the exemption of the environmental impact reporting duty	Here

¹. This field includes the main publisher, and where possible includes the in-text reference. This is signified by the date between brackets.

Appendix 3 – Documentary research table (Beneden-Nete)

In-text reference or publisher ¹	Publication date	Retrieval date	Title of the document	Link
Flemish Government (2011)	04/2011	15/11/2020	White paper Internal State reform	Here
Vlaamse Waterweg (2011)	07/2011	12/10/2020	Meet the Netes	Here
Opvolgings-commissie (2012)	07/2012	16/10/2020	Concept note to members of the Flemish Government	Here
Flemish Government (2012)	07/2012	14/11/2020	Principal decision concerning coordination of the regional planning initiatives and projects in the valley of the Kleine Nete and Aa between Kasterlee and Lier	Here
Opvolgings-commissie (2013)	02/2013	19/11/2020	Regional projects and planning processes in the valley of the Kleine Nete	Here
Opvolgings-commissie Kleine Nete	02/2013	16/11/2020	Follow-up commission Kleine Nete – Report	Here
Flemish Government	03/2013	16/11/2020	Progress report concerning coordination of the regional planning initiatives and projects in the valley of the Kleine Nete and Aa between Kasterlee and Lier	Here
Department of Agriculture and Fishery	01/2014	12/10/2020	Cumulative effects projects Kleine Nete	Here
Flemish Government	01/2014	11/10/2020	Report coordination assignment Kleine Nete: Appendix 3. Project note Sigmaplan Nete en Kleine Nete – January 2014	Here
Vlaamse Waterweg (2014a)	01/2014	11/10/2020	Meet the Netes	Here
Vlaamse Waterweg (2014b)	06/2014	12/10/2020	Welcome to the Sigmaproject Nete and Kleine Nete	Here
Berx (2014)	07/2014	16/10/2020	Concept note to the members of the Flemish Government	Here
Opvolgings-commissie (2015)	04/2015	16/11/2020	Together we will realise an ambitious and balanced future project for the valley of the Kleine Nete – from coordination to coproduction	Here

Vlaamse Waterweg	09/2015	12/10/2020	Newsletter Nete and Kleine Nete – September 2015	Here
Cathy Berx	01/2016	15/11/2020	Coordination assignment provincial governor – Year report 2015	Here
Departement Omgeving (2016)	30/09/2016	12/10/2020	Layout of the provincial zoning plan ‘openruimtegebieden Beneden-Nete’ actor discussion 1 st zoning (RUP) proposal, 30 September 2016	Not publicly available
Vlaamse Waterweg (2016)	12/2016	12/10/2020	Valley of Nete and Kleine Nete – The triumphs of wet nature	Here
Tractabel Engie (2017a)	26/01/2017	04/09/2020	Environmental Impact Report for flood areas of the actualised Sigmaplan – cluster Nete and Kleine Nete	Here
Opvolgings-commissie	04/2017	29/10/2020	Follow-up commission Kleine Nete Olen – Thursday 20 th April 2017	Here
VLM (2017)	09/2017	11/10/2020	Development Kleine Nete valley	Here
Tractabel Engie (2017b)	21/12/2017	12/10/2020	Execution construction Polder van Lier within the actualised Sigmaplan: motivated request to exemption of environmental impact reporting duty	Here
Opvolgings-commissie	01/2018	11/10/2020	Follow-up commission Kleine Nete Lier	Here
Vlaamse Waterweg (2018)	05/2018	12/10/2020	Valley of the Nete and Kleine Nete – Execution Sigmaplan Nete valley started in Polder van Lier	Here
Berx (2018)	2018	15/11/2020	Coordination assignment - yearly report 2018	Here
Departement Omgeving (2019)	01/03/2019	04/09/2020	Follow-up commission Beneden-Nete	Here
Vlaamse Waterweg	Fall 2019	12/10/2020	Valley of the Nete and Kleine Nete – construction Sigmaplan Nete valley started in Polder van Lier	Here
Berx (2019)	2019	15/11/2020	Follow-up commission – Yearly report 2019	Here
De Kleine Nete (2020)	202	12/10/2020	Progress report April 2020: Strategic project – Resilience in the Valley of the Kleine Nete	Here

¹ This field includes the main publisher, and where possible includes the in-text reference. This is signified by the date between brackets.

Appendix 4 – Coding table

Category		Sub-category	Deductive (D) / Inductive (I)
BOUNDARY SPANNING ACTIVITIES	Information Transferring	Modelling	D
		Gathering	D
		Scanning	D
		Feedback seeking	D
	Translating	Translating	D
	Coordinating	Coordinating	D
		Negotiating	D
		Reviewing	D
	Co-creating	Research by design	D
	Lubricating	Creating equilibration procedures	D
		Signalling shift from status quo	D
		Challenging assumptions	D
	Representing	Persuasion	D
		Talk up	D
	Guarding	Preventing overexertion	D
		Assessing intentions	D
Isolating		D	
BOUNDARY TYPE	Semantic	D	
	Syntactic	D	
	Pragmatic	D	
EFFECTS	Increased performance	D	
	Reach better decisions or outcomes	D	
	Gained trust	D	
	Create sustainable relationships	D	
	Increased commitment	D	
	Gain legitimacy	D	
	Information sharing	D	
	Create common understandings	D	
	Avoid litigation	D	
	Merging self-interest into joint action	D	
	Innovation	D	
	Increase Risk perception	D	
	Merge present and future needs	D	
Access local knowledge	D		
	Insight in local sensitivities	I	

EFFECTS (cont.)	Mobilised stakeholders	I
	Identified stakeholders	I
	Spread process awareness	I
	Enabled communication	I
	Changed boundary type	I
	Shifted discourses	I
	Divided labour based on expertise	I
	Enhanced contextual knowledge	I
	Created trade-offs	I
	Created political agreements	I
	Focused on singular objective	I
	Gave feedback opportunities	I
	Created conflict	I
	Decreased willingness to collaborate	I
	Reduced spatial claims	I
	Recovered resources	I
	Improved resource security	I
	Decreased available resources	I
RESULTS	Increased integration	I
	Decreased integration	I
	No effect on integration	I
	Facilitative for other activity	I

Appendix 5 – Actions taken to minimise harm

CATEGORY	ACTION TAKEN
Informed consent	The autonomy of interviewees has been respected by giving them the chance to refuse participation. In agreement with the supervisor, it was decided not to send a consent form to avoid reflexivity issues. Instead, interviews were started by informing the interviewees about their rights and the purpose of this research, before asking for their consent.
Data protection	Raw data was only stored on my personal digital devices and the University of Groningen servers for no longer than required.
Privacy	The data have been anonymized and reduced to the format in <i>Table 3.3</i> .
Harm minimization	Anonymization has been used to limit identification of interviewees. However, as this cannot be fully guaranteed interviewees have been fully informed of their rights to withdraw, change previous answers, and read and change the transcript and direct quotes.
Health risks	At the time of the data collection, the WHO (2020) advised researchers to consider the risks of carrying out a study and to pay moral respect to the needs of researched communities. Therefore, the online communication services Google Meet, Skype, and Zoom were used as instruments for data collection.

Appendix 6 – Guiding principles for Droogdokkenpark

Principle	Summary
Active harbour	It is considered important to retain the presence of ships and refresh the relation between people and the river. Protecting old harbour infrastructure, and reusing it where possible, should be considered where possible
Historical heritage and architecture	The Quays should be used to display the history of Antwerp. Historical elements should be integrated into the designs, integrating new developments with historical value
New flood protection	Creating a new flood defence that does not form a barrier inhibiting the interaction between people and the river
Mobility	There should be an uninterrupted boulevard across all zones that allows walking and cycling along the river. Additionally, public water transport and local transport infrastructure should increase accessibility
Public space and image quality	The Quays belong to everyone and should be viewed as a transition zone between city and river
Quay programmes	Many buildings are waiting for a new purpose. This should be done in a preferably water-inclusive and publicly accessible way.

Based on Vlaamse Waterweg (n.d.) & AG Vespa (2010)

Appendix 7 – List of organisations in Droogdokkenpark

Organisation	Function of the organisation
Vlaamse Waterweg	Vlaamse Waterweg (Previously Waterwegen & Zeekanaal) is a Flemish agency, commissioned by the Ministry of Mobility and Public Works agency that manages waterways and access to them. They are also responsible for the successful implementation of actualised Sigmaphan.
AG Vespa (Team Scheldekaaien)	Formerly known as AG Stadsplanning, AG Vespa is an autonomous municipal company, commissioned by the municipal government of Antwerp to undertake real estate and urban development projects in Antwerp.
Department Maritime Access	This is a cell within Department Mobility and Public Works that serves to maintain and manage access to harbours. This includes the management and maintenance of Royerssluis, which provides access to the harbour of Antwerp.
Zwarts & Jansma	Landscape architect contracted by the Agency for Maritime Access to facilitate spatial integration Droogdokkenpark with Royerssluis.
Mayoral office	The mayoral office in Antwerp represents a coalition of political parties elected during municipal elections that occur on a 6-yearly cycle. The Mayor oversees and intervenes the development of Antwerp, based on the joint decisions of the aforementioned coalition.
Instituut voor Natuur- en Bosonderzoek	Acts as an independent research institute of the Flemish government that evaluates and supports biodiversity policy and development
Vogt Landscape ltd	Landscape architect contracted to integrate public space in Droogdokken with flood defence, natural qualities, and its surrounding area. Partnered with Van Belle & Medina.
Van Belle & Medina	Architectural expert that focussed on design and function of existing and envisioned buildings. In their partnership with VOGT Landscape, they sought to preserve the architectural heritage and highlight historical functions of buildings.
Stedelijk Wijkoverleg	The organisation translates to urban district consultation, and is a department of the municipality of Antwerp focussed on facilitating, encouraging, and moderating interaction between professional project stakeholders and local stakeholders.

Appendix 8 – List of organisations in Beneden-Nete

Organisation	Description
Vlaamse Waterweg (VW)	Vlaamse Waterweg (Previously Waterwegen & Zeekanaal) is a Flemish agency, commissioned by the Ministry of Mobility and Public Works agency that manages waterways and access to them. They are also responsible for the successful implementation of actualised Sigmaplan.
Agentschap voor Natuur en Bos (ANB)	ANB is Flemish governmental agency responsible for the policy design, management, and improvement of nature in Flanders. Within Sigmaplan they are a key player in the in realising and guarding the nature objective.
Vlaamse Landmaatschappij (VLM)	Privatised actor that invests in achieving a variety of objectives in undeveloped space and agricultural land. Within Beneden-Nete they were commissioned by VW & ANB to purchase agricultural land outside project area operate the landbank, as well as the trade and purchase of agricultural land within the project area.
Tractebel Engie	Tractebel Engie is a large international engineering and consultancy firm that created the design of the zones within Beneden-Nete, as well as connection between them.
Boerenbond & Boerensyndicaat	Boerenbond is an interest group that protects affiliated agrarians. It is connected to Sigmaplan on both the project and programme level. Boerenbond was involved in the actualisation of Sigmaplan, influencing the programme objectives, but also protects and negotiates on the behalf of individual agrarians within project areas.
Natuurpunt Wielewaal	Natuurpunt is present in Beneden-Nete as a local and central actor. Its central branch protects nature, biodiversity, and open space in Flanders, and shaped the nature objective in the actualised Sigmaplan. The local component, Natuurpunt Wielewaal, is directly involved in Beneden-Nete and guards the access of local stakeholders to nature, biodiversity, and open space.
Polder van Lier	Polder van Lier is one of the five areas within the Beneden-Nete projects, and the manager of this area eponymous. The organisation Polder van Lier was originally created to regulate groundwater for agricultural use, but have since shed this function. Instead, it focusses on the maintenance of forestry, open space, and the dike.
Governor Cathy Berx	In 2011 the Flemish Governors received a new function. They were to coordinate decision-making processes when needed, mediate between stakeholders when requested, and establish discussion platforms for governmental and non-governmental stakeholders. Within Beneden-Nete the Governor used this coordination assignment to establish a follow-up commission and Process management committee.
Process Management Committee	In the Governors coordination assignment. The Process Management Committee is the first step in the coordination structure. It is a gathering a project managers and programme managers within the organisations that are developing projects the Kleine Nete Valley. Here, this includes the Vlaamse Waterweg, Agentschap voor Natuur en Bos, Vlaamse Landmaatschappij, and Vlaamse Milieu Maatschappij.
Follow-up Commission Kleine Nete	The follow-up commission is the second step in the coordination structure. After discussion in the Process Management Committee, the findings are discussed with a wider audience of experts. This includes all members of the Process Management Committee, municipal governments, civil society organisations, and interest groups. In the Kleine Nete Valley these include representatives from, but are not limited to, all stakeholders in this overview.

Appendix 9 – Conditional factors that influence boundary spanning activities

CONDITIONAL FACTORS	DROOGDOKKENPARK		BENEDEN-NETE	
	Sub-conditions	Description	Sub-conditions	Description
Environmental characteristics	<ul style="list-style-type: none"> – Environmental uncertainty – High dependency 	<ul style="list-style-type: none"> – Unstable project environment due to 6-year mayoral cycle – Vlaamse Waterweg and AG Vespa could not realize their goals independently 	<ul style="list-style-type: none"> – Environmental uncertainty – High dependency – Low urgency 	<ul style="list-style-type: none"> – Various pre-existing conflicts within the Nete and Kleine Nete cluster – Vlaamse Waterweg and ANB execute Sigmaplan and its objectives together – Sigmaplan Retention areas buffered most recent storm in Nete cluster
Organisational support and feedback	<ul style="list-style-type: none"> – High organisational support – Low organisational support 	<ul style="list-style-type: none"> – Considered prestige project of the mayoral office (SP.A), lead to design support from the city architect Kristiaan Borret – Mayoral office (NV-A) did not want to carry out predecessor's project 	<ul style="list-style-type: none"> – High organisational support 	<ul style="list-style-type: none"> – Close monitoring from project level with willingness to carry discussions through here
Role definition and role stressors	<ul style="list-style-type: none"> – Clear role definition 	<ul style="list-style-type: none"> – All actors had a clear role within the scope of the project; INBO researcher hired by Vlaamse Waterweg; Vogt and Zwarts & Jansma designated to create spatial integration; AG Vespa empowered to carry out coordination 	<ul style="list-style-type: none"> – Clear role definition 	<ul style="list-style-type: none"> – Vlaamse Waterweg, ANB, and VLM clearly demarcated their roles and respective themes

Individual determinants	<ul style="list-style-type: none"> – Skills and abilities – Personal relations 	<ul style="list-style-type: none"> – Dutch speaking Vogt employee – Project leaders from Vlaamse Waterweg and AG Vespa studied together 		
External factors	<ul style="list-style-type: none"> – Institutional framework supports ecology – Political discourse stuck on other project dossiers 	<ul style="list-style-type: none"> – INBO's position strengthened by existing EU and national ecological goals and legislation – Ongoing debates on the political level influence the ability of the project to receive support (particularly Ring of Antwerp) 	<ul style="list-style-type: none"> – Institutional framework supports discussion – Institutional framework supports ecology – Institutional framework supports ecology 	<ul style="list-style-type: none"> – The new coordination assignment gave the governor cause to intervene in Kleine Nete projects – EU and national level ecological goals help ANB create urgency for nature – Sigmaplan's supporting measures