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Push the pedal or hit the brakes?

A dynamic analysis of time pressure in collaborative strategy formulation for the Regional Energy Transition

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Push the pedal or hit the brakes? A dynamic analysis of time pressure in collaborative strategy formulation for the Regional Energy Transition

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Abstract

Many national energy policies commit to using collaborative innovation at a regional level to tackle the transition to a low-carbon energy economy. The pressure is high in developing strategies to tackle the transition effectively from a bottom-up approach. Collaborative innovation can allow many stakeholders to engage in consensus-driven decision-making processes while dealing with high levels of uncertainty. Whereas existing practice-based work on collaborative innovation describes various relevant antecedents, barriers and success factors, the true complexity lies in the dynamic nature of collaborative innovation initiatives. This study answers the recent calls to study the dynamic relations within collaborative innovation and responds with an interdisciplinary approach by merging collaborative innovation with system dynamics to display the interrelations within the process. Studying a longitudinal in-depth case study of a collaborative initiative of the Regional Energy Strategy within the Netherlands we develop a causal loop model to capture the influence of time pressure and time windows on the collaborative process. The model describes the interplay between pragmatic results and collaboration within the process, which results in behavioral changes and balancing actions in response to the influence of looming deadlines. This study particularly focuses on the role of deadlines in the implementation of collaborative innovation in a regional setting and gives key considerations when implementing collaborative innovation while dealing with a high-pressure environment and wicked problems.

Key words:

Collaborative governance, collaborative innovation, system dynamics, regional energy transition, wicked problems, fragmented workstyle.

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Abbreviations

Terms	Definition
Regional Energy Transition (RET)	Sustainable energy transition projects that occur on regional or local level. These projects often include many custom options and many different stakeholders (Nationaal programma Regionale Energie Strategie, 2021).
Regional Energy Strategy (RES)	A governmental agency that facilitates and supports regions with making their strategy for energy transition. They help create and share knowledge and processes between different regions (Nationaal programma Regionale Energie Strategie, 2021).
Metropolitan Region Eindhoven (MRE)	A collaboration of 21 different municipalities in the Noord-Brabant province, two waterboards, the energy grid, and the province (RES, Nationaal programma Regionale Energie Strategie, 2021).

1 Introduction

The transition to a low-carbon energy economy will remain a cornerstone of national energy policies of countries committed to the climate change accord for decades to come. The Paris agreement of 2015 shapes much of the policies of these governments. In response, many governments have chosen regional approaches to implement the energy transition. The Netherlands in particular has established the Regional Energy Strategy (RES) to implement their Regional Energy Transition (RET) (RES, Nationaal programma Regionale Energie Strategie, 2021). Local innovation policies are gaining importance and governments increasingly choose a bottom-up, tailor-made approach to support specific innovations (Grotenbreg & van Buuren, 2018). Developing such solutions requires multiple stakeholders, including public, private, and civic actors, to join forces in creating and implementing innovations (Hoppe & Miedema, 2020; Dall-Orsoletta, Romero, & Ferreira, 2022). For this, collaborative governance can allow a multitude of stakeholders to engage in consensus-driven decision-making processes (Ansell & Gash, 2007). The switch to use collaborative governance for RET is gaining more traction and the benefits are becoming more apparent (Douglas, et al., 2020; Gailing & Röhring, 2016; Sedlacek, Tötzer, & Lund-Durlacher, 2020; Hofstad & Torfing, 2015). For instance, the use of RET for energy transition in two regions within Germany or the national policies for regional sustainability transition in Norway (Gailing & Röhring, 2016; Hofstad & Torfing, 2015). To further expand on the collaborative governance literature, an innovation-driven approach has been labeled collaborative innovation, which aims to integrate the collaborative governance literature with insights from innovation studies (Ansell & Torfing, 2014).

To better understand and facilitate collaborative innovation, scholars have focused on its characteristics, contextual conditions, barriers, and best practices (Cinar, Trott, & Simms, 2019; Torfing, 2019). The public sector's barriers to innovation have been well-rehearsed, even over-rehearsed (Hartley, Sørensen, & Torfing, 2013). And, while significant progress has been made in explaining the complex nature of collaborative innovation, they remain understudied. Cinar et al. (2019) study the interrelations between innovation barriers observing that barriers in the development and design phase can lead to new barriers or become more severe barriers itself acting [as] a snowball. As such, collaborative innovation can be best understood of endogenous, feedback-driven processes, delays, and nonlinear relationships (Torfing, 2016). Therefore, a dynamic approach is more suited to understanding the underlying mechanisms within collaborative innovation.

Collaborative innovation tends to engage in wicked problems while simultaneously working with high levels of uncertainty and facing short time spans. Wicked problems, are ill-defined, difficult to respond to, require specialized knowledge, involve many stakeholders, and carry a high potential for

conflicts (Koppenjan & Klijn, 2004). Subsequently, innovation processes are characterized by high levels of risk and uncertainty (Rindova & Courtney, 2020), and they typically involve highly iterative processes of prototyping, experimentation, and learning by trial and error (Crosby et al., 2017). To add to that, the many milestones defined within sustainability transition lead to a high-pressure environment in which time pressure is prevalent. These aspects together result in a dynamic interplay between the collaborative processes required to deal with the wicked problems and the need to meet milestones. As we know from innovation literature, innovation speed and time pressure are key characteristics for successful innovation (Kessler & Chakrabarti, 1996; Sheremata, 2000). Within other literature fields, a successful innovation is defined by, attaining development schedule, costs, and product quality (Sheremata, 2000). However, the implications of these circumstances all together within collaborative innovation remain largely absent within the literature.

This study wants to explore the interplay between these different aspects that all come together within collaborative innovation. By taking a systems perspective within a collaborative innovation setting the complex and dynamic relations within the collaborative process will be exposed, as response to recent calls (Ansell & Gash, 2007; Cinar, Trott, & Simms, 2019; Torfing, 2019). Additionally, this study aims to bring to light the influence of time pressure and deadlines within the collaborative process that exists within collaborative innovation.

The empirical part of this study draws on an in-depth, longitudinal inductive case study of a collaborative innovation project within the regional energy transition environment. We develop a causal loop model (Sterman, 2000), grounded in rich qualitative data to capture, formalize and theorize the key behavioural patterns of this collaborative innovation project (Gioia, Corley, & Hamilton, 2013). By analyzing the project groups within the collaborative innovation throughout the innovative process, the path-dependent aspects can be unearthed that influence the whole innovative process. This is especially relevant as, the exact nature of these feedback-driven processes within a temporal setting in and around collaborative innovation remain imprecise.

The next section provides a review of the literature on collaborative innovation and dissects the collaborative process within collaborative innovation. Secondly, it highlights the importance and hurdles of governing complex projects within a high uncertainty complex setting. Subsequently, we outline the research method that is adopted for this study and present the main findings thereafter. Finally, the findings will be contextualized and reviewed, and a prospect for future studies is proposed.

2 Theoretical background

Within the theory section the notion of collaborative innovation within a regional and public setting will be outlined. Additionally, the corresponding collaborative process will be detailed. Subsequently, management of complex public-private innovations and project management styles will be discussed to further enrich the playing field of complex innovations within collaborative innovation.

2.1 Collaborative innovation in a regional setting

Today, public authorities increasingly view public innovation as a tool for improving public governance and strategic efforts are made to enhance the capacity of the public sector to formulate, implement, and diffuse innovative public policies, services, organizational designs, and procedures (Sørensen & Torfing, 2017). One way of turning public innovation into a more permanent and systematic endeavour is to institutionalize arenas where collaborative innovation can take place. Sørensen & Torfing (2017) identified four circumstances that call for the adoption of such a meta-governed strategy, one being the proliferation of wicked problems, such as climate change, in the public sector. Specialized knowledge is needed, in terms of climate mitigation, in order to capture the complexity of the problem and efforts must be undertaken in order to reduce the risk of conflicts between the many different stakeholders (Sørensen & Torfing, 2012). Furthermore, collaborative innovation requires the inclusion of a diverse range of actors involved in the process to be successful, each possessing important innovation assets such as, firsthand experience with the problem or challenge at hand, expert knowledge and new and competing ideas, the capacity for creative thinking, the courage to experiment with new solutions despite the associated risks, competences and skills needed for implementation and diffusion of new solutions, and tolerance toward complexity and cognitive dissonance in the consolidation phase (Sørensen & Torfing, 2017). Therefore, collaborative innovation will contain a distinct group of actors all with their own motives and skills attempting to reach a collective goal.

Ansell & Gash (2007) created a model for collaborative governance and they identified that a successful collaborative process is crucial for successful implementation of collaborative governance. The process can be divided into four broad stages, (1) starting conditions, (2) institutional design, (3) facilitative leadership, and lastly (4) the collaborative process (Ansell & Gash, 2007). Each of the stages can then be furthered distilled into sub-variables that together structure that particular stage. The first three of the broad stages, which are, the starting conditions, institutional design, and facilitative leadership, directly impact the collaborative process. These three stages are considered to be critical contributions for the collaborative process and provide a starting ground for the collaborative process (Ansell & Gash, 2007). The stages are context and actor dependent for every

collaborative process in particular. Therefore, making the generalization of constructs evermore complex in collaborative innovation and make comparing cases especially difficult as they shape the context of the collaborative process. Subsequently, the collaborative process will spark a dynamic and iterative process as the variables within the process will influence, and change, each other consecutively.

2.2 Collaborative process within collaborative innovation

The collaborative process is treated as the core of the model and the process can be divided into five different variables. The variables are the, Face-to-Face dialogue, Trust-building, Commitment to process, Shared understanding, and intermediate outcomes. The iterative cycle that entails from this leads to dynamic behavior of the collaborative process as actions echo throughout the process over time. Meaning that, past choices made can impact the future collaborative process by creating temporal feedback loops that often remain concealed. Therefore, constant monitoring of the process is required in order to encourage positive effects and intervene whenever negative effects start to occur. The benefits of successful monitoring collaborative processes include greater responsiveness to complex situations and more deliberation than traditional governance processes (Leach, 2006). Additionally, collaborative governance may produce more effective, efficient, and flexible policies (Sousa & Klyza, 2007) with greater public acceptability. However, the interrelations between the variables and the exact consequences of external influences, and of temporal feedback loops remain largely uncharted. Several researchers have advocated for further deeper understanding on the variables of trust building, shared understanding and commitment formation within the collaborative process (Ansell & Gash, 2007; Klijn, Edelenbos, & Steijn, 2010).

The collaborative process also has some barriers which can negatively impact the collaboration between stakeholders (Cinar, Trott, & Simms, 2019; Lopes & Farias, 2020). Gerlak & Heikkila (2006) explain that many of the institutional and political obstacles to collaboration are the conflicting agency goals and missions, inflexible and legal procedures, and constrained financial resources. Additionally, collaboration can be a way of advancing self-interests, such as gaining power (Huxham & Vangen, 2000). Furthermore, critical interests may not be represented (Leach, 2006) and collaborative processes may bias decisions toward the participants with greater resources (Purdy, 2012). Consequently, deadlock can occur when articulated public ambitions do not match their actual ability or willingness to act (Grotenbreg & van Buuren, 2018). Many of these above-mentioned concerns can be linked to power disadvantages between different parties within the collaborative process. Furthermore, the many different institutional logics that are mixed when collaborating in large-scale public-private projects result in many tensions, requiring a governmental policy mix in which coordination and facilitation are paramount (Grotenbreg & van Buuren, 2018).

This is especially relevant when performing a meta-governed approach to energy transition with public and private organizations of varying sizes. As governmental policies shape the collaborative environment and processes within. But for many complex public–private innovations, such as integrated energy to succeed, no single policy instrument can do the job (Grotenbreg & van Buuren, 2018). Purdy (2012) states that despite the importance of such concerns, little theory exists to guide conveners, participants, and researchers in understanding how power shapes collaborative processes and outcomes.

2.3 Collaborative innovation and time pressure

The momentum of regulations and policies regarding sustainability transitions have increased rapidly over the last decade, which in turn led to an increased demand for studies regarding regional transitions (Camagni & Capello, 2017; Uyarra, Flanagan, Magro, Wilson, & Sotarauta, 2017). The high momentum of regulations and policies allow a government to rapidly respond to a quick developing market in which uncertainty is high. Likewise, the Netherlands have chosen for a similar swift approach for their RET by dividing their nation into 30 regions. The RES is responsible for governing the RET in which each region separately has to produce a yearly strategy regarding their RET (RES, Nationaal programma RES, 2022). This results in high pressure situations in which time and decision-making speed is essential for reaching the deadlines. These tense situations within collaborative innovation, in which time pressure and uncertainty are high, is becoming increasingly more prevalent.

Time pressure is defined as the difference between the amount of available time and the amount of time required to resolve a decision task (Rastegary & Landy, 1993). The time pressure intensifies as required time increasingly exceeds the available time. Time pressure restricts a decision-maker in collecting the needed information, it contributes to project uncertainty, and can lead to accelerations of activities (Rastegary & Landy, 1993). Furthermore, a team consists of many different types of individuals, each responding differently to time pressure according to their pacing style (Mohammed & Nadkarni, 2011). These different pacing behaviors can lead to inconsistencies in working behavior and even frustrations between team members (Mohammed & Nadkarni, 2011). Kapucu & Garayev (2011) noticed that within collaborative decision-making, the stress induced by time pressure can lead to a disturbing effect on the whole collaborative process, for instance, the skipping of steps in their process.

From the project management literature we know that the impact of time pressure is not linear on the overall team project performance. Time pressure has an inverted U-shape correlation to team processes and indirectly impacts team performance (Maruping, Venkatesh, Thatcher, & Patel, 2015).

While at first, increasing time pressure activates actors within the team the positive effect transforms into a negative effect as time pressure increases more on the team. A shorter time window puts extra strain on the team members and increases the impact of slack on the projects' outcome. The negative effect, however, can get moderated whenever a strong temporal leader is active within the team (Maruping, Venkatesh, Thatcher, & Patel, 2015). Maruping et al., (2015) define a temporal leader as a leader whose behavior aids in structuring, coordinating, and managing the pacing of task accomplishment within the team. They conclude that a strong temporal leader, while having little-to-no impact on the positive effect of time pressure, can completely negate the negative effects of time pressure on the team processes. Furthermore, from literature research on crisis management and rapid decision-making it has shown that these influences are not ideal for establishing emergent collaborations with new partners or expanding existing collaborative arrangements (Parker, et al., 2020). This is especially relevant as regional energy transition is filled with many wicked projects and fast-paced deadlines. We know the impact of time pressure on project performance from other literature (Kapucu & Garayev, 2011; Maruping, Venkatesh, Thatcher, & Patel, 2015), however, the exact influence that time pressure has on the innovative processes within collaborative innovation is not studied yet within collaborative innovative setting and this study is the first address this topic.

3 Research method

In this section, first an in-depth description the case setting is being described and reasoning for the suitability of this case study is elaborated. Subsequently, the collaborative environment is outlined in which the case study is situated. Thereafter, the examined team is elaborated and their engaged projects are defined. Lastly, the types of collected data and the data collection method is explained in detail.

3.1 Empirical case setting

A longitudinal case approach is a key instrument in uncovering the underlying mechanics of the collaborative innovation processes because of its inductive nature. To build a dynamic understanding of collaborative innovation we conducted a longitudinal inductive case study of the RES Metropolitan Region Eindhoven (MRE) Heating working group (Langley, 1999). Building theory from case studies is a research strategy that involves using one or more cases to create theoretical constructs, propositions and/or midrange theory from case-based, empirical evidence (Eisenhardt & Graebner, 2007). Case studies are rich, empirical descriptions of particular instances of a phenomenon that are typically based on a variety of data sources (Yin, 2009). By drawing on various sources of data, our case study serves to identify the underlying mechanisms and temporal

feedbacks driving the dynamics of collaborative innovation (Hoppe & Miedema, 2020). An inductive case study is best suited when trying to answer a tightly scoped research question which rests heavily on complex social processes that quantitative data cannot easily reveal (Eisenhardt & Graebner, 2007). Specifically for this research, the mechanisms of time pressure and deadlines is examined within a collaborative regional innovative setting with many different stakeholders, merging the collaborative innovation literature with project management literature.

For this research in particular the Heating working group, from the RES MRE, is taken as a case study as the importance of deadlines and time pressure are expected to be prevalent for the following reasons. First, the Heating working group within the MRE area is considering a total 18 different potentially possible technological solutions for heating. This leads to complex and wicked problems which require specific expert knowledge and, most of all, time to explore. Secondly, many of these technological solutions have different societal- and environmental impacts, development time, technological uncertainty and costs associated with them. This, combined with a different societal acceptance per municipality on each possible technological solution, creates a complex socio-technical environment which can lead to many delays in the process. Thirdly, many technological solutions are highly proximity dependent, e.g., as generating energy out of water basins need a nearby large water source. This creates a power imbalance to the owners of valuable land and natural resources, and requires the setup of deals between owners and government which requires time. Lastly, their low available time leads to difficulty exploring all the technological, financial and societal aspects of each different technological solution. Collectively, their complexity of collaboration, their high degree of varying tasks, their limited available time for tasks and, their high technological uncertainty makes the Heating working group a suited case study to examine time pressure within a collaborative innovative setting.

3.2 The collaborative environment: RES MRE

Within the MRE 21 municipalities, two water boards, and the province of Noord-Brabant collaborate with regional stakeholders to develop a collaborative future energy strategy. In 2020 the MRE submitted a concept RES 1.0, and later in December of 2021 they presented their final version of the RES 1.0. Subsequently, the MRE revise and submit a new version of their RES every 2 years, these also includes a concept version a year prior.

The MRE is part of a greater initiative from the government to divide the country into 30 regions. These regions are to develop their own RES and are facilitated to collaborate and share their knowledge on complex problems via a shared platform. This overarching environment emphasizes the priority of collaboration within the designed collaborative innovation setting. The MRE region is

part of the Noord-Brabant province, in which 4 regions work closely together. In practice, however, the inter-region collaboration is minimal between the MRE and other regions. This is partly because the MRE region has a large number of municipalities of their own joined in their collaborative setting, resulting in an already diverse input (RES, Nationaal programma Regionale Energie Strategie, 2021)

Within the MRE, the implemented hierarchy structure of the RES makes the collaboration process a layered structure of a total of three layers with many back-and-forth mechanisms. The three layers are; the province layer, the regional layer, and the municipal layer. Strategic decisions are made on the regional level between the 21 municipalities on consensus basis. The water boards, network operators, together with other important stakeholders provide expert input for the strategic decisions. Whenever strategic decisions are made the 21 municipalities decide on one of the working groups to tackle that task or project. A working group consists of a few members from the 21 municipalities, experts and hire-ins. Currently, within MRE there are multiple active working groups as can be seen in Figure 1, and new ones will be created when new large-scale goals are defined. After a working group has reached a first concept, the project gets brought to the bi-weekly 21-municipality meeting in order to receive feedback. This process gets repeated until a final concept is created. The project is then brought to the steering group, which is provided by the province, they evaluate the project and prepare it to be brought to the corresponding civil council(s) of the municipalities involved. On municipal level the impacted stakeholders, affected unions and citizens are involved and have input of the decision. During the civil council meeting the delegation from the RES defends their project after which the civil council has to vote to get it accepted. A majority vote rule is maintained and when accepted, the project can be executed.

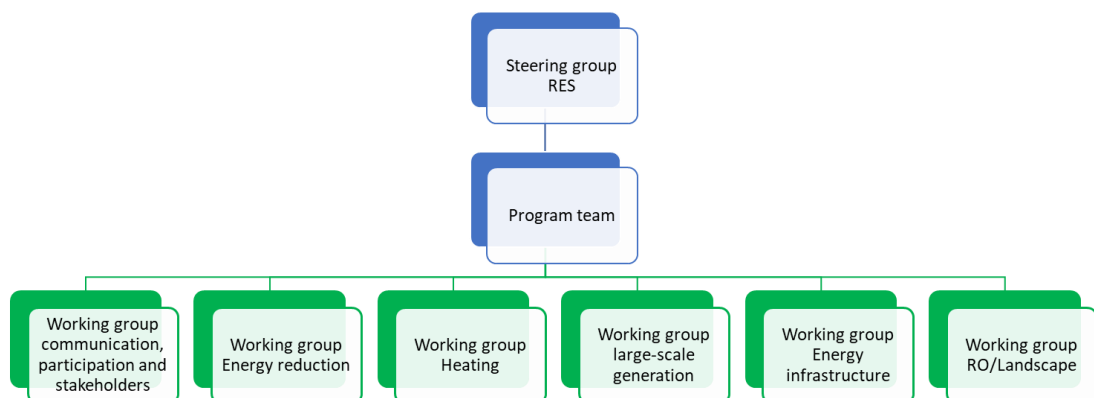


Figure 1: layout RES MRE working groups (MRE, 2022)

Because some of the members of the working groups are recruited within the 21-municipalities representatives, the possibility of project favoritism can occur during the bi-weekly meetings for their own projects. Additionally, this could lead to members progressing personal agendas within the

RES MRE. The recruitment of members in the working group is done on interests of the members and on interest of the municipalities. The tasks of the working are to detail the projects and strategies decided by the 21-municipality meetings. The MRE working groups work in parallel to each other. Secondly, the working groups also scout for opportunities and provide these to the 21-municipality meetings to get evaluated and accepted. Once accepted they follow the same path as a standard task or project.

3.3 Case description: The Heating working group

Within the Heating working group two major projects were in the pipeline during the examination. These projects served as milestones for the Heating working group and took a longer time to finish than standard tasks. The collaborative initiative aimed to develop (1) a regional assessment framework for dividing supra-local energy sources and (2) a story map focused on past developments and future developments in the region. These two projects combine the uncertain and innovative nature of the work that the project group performs, as well as the collaborative structure in which the municipalities need to come to a compromise. This combination results in ambiguous projects with many stakeholders and iterations resulting in an extended amount of time spent on the projects. Therefore, these projects serve as a suitable focus point as the underlying mechanisms and temporal feedbacks exhibit a larger impact on the overall projects.

To tackle the regional energy transition the Heating working group focuses on strategies and policies within the MRE regarding the technologies and opportunities of particular types of energy production. Specifically, the group focuses on creating strategy concerning the supply of heating to and from residential housing. Within this ambition is also included the transition of all residential housing to become free of natural gas. In order to efficiently stimulate the development of the heating networks and heating replacements, the Heating working group has two major projects that they are currently developing. These are the Assessment framework and the Timeline roadmap. An overview of the key events during the progress of both projects is given in; Figure 2 and Figure 3. In addition, both the timelines grant insight on the different levels that decisions are being made and events are happening during both projects. Both projects are still in development at the time of writing.

3.4 Data and Data collection

The investigated period runs from June 2019 until May 2022. From June 2021 onwards, we started engaging in the Heating working group in real time, as longitudinal participant-observers. As participant-observers we were given access to various sources of data regarding development of projects and the functioning of the collaboration over time. This allowed us to observe relevant

dynamics within the working group and examine the decision-making process over the period from June 2021 until May 2022. We relied on three types of data sources to develop and triangulate the findings: (1) semi-structured interviews; (2) observations made during formal and informal project meetings; and (3) archival data from various organizations involved in RES MRE (Yin, 2009). The overview of the gathered data and their use in the research can be found in Table 1.

Table 1: Data sources and their use in the analysis

Source	Data Type		Use in the analysis
Semi-structured interviews	RES MRE Interviews (23)	Process manager (1), Project champion (4), Advisor (1), Project leader (2), Unspecified role (15)	Collected detailed information on key activities and events of interest. Gain a better understanding of actors' actions and motives.
	RES MRE Interviews partners (3)	Enexis (2), External researcher (1)	Understand how actors perceived collaborative dynamics and other actors' actions.
	Short-talks with members involved (-)	Coffee table talks, Catch up talks	
Participatory observations	Formal meeting with workgroup RES MRE (31)	Project meetings (16) Core team meetings (15)	Observe collaborative actions, and gain insights in actors' motivation. Observe interaction between actors.
	Meeting with all RES participants (17)	Brainstorm session (1), RES MRE Strategy meeting (1), Bi-weekly project update meetings (15)	Observe the inner workings of the organizational structure. Informal talks with actors to discuss personal values and motivation.
Archival data	Website visits RES MRE, Publication of RSW concept 1.0, Publication of RSW 1.0, Organizational structure, Communication channels, past activities.		Chronically trace key events. Gain contextual understanding of actors past collaborative activities. Triangulation.

In total, 26 semi-structured interviews were performed, recorded and transcribed. We interviewed different members of the Heating working group, as well as members of the RES MRE, to get a diverse input on the activities performed and the decision-making process. These interviews were taken throughout the project timeline to get input on the decision-making processes, as well as to verify the previous gathered interview data (Gioia, Corley, & Hamilton, 2013). This gathered data was then used to ask follow up questions in subsequent interviews. We asked the participants to elaborate on their background, their organizational interests, their motivation for engaging in a collaborative innovation setting, and to reflect on the decisions made during the process. Subsequently, we asked the interviewees to give their perceived judgement on the current state of, and possible improvements on, the collaboration process within the RES MRE. Furthermore, we asked interviewees for additional information on historic events and relationships between different

stakeholders. Lastly, many informal short-talks, and coffee-table talks were performed, which gave actors more freedom to elaborate on their decisions and actions.

As participant-observers we attended various meetings, a total of 48 over the course of 9 months. These meetings included bi-weekly meetings with the Heating working group as well as regional meetings between municipalities. In the bi-weekly meetings the project's progress was discussed and tasks regarding the project were divided. The discussions were held on a mix of technical uncertainty and societal focus. In the regional meetings the focus of the discussion was on the project pipeline, municipal alignment, municipal goals and the milestones set by the national government. As participant-observers we are able to engage in informal talks that took place before and after the meetings. Such talks allowed us to better gain information on personal inquiries on the collaboration process and developments on personal level within the group. These off the record conversations allowed to gain wider information on project progress and frustrations. Additionally, observations of the meetings will provide an opportunity to gain new insights and expand on the used terminology of the participants.

Finally, we collected archival data from the period of 2018 to the period of 2021 prior to the start of the interviews. Archival data includes public sources such as the RES MRE website, Articles posted by the RES MRE, the regional energy structure (RSW) and public hall meeting outcomes. The archival data served to chronically place events, activities and developments of the RES MRE and to prepare interviews for future RES MRE plans. These archival data posts gave contextual understanding of stakeholders' motives and interests, and to triangulate our findings (Yin, 2009). Case study researchers usually triangulate data as part of their data collection strategy, resulting in a detailed case description (Ridder, 2017). The triangulated data allows for an inductive study that can then be used to write a narrative.

4 Data analysis

To explain the dynamic interplay between conflict and the collaborative process of collaborative governance a process research approach is used developed by Langley (1999) and data analysis approach developed by Gioia, Corley, & Hamilton (2013). This will be further augmented by taking a systems perspective to explain the complex, dynamic and nonlinear nature of collaborative governance and innovation in response to the recent call from (Ansell & Gash, 2007; Cinar, Trott, & Simms, 2019). The process approach refers to the event-driven approach where raw data is collected in an ongoing and frequent basis and constructed into a detailed narrative (Langley, 1999). Secondly, the narrative will be analyzed via a data structure that will transform the informant terms into 2nd-order themes that can be theoretically supported and challenged. While lastly, the systems

perspective (Stermann, 2000) allows to capture the underlying mechanisms between these 2nd-order themes and the capricious influence of conflict on the collaboration process.

Data analysis commenced shortly after the start of the data collection, and we kept iterating while collecting data in the field. It is important to keep gathering data during the data analysis on multiple levels, verifying 2nd-order themes while still gathering informant terms and codes (Gioia, Corley, & Hamilton, 2013) and iterating the system that generates from that. Particularly, we started by analyzing the hierarchy structure of the RES, as the hierarchy design leads to many sequential steps and redoes in the overall projects. Our goal was to capture key events and activities that relate to the collaboration process. Consequently, a timeline was created, according to the Visual Mapping Strategy (Langley, 1999), to visualize the development of a project over time, Figure 2 and Figure 3. The timeline helped to triangulate our findings by verifying key events. To develop a manageable set of 1st order concepts, key codes and concepts were iteratively refined by actively comparing similarities and differences (Gioia, Corley, & Hamilton, 2013). The key codes and concepts were defined by marking the frequently discussed concepts and terms within the investigated group. Consequently, the key codes and concepts were grouped according to their meaning or context. As data analysis progressed, the 1st order concepts were distilled into second-order themes and aggregate dimensions, the themes were linked to the model of collaborative governance by Ansell & Gash (2007) to focus specifically on the collaborative setting. Specific patterns regarding the management of projects within the working group emerged as the projects were progressed. The described coding method is illustrated in Figure 4. The figure clarifies the transition from raw data to concepts, themes, and dimensions to make the data analysis as transparent as possible.

4.1 Project timelines

Both investigated projects follow a similar trend. First, a problem or opportunity is spotted by the Heating working group. As a response, a smaller project group within the Heating working group is created and a project champion is assigned. At this stage the project group is small, e.g. two to four persons. Next, the definition phase starts in which the problem is defined and explored. After some time, the first ideas to tackle the problem are formulated and these are then brought to the Heating working group meeting to be assessed. Feedback is given on the idea, and either the stage needs to be explored more and redone, or the idea is accepted and developed further. During the ideation phase, the project champion tries to attract members whenever barriers occur that warrant specific knowledge or skill. Once the idea is fully developed and ready to be executed into a proper project the project is discussed again within the Heating working group. This discussion focuses on strategy of implementation and creating support base for the RES MRE. Lastly, the end product of the project will be developed by, either members of the Heating working group, or hire-ins.

PROJECT TIMELINE ASSESSMENT FRAMEWORK

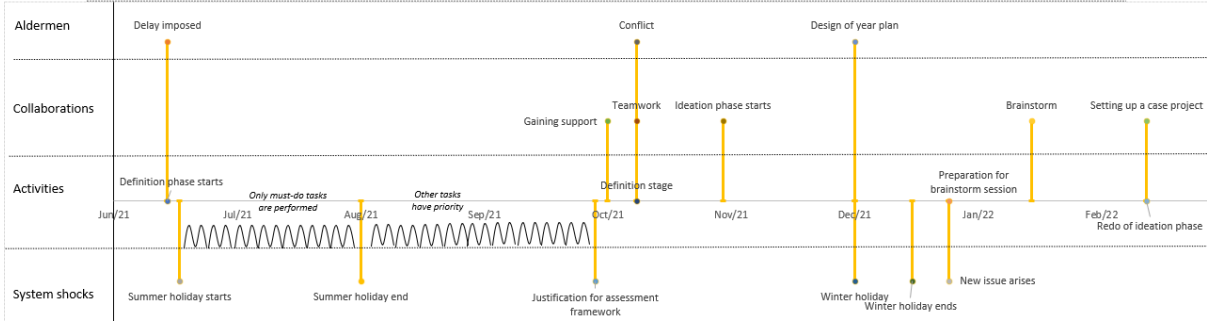


Figure 2: Project timeline Assessment Framework

PROJECT TIMELINE ROADMAP

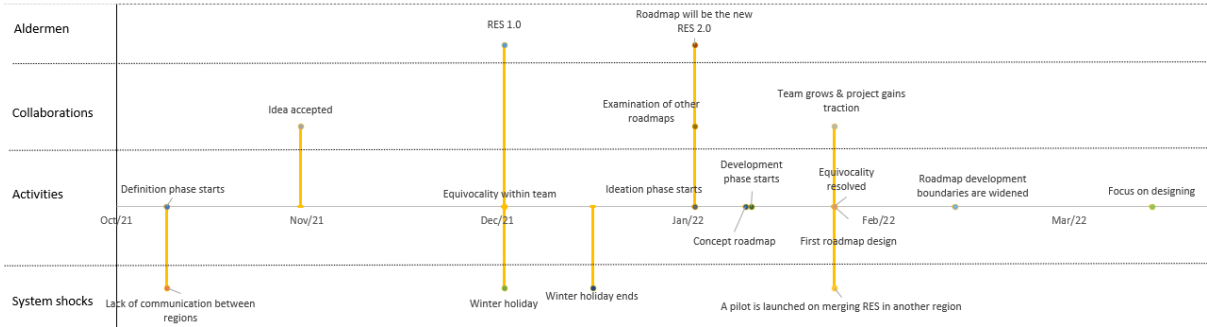


Figure 3: Project timeline Roadmap

Both projects started around the same period before the yearly regional strategy decision meeting. This meant that both projects were being assessed for this strategy and this impacted the collaborative process. During the last few months prior to the deadline of the strategy the available time for the projects of the members involved diminished as other projects also gained more immediate attention. Also, the ideation phase was sped up as an emphasizes was put on tangible results that could be discussed. After the strategy meeting, strategic and executive decisions were made regarding both projects and as a result, both projects continued.

4.2 Data structure

Figure 4 paints a static data representation of a dynamic phenomenon. The data, however, is not static as the data structure cannot capture the feedback, non-linearity and time delays within the casual and endogenous relationships between the 2nd order themes and the aggregate dimensions. The dynamic essence is further illustrated by the existence of complex dynamic patters, for instance, by having positive and negative effects influencing the effective decision-making speed. Secondly, the existence of conflicting objectives, time pressure for instance having multiple indirect effects on the effective decision making-speed further cementing the existence of complex dynamic patterns. Subsequently, a casual loop diagram was modelled to analyze these complex phenomena.

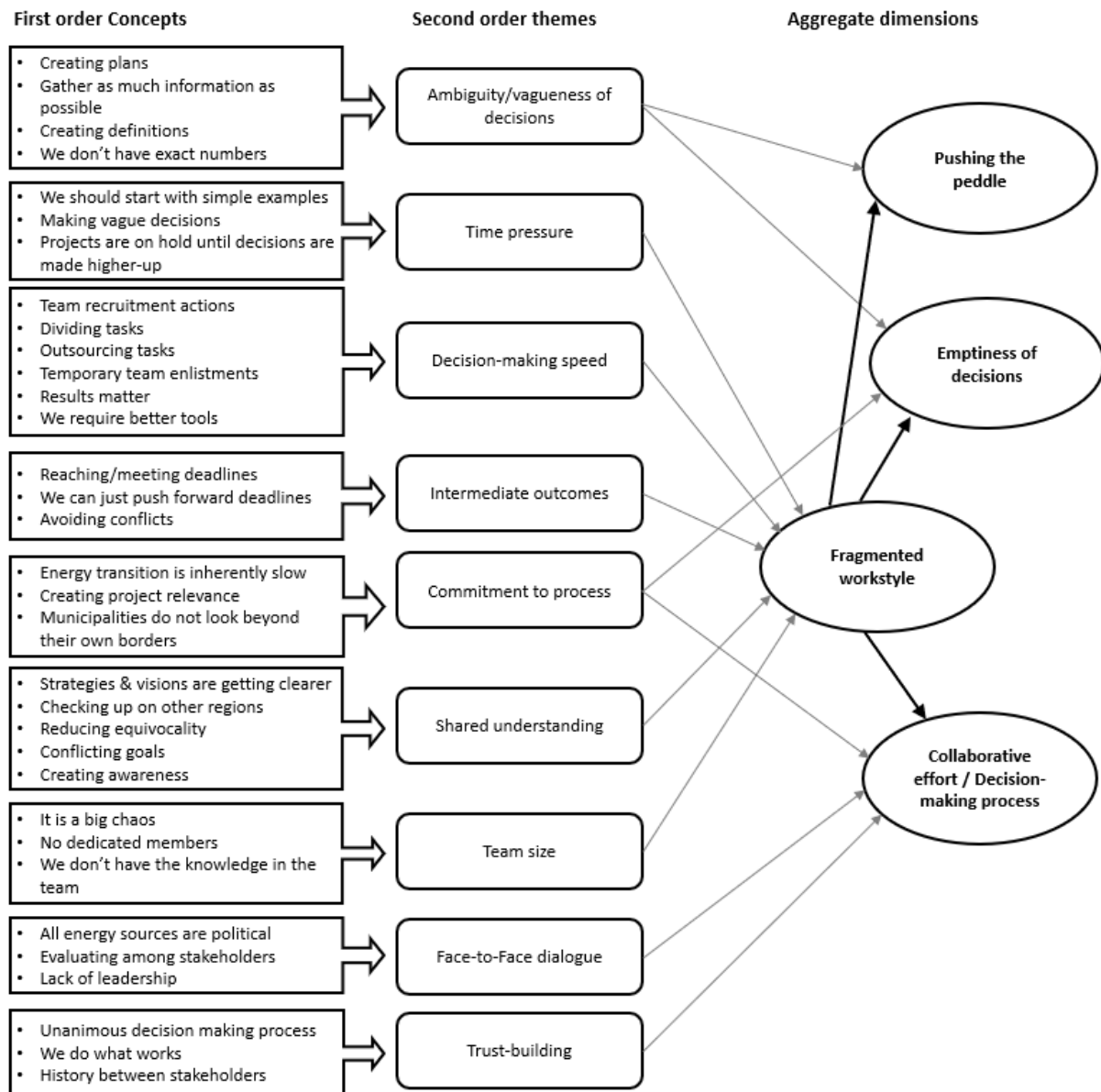


Figure 4: Data structure

4.3 Causal loop diagram explanation

Causal loop diagrams originate from the system dynamics literature (Sterman, 2000) and are widely used within management and organizational studies to understand and describe feedback-driven systems with complex behaviors. The diagrams have circular format in which influences between variables are given by arrows with a polarity, this polarity can denoted by '+' and '-'. This depends on the type of effect the variable has on the next variable. The influences together form a loop which is denoted by either a 'B' (balancing) and a 'R' (Reinforcing) label and display the nature of the feedback loop. A substantial delay is denoted by two short lines across the casual link (Sterman, 2000). By translating the 2nd order themes and aggregate dimensions into a casual loop model the

complex structure and feedback driven systems can be studied and disassembled to capture the key mechanisms driving the dynamic complexity within the RES MRE collaborative process.

During the analysis of the data and the codifying of key findings, we observed path-dependent behavior of the Heating working group. Path dependency is defined as a continuous and endogenous change process whereby the inherited local knowledge base of an industry, through branching, can push technology, industry or the regional economy along one path rather than another (Brekke, 2015). Brekke (2015) also mentions that structural or systemic change is not random but takes the form of a path-dependent process whose evolution is governed by its own history. Highlighting the importance prior choices made on the system as a whole as these choices shape your future process. During examination the observation was made that the choices and changes to the system remained close to the prior choices made, demonstrating path-dependent behavior.

5 Findings

In this section we organize the main findings of the analysis and describe the dynamic system that is in play during the collaborative process. The process can be divided into three different sequential stages, the collaborative effort, the fragmented workstyle, and the pushing the pedal. In the first stage, the team focuses on the collaborative activities such as, face-to-face dialogue, trust-building, creating commitment, shared meaning, and intermediate outcomes (Ansell & Gash, 2007). While the project is in its early stage, the team's focal point is on creating effective decision-making speed and intermediate products. The second stage, starts when the time pressure starts to increase the pressure to create intermediate products and make meaningful decisions. This incites the team to try and increase their decision-making speed to meet the deadlines, because their current decision-making speed is not sufficient. Subsequently, the system is shaken by the emergence of a close deadline, this induces the team to push the pedal and start with the rapid decision-making. Having little time remaining results in a vastly increased time pressure, a second fix is implemented in order to fulfil the deadlines on time. These system changes and new patterns that emerge over time create a dynamic system that keeps shifting during the process. The pattern can even overrule the pre-existing dominant loop and create a new equilibrium.

Below we will discuss and elaborate on the different stages and how the model evolves over time. The complete casual loop model of the RES MRE collaborative dynamics can be found in the Figure 5. Within the findings section the systems' relationships will be supported by illustrative quotes from actors during the data gathering process, the quotes are anonymized for privacy protection.

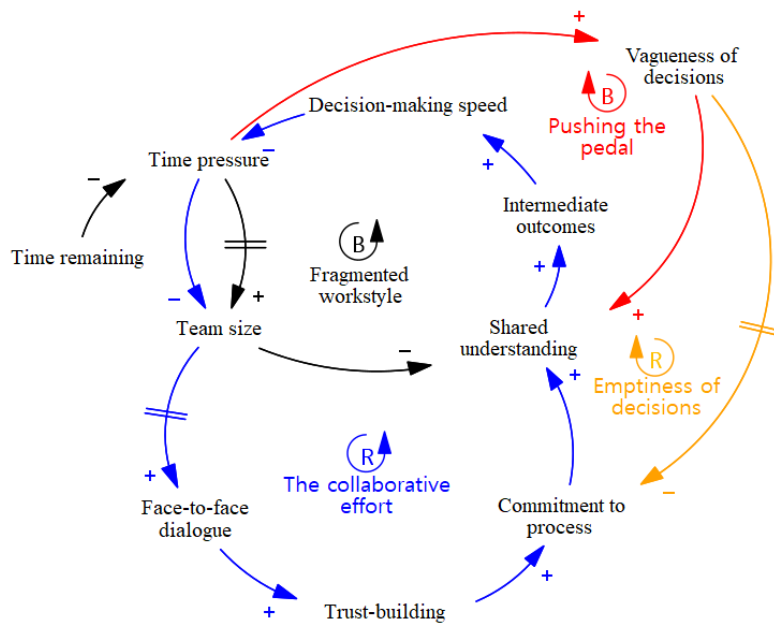


Figure 5: Casual loop model of the interplay between the collaborative process RES MRE, the fragmented workstyle fix, and the pushing the pedal fix

5.1 A dynamic perspective on collaborative innovation: The collaborative effort

The first stage is called the collaborative effort, in which the group collaborates on strategies and projects and goals are being established. In this stage, all the stakeholders are present, and give input on the decisions regarding strategy and projects. At this point there is still a large amount of time remaining for the first deadline. The focus of the group is on alignment of goals and discussions between stakeholders. The actions include, face-to-face dialogue, creating trust, commitment, and shared understanding iteratively. However, due to the large number of stakeholders participating in these discussions the progression of these steps was slow. During the first period that the municipalities came together the collaboration was messy and, the group size was considerable this made discussions needlessly long.

At the start it was a big chaos, 21 civil servants coming together with also a few people from MRE and no chairman to lead the discussions.

Funny enough we are all waiting, nothing is happening. We formulate actions and plans but we keep discussing instead of acting.

As a response to the slow process the different working groups were created, such as the Heating working group. By dividing the work into a few large-scale problems and assigning members to these groups, the tasks could be executed more effectively. This process was continued for some time until the first large product had to be completed, the Concept RES 1.0.

5.2 Reducing team size: A fragmented workstyle

As a response to time pressure slowly increasing, as deadlines were getting nearer, the Heating working group also decided to divide into smaller groups, each group focused on a specific task. These groups each have a champion assigned that is responsible for the specific task and the members that remain in the group are only the directly involved, the experts. Sometimes adding the necessary stakeholders when needed and removing them afterwards.

Every week we had a meeting, and almost every time a new person was there without the history of the group asking the same prior questions... so we decided to kick out some members, you are either in the group and work or you join another group.

By reducing the team diversity and lowering the active participants, decisions can be made more effectively, see Figure 6. This resulted in a fragmented workstyle with a number smaller groups of about two-to-four members within the working groups.

We want to work more intensive on [projects], since there are [more projects] available now and work in smaller teams on [these projects] ... I would also like to work with 2 municipalities who already want to start on implementing [projects]

Many more trivial tasks were performed with much more ease because these tasks did not have extensive discussions attached to them anymore. This resulted in a quicker pace of the projects and quick decision making within the group without involving all stakeholders on the less impactful decisions.

We should definitely focus on the starting question, what do we want to achieve with the [project]. Not go too deep in it.

The last part you mentioned is something for a different working group. So that should not be something we should discuss but rather forward to them.

This behavior was continued for some time, as a quote from later meetings indicates:

We first need to have a global discussion with the group on what is the [project] and what do we want with it... and, then make a group on who wants to help create this [project].

The result from this was that, because the team sizes were much smaller that, at that time, shared understanding increased drastically. Letting them make decisions quicker and make progress on the meeting the important deadlines that were looming closer. It, however, had unforeseen consequences on the collaborative effort that was so deliberately created over the previous period of time.

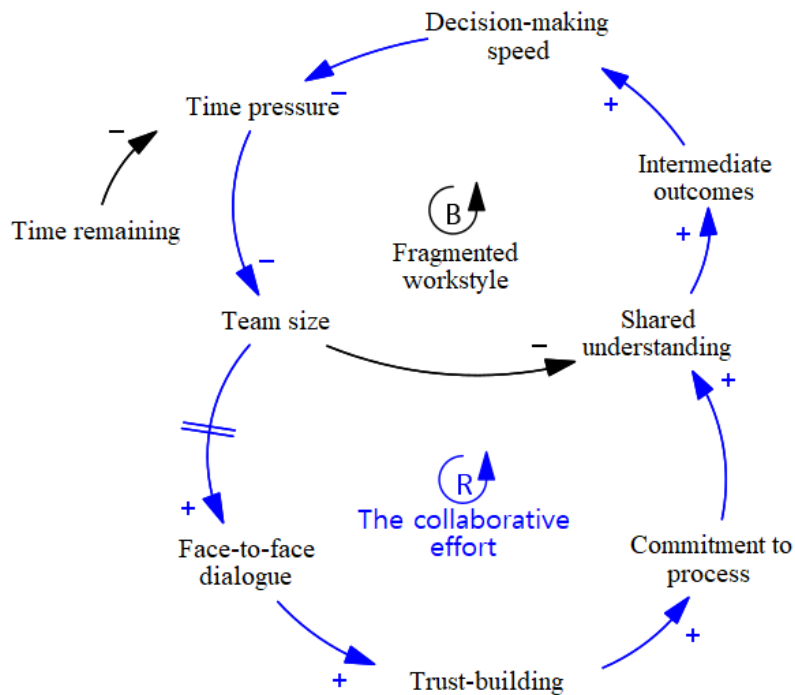


Figure 6: Casual loop model of the interplay between the collaborative process RES MRE and the fragmented workstyle fix

5.3 The fix that fails; Team size affecting the collaborative effort

By lowering the team sizes and therefore dismissing the discussions between the different actors for increased decision-making speed a negative feedback loop emerged within the collaborative effort. By excluding non-crucial partners, the collaborative effort gets undermined and this will, with a delay, result in fewer dialogues between actors. As less participants are now involved in the projects, the collaborative effort becomes less effective and that will in turn, trickle over into a lower overall shared understanding, see Figure 6. Because of the extensive and complex nature of the projects that the RES MRE works on, it is important to be involved in the projects from the start. Not being involved in the project can result in more equivocality between the fragmented teams.

We are not always on the same lines with terms, like with the [key term within the project] and [Another key term within the project], do they mean the same thing?

It can also lead to delays in the project as it is time-consuming to be brought up to speed on the projects knowledge base in order to have meaningful discussions in the general meetings.

[Actor 1] "I want to know the possibilities are of the [the project] so we can set a goal"; [Actor 2] "I want to know what the goal is because the possibilities are abundant".

This fragmented workstyle resulted in more equivocality and less shared understanding between the stakeholders on specific topics and terms within the projects. Furthermore, the lower team diversity within the project groups also resulted into less diverse input on the topics.

No, we had not considered it prior until [that party] was involved. We did not know about it until it until later when it came up in the process.

Many people in the RES are single functional [...] The teams do not contain the correct functions it needs to decide on multi-faceted problems.

In the end, however, the final decisions on the project are not made by the fragmented teams but by all the members of the working group, via consensus. This meant that the information sharing between all the fragmented teams became increasingly more crucial. This, combined with their limited time available for discussing and meeting, this led to a slower decision-making process.

We now have a bi-weekly meeting of only one hour to discuss all current processes and extra RES activities. This is very minimal and we would like propose to expand the meeting to two hours.

Within the MRE, they say, let's do it together but there is no real governance, no real leadership. They work with consensus currently but not with votes or something else, so if one party opposes then it slows down the whole process.

Their fragmented workstyle also led to less oversight from the team as a whole on what was happening within the MRE

Some projects that are being performed are not even known within their own municipality.

While at the start the separation of the groups was effective at increasing the effective decision-making speed, the process now has arrived at a point in where the consequences of implementing the short-term fix are catching up and worsening the original problem. The fix, which was lowering team size, is now overtaken by the feedback loop which now results in less decision-making speed. This phenomenon is a frequent occurring system archetype within system dynamics called a fix that fails. This is a system where a fix has a direct balancing effect on your targeted variable but creates a feedback loop that either worsens the original problem or creates a related one (Sterman, 2000), see Figure 6. In this case the negative effect of the feedback loop of the team size overrides the positive

effect of team size with a delay. And in the end, worsens the original problem by lowering the decision-making speed.

5.4 Time pressure and decision-making speed: Fixing the fix

While at first benefits of the fragmented workstyle increased the decision-making speed, now the process slows down significantly because of it. With the more trivial tasks now performed, the tasks that remain require more diverse knowledge input.

After practicing and trying around a bit on my own with [task within the project]. I noticed that, it is perhaps too big for us to make it ourselves.

To tackle this, the teams needed to reconnect and broaden their knowledge base.

It would be wise to start working together with all these small initiatives that are now setup, as many have overlap on their topics and I think all the groups can benefit from sharing their information. A lot of these groups are working autonomous.

However, the group was unprepared for the task of recruiting new and correct members for the problems they were facing at that time.

Innovation is important but we know nothing about that... we do not have a responsible person that makes sure that, if the required knowledge is not within our group, that we recruit new members that do know about it.

Therefore, the task of recruiting the members needed to fill in the positions were up to the project team champions themselves. Mostly, they recruited new members from the RES MRE team again who left the project team at an earlier stage. Recruitment of these members, however, took time and, they first needed to be brought up to speed on the knowledge base of the project.

We are also searching for help in designing the [project]. Because, we think that we will be needing the [project] this year already. I think it would be valuable if the province would be involved in the process.

We are quite a select group here, also on knowledge. It might be a smart move to include a few flexible workers to handle specific topics, such as [these projects].

These recruitment efforts led to delays in the process and by countering the earlier created feedback loop an attempt was made to balance the original fix that was introduced in the first stage, see Figure 7.

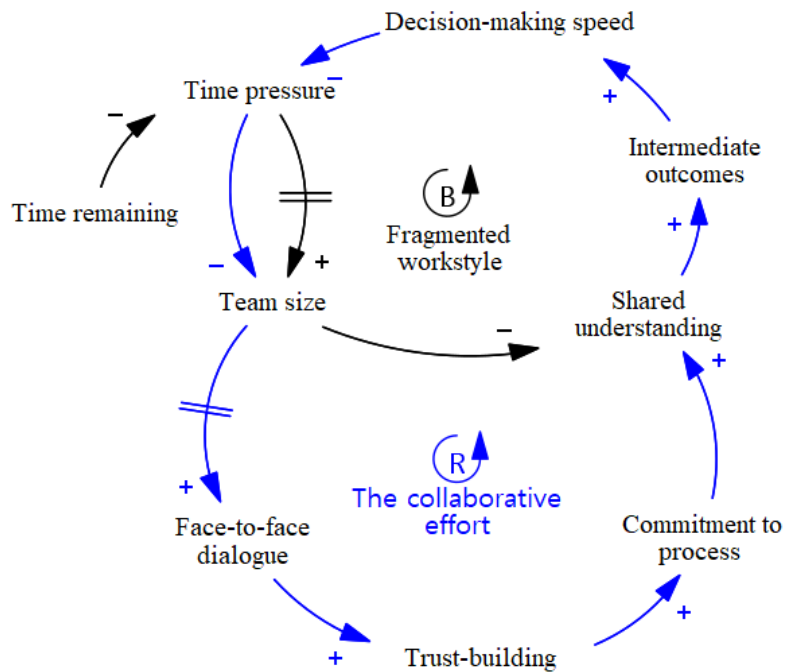


Figure 7: Casual loop model of the interplay between the collaborative process RES MRE, Fixing the fix

However, as time went on, the deadlines loomed closer, resulting in even more time pressure on the teams to perform. The RES works with a strict time schedule and milestones. Every two years they need to produce a new RES with a year prior to the deadline a concept version of that RES. Meaning that they have yearly product deadline and evaluation.

Many new projects and new ideas are on hold to be evaluated. Now is the time to determine what will be done next year.

The uncertainty of the projects is high and the MRE wants to create the best result for the region, while also doing balancing the interests of the involved (local) stakeholders.

The RES heating working group has the problem that there is no easy energy source to go to. All heating sources seem to be political.

This results in many discussions which usually are not resolved until later as the deadline at first does not look that menacing.

A big problem within the RES is that it is a big discussion group that can just push forward the issues whenever they arise, leading to no decisions. However, we are nearing a point in which we can no longer push forward.

Additionally, this behavior results in a fire-fighting behavior to the projects that are more imminent. And, as a consequence, the other less urgent projects are left behind, sentenced to the same fate as its predecessor in a later stage.

We put the [smaller project] on hold as we currently have [a bigger project] that is due [a close date]. We will discuss [the smaller project] as well but I think it will be overshadowed by [the bigger project] and not much will come of it.

5.5 Meeting the deadlines: ‘Pushing-the-pedal’ as a fix

Eventually, the system is shaken by the imminent closing of the yearly deadline. Now, compromises and decisions have to be made in order to finish the RES on time.

The main problem is that the decision is not so simple, because the problem is complicated. We have very good indications on most problems, but we don’t have exact information, such as numbers, exact costs and how much CO2 is reduced, for instance.

This leads to a new fix to be implemented, the pushing the pedal, to achieve rapid decision-making. The group suspends the nice-to-do tasks and limits the concreteness of the strategy and design, this leads to more vagueness in their decisions. As results becomes more important that the effectiveness of the decisions.

Many visions for heat transitions are created by consultancy bureaus. These usually have vague stories and lack hard/strict choices on the important topics.

The vagueness of the decisions allows the RES MRE to more easily agree on the strategies, as the consensus is still maintained throughout the decision-making process. This allows the group to rapidly make decisions based on the knowledge at hand, see Figure 8.

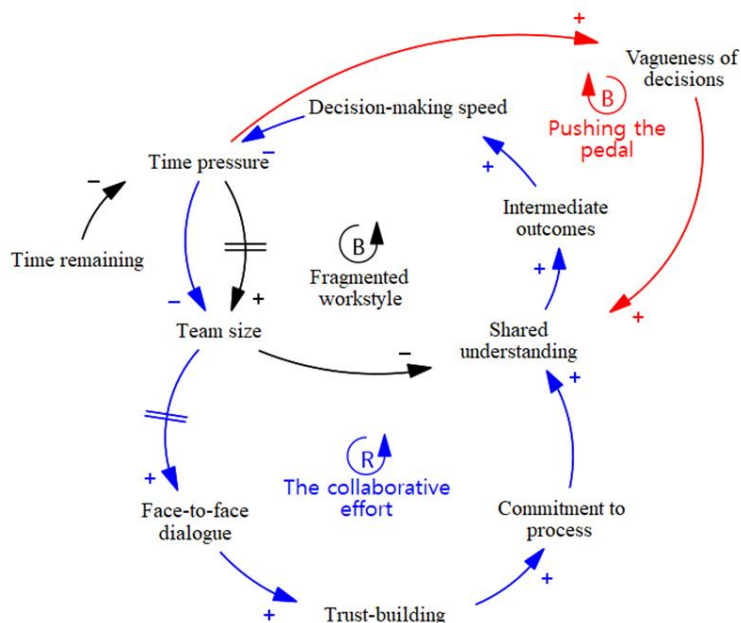


Figure 8: Casual loop model of the interplay between the collaborative process RES MRE, the fragmented workstyle fix and the intended impact of pushing the pedal

5.6 A second fix that fails: The emptiness of pushing of the pedal

This, however, sidesteps the collaborative process that is in play and focuses solely on outcome and decisions. Due to the vagueness of the decisions, the commitment to the process is not generated, see Figure 5. By skipping most of the steps of the collaborative process they forgo dealing with the so-called 'elephant in the room' as the issues that would arise when detailing strategies are not (fully) addressed. Consequently, not involving all the necessary stakeholders fully in the process.

Currently we are very much searching and in the dark with our goal. All the while, we are in a huge force field of municipalities and stakeholders all pushing us different directions.

Subsequently, this leads to empty decisions that are symbolic rather than meaningful due to bypassing the confrontation. Therefore, the real decision-making process has to be redone at a later date because they group lacks the important information required for executing the decisions and strategies determined.

Once you make it formal. Like making definitions. That's when the conflict starts to happen. When collaboration brakes down a bit, dialogue is slower.

This means that the process, or part of it, has to be repeated later on, but, now with restrictions. As the decisions made, vague as they are, still hold and have to be acted upon.

6 Discussion and conclusion

The process within collaborative innovation involves around iteratively defining problems, developing and combining new ideas, prototyping and piloting, and implementing and diffusing new solutions (Ansell & Gash, 2007; Hartley, Sørensen, & Torfing, 2013). Many studies focus on the benefits of collaborative innovation e.g. increased quality innovation and stakeholder acceptance. By conducting a longitudinal case study of the collaborative innovation within the RES MRE the importance of development speed and time windows is displayed. The model, provided by this research, suggests that the classic iterative cycle within the collaborative innovation gets disrupted whenever the unescapable deadlines come into play. This study aims to merge the regional collaborative innovation perspective with a project-oriented mind-set. Answering the call by Torfing (2019) to perform interdisciplinary research on collaborative innovation and close interaction with practitioners. By highlighting the inevitability of deadlines and time windows, the limitations of collaborative innovation in a regional setting start to surface.

6.1 Towards a systemic perspective on collaborative innovation: Path dependency

The RES MRE Heating working group has two systems that interchange with each other. The first system is the collaborative effort, which consists of iteratively conducting dialogues, creating shared understanding and developing projects and strategies. The second system is the focus on decision-making speed, in which the collaborative process is traded for a quick and dirty decision-making speed because of the increasing time pressure. The changes (or fixes) to the system remain closely related in nature and share a path-dependent behavior. Because of the impact of time pressure on the overall system, the group decides that they need to pragmatic produce results over collaborative effort.

6.2 The impact of time pressure on collaborative innovation

Governance of collaborative innovation within the regional energy transition, is a complex playfield of managing many different stakeholders while simultaneously managing the uncertainty of new technological solutions. It is widely known that collaborative innovation requires the inclusion of a diverse range of actors involved in the process to be successful (Sørensen & Torfing, 2017).

However, as this is a slow process, there is not always enough time to go through the whole iterative process. Specifically, the pre-set milestones by the RES create a landscape in which decision-making speed and development speed dominates the need for the best socio-technological solution.

Therefore, more attention should be given by the governing parties to the collaborative projects that are executed, as these complex projects are still projects in their own right. These collaborative projects still adhere to the process of scoping, ideation, development, and implementation highlighting the importance of careful project management. Specifically, more consideration should be given to the managing of the separate projects within this collaborative setting.

In our model the shifts in between the collaborative process and pushing the pedal already suggests an attempt to balance the decision-making speed and the collaborative processes. However, the balancing attempts by the RES MRE are mostly reactionary, leading to overshoots and undershoots when shifting the between the systems. Sterman (2000) identified this system archetype as a balancing loop with delay. The system is simple yet complex as the delays within such a typical system and the cumulative effects are usually beyond the control of any one person (Sterman, 2000). This creates a dynamic that whenever time pressure is low, the team goes through the collaborative processes. But whenever time pressure reaches a boiling point, the collaborative processes get traded for pragmatic results. Therefore, low time pressure becomes an enabler for innovation and a disabler for innovation whenever time pressure becomes considerable.

This shortcoming creates the need for a balance between the collaborative and innovative processes, and generating pragmatic results. The time pressure imposed on the projects leads to compressed collaborative activities. While on the one hand the necessity of collaboration, to answer to the increasing pressure from society to tackle both climate change and implement renewable energy solutions, is the focal reason these stakeholders are collaborating at all. On the other hand, the necessity of collaboration also generates increased pressure for quick solutions. Therefore, governing parties should not solely focus on the benefits of collaborative innovation, which focuses heavily on the; exchange of knowledge, competences and ideas between relevant and affected actors with a focus on mutual learning that may improve the understanding of the problem or challenge at hand (Roberts, 2000; Torfing, 2019). By bringing to light the influence of time pressure and deadlines within the collaborative process, the limitations of collaborative innovation start to surface. Because, as time elapses, pragmatic results need to be achieved by the governing party. Our findings emphasize the need to expand on the examination and management of time pressure within the collaborative innovation processes.

6.3 Lock-in effects of collaboration: The illusion of collaboration

The collaborative process within regional collaborative innovation focuses on consensus to tackle the need for renewable energy solutions. Developing such solutions requires multiple stakeholders, including public, private, and civic actors, to join forces in creating and implementing innovations (Hoppe & Miedema, 2020; Dall-Orsoletta, Romero, & Ferreira, 2022). However, the focus on creating consensus and support can also lead to negative impacts on the overall quality of the project outcome. As in the case of the RES MRE, whenever the collaboration is high enough not to break down, positive feedback will maintain the collaboration. This feedback will be independent to the level of innovativeness of the projects, which could generate a satisfactory collaboration, but, with low innovativeness. This creates a path-dependent cognitive lock-in which the common mindset of the group confuses the feedback of cyclical downturns for a positive effect (Brekke, 2015). In particular the illusion is produced that the collaboration is satisfactory, while in essence, it is sub-optimal. Specifically, this was the case with the RES MRE where under high pressure and stress the group started to make decisions that were more symbolic and consensual in nature, rather than meaningful. In order to provide more conclusive evidence of the impact of collaboration on public innovation and its ability to produce desirable outcomes, a criteria-based assessment tool that measures the degree of collaboration is required (Torfing, 2019). However, due to the novelty of collaborative innovation studies and the complexity performing generalised research on the topic, precise assessment tools remain underexamined.

Interestingly, the double-edged nature of time pressure on the collaborative process is unearthed. While simultaneously the positive feedbacks from time pressure foster these parties to collaborate, that same time pressure leads to negative effects for these parties. As the collaborative process is ill-executed leading not completing the necessary steps on time and resorting to quick fixes to survive. This is especially relevant, as many switch to adopting the collaborative governance because of the recent developments on the many benefits of collaboration and bottom-up approaches to wicked problems. Leading the inexperienced into a trap which is the illusion of successful collaboration. This study advocates to further study this double-edged nature of time pressure on the collaborative process and, specifically, how to successfully manage it.

6.4 Practical contribution

Our findings have valuable implications for practitioners of collaborative innovations, specifically when related to high-pressure environments or quick-paced development within complex public-private collaborations. Multi-actor involvement is key for developing innovative and creating support (Hoppe & Miedema, 2020). However, the collaborative process that entails when incorporating so many different stakeholders creates a slow collaborative process. Therefore, a policy mix, which refers to a set of different and complementary policy instruments, is required to engage the actors successfully (Grotenbreg & van Buuren, 2018). However, it is important that they do not influence the objectives but solely stimulate the innovation process (Borrás & Edquist, 2013). These policy instruments include, but are not limited to, advice, training, information provisions (Grotenbreg & van Buuren, 2018), subsidies or regulations (Borrás & Edquist, 2013). Subsequently, the local authorities' capacities are limited, but they are an important actor in the innovation process. They provide crucial coordination capacity, and can act as network managers, bringing together relevant share- and stakeholders, achieving public alignment and public support (Grotenbreg & van Buuren, 2018). Furthermore, the authorities all employ their capacities in a way that fits their own procedures and ambitions (Grotenbreg & van Buuren, 2018). Touati & Maillet (2018) also found that the inter-sectoral collaboration is hampered by the nonconvergence of actors' interests. The difficulty lies in appointing one responsible party for implementing these instruments within a collaborative setting with equivalent parties.

Collaborative innovation drives on the inclusion of a diverse group of actors to reach the most innovative solution to a wicked problem. A diversified group of actors, with different knowledge and experience, allows for the identification of creative solutions to the identified problems (Sørensen & Torfing, 2017). Actors engaged in such partnerships would benefit from understanding the nuance that arises when combining complex socio-technical problems with a high-pressure environment. Two seemingly contradictory processes. Our findings suggest that a balanced approach should be

taken when implementing both collaborative processes, and short-term goals and milestones. By speeding up the collaborative processes' internal steps, e.g. creating shared meaning and trust-building, the risk of having to implement a quick-and-dirty decision-making processes could be prevented. This will, in terms of collaborative innovation, limit the innovative potential of collaborative innovation. But will in turn will prevent the formation of a quick-and-dirty decision-making process that nullifies the previous efforts of the collaborative process.

7 Limitations and future research

Within collaborative innovation, and the collaborative process that entails from that, the benefits of a good facilitative leader guiding the team is critical to the success (Ansell & Gash, 2007). The facilitative leader allows the team to more effectively work across different organizational boundaries (Morse, 2014). Leadership is crucial for setting and maintaining clear ground rules, building trust, facilitating dialogue, and exploring mutual gains (Ansell & Gash, 2007). However, a third party could assume a leader, intervening, mediating, and negotiating but not as effective as a dedicated leader. And, although unassisted negotiations are sometimes possible, the literature overwhelmingly finds that facilitative leadership is important for bringing stakeholders together and getting them to engage each other in a collaborative spirit (Ansell & Gash, 2007). However, it should be noted that in this case the choice for not having a dedicated leader was a conscious one. As the playing field between the different municipalities is steeped with independence, egotism, and power difference. Therefore, implementing a person into a position with power would create a divide amongst the different parties resulting in an aversion to collaboration. Nonetheless, it would be interesting to research the impact of time pressure on the collaborative process when a facilitative leader would be present.

The lack of leadership gave rise to members within the teams to organically rise into that role for periods of time. Organic leadership within collaborative governance is under-researched, and especially relevant in this case. Ansell and Gash (2008) argue that when power distribution is asymmetric and incentive to participate is weak the governance is more likely to succeed with a strong organic leader who commands trust and respect from the various stakeholders. Organic leaders differ from professional facilitators in the sense that stakeholder community background grants them access unique tools, but can have trouble convincing stakeholders of their neutrality (Ansell & Gash, 2012). The role of organic leadership within collaborative governance and possibly a mediating effect of organic leadership on the lack of leadership is still unclear and offer a new opportunity for research.

The limited depth of this study gives rise to a few opportunities for further study of time pressure within collaborative innovation. Firstly, this study was not able to capture the whole process from start to finish and focuses on only a specific time frame within the whole collaborative process. Not being able to see the team projects within the process fully unfold over time. Therefore, the long-lasting implications of the actions and decisions made to the process were not captured. Secondly, this study focused on a specific working group, and while dynamics between the Heating working group and other groups were examined, the other working groups were not examined in the same detail. This limits the external validity of the findings of this study to other settings. This produces an opportunity for extended case studies to further investigate these processes on a larger scale and determine the influences of time pressure over time on the collaborative process as a whole.

Finally, the implemented design of collaborative governance, and the collaborative process leaves much freedom of interpretation. Raising the question, how the dynamics within the process are influenced by different applications of collaborative governance. Should regional collaborative governance focus on different aspects when compared to national or international collaborative governance? For this an extended case study with multiple different cases is required and could give valuable insight on how dynamics within collaborative governance change when implementing within different environments.

7.1 Concluding remark

Many governments opt to use collaborative innovation at a regional level to tackle the transition to a low-carbon energy economy. However, the time pressure imposed on the practitioners is consequential for the successful execution of the process. By conducting a longitudinal in-depth case study, a dynamic perspective is given to the impact of time pressure on the collaborative process when facing wicked problems in regional energy transition. A balance between the focus on the collaborative process and the efficiency of decision-making is crucial as an imbalance can lead to having to forego the collaborative process and limited commitment of the team. Therefore, it is important to define your collaborative process design and speed before engaging in collaborative innovation in a regional setting.

8 References

- Ansell. (2012). Collaborative governance. *The Oxford handbook of governance*.
- Ansell, C., & Gash, A. (2007). *Collaborative governance in theory and practice*. *Journal of public administration research and theory*, 18(4), 543-571.
- Ansell, C., & Gash, A. (2012). Stewards, mediators, and catalysts: Toward a model of collaborative leadership¹. *The Innovation Journal*, 17(1), 2.
- Ansell, C., & Torfing, J. (2014). *Public innovation through collaboration and design*. Routledge.
- Borrás, S., & Edquist, C. (2013). The choice of innovation policy instruments. *Technological forecasting and social change*, 80(8), 1513-1522.
- Brekke, T. (2015). Entrepreneurship and path dependency in regional development. *Entrepreneurship & Regional Development*, 27(3-4), 202-218.
- Camagni, R., & Capello, R. (2017). Regional innovation patterns and the EU regional policy reform: towards smart innovation policies. *In Seminal studies in regional and urban economics*, pp. 313-343 Springer, Cham.
- Cinar, E., Trott, P., & Simms, C. (2019). A systematic review of barriers to public sector innovation process. *Public Management Review*, 21(2), 264-290.
- Dall-Orsoletta, A., Romero, F., & Ferreira, P. (2022). Open and collaborative innovation for the energy transition: An exploratory study. *Technology in Society*, 69, 101955.
- Douglas, S., Ansell, C., Parker, C. F., Sørensen, E., 'T Hart, P., & Torfing, J. (2020). Understanding Collaboration: Introducing the Collaborative Governance Case Databank.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of management journal*, 50(1), 25-32.
- Fisher, R. J., & Keashly, L. (1990). Third party consultation as a method of intergroup and international conflict resolution. In *The social psychology of intergroup and international conflict resolution*. Springer, New York, NY, 211-238.
- Gailing, L., & Röhring, A. (2016). Is it all about collaborative governance? Alternative ways of understanding the success of energy regions. *Utilities Policy*, 41, 237-245.
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational research methods*, 16(1), 15-31.

- Grotenbreg, S., & van Buuren, A. (2018). Realizing innovative public waterworks: Aligning administrative capacities in collaborative innovation processes. *Journal of Cleaner Production*, 171, S45-S55.
- Hartley, J., Sørensen, E., & Torfing, J. (2013). Collaborative innovation: A viable alternative to market competition and organizational entrepreneurship. *Public Administration Review*, 73(6).
- Hofstad, H., & Torfing, J. (2015). Collaborative innovation as a tool for environmental, economic and social sustainability in regional governance. *Scandinavian Journal of Public Administration*, 19(4), 49-70.
- Hoppe, T., & Miedema, M. (2020). A governance approach to regional energy transition: Meaning, conceptualization and practice. *Sustainability*, 12(3), 915.
- Huxham, C., & Vangen, S. (2000). Leadership in the shaping and implementation of collaboration agendas: How things happen in a (not quite) joined-up world. *Academy of Management journal*, 43(6), , 1159-1175.
- Kapucu, N., & Garayev, V. (2011). Collaborative decision-making in emergency and disaster management. *International Journal of Public Administration*, 34(6), 366-375.
- Kessler, E. H., & Chakrabarti, A. K. (1996). Innovation speed: A conceptual model of context, antecedents, and outcome. *Academy of management review*, 21(4), 1143-1191.
- Klijn, E. H., Edelenbos, J., & Steijn, B. (2010). Trust in governance networks: Its impacts on outcomes. *Administration & society*, 42(2), 193-221.
- Kuppens, P., Stouten, J., & Mesquita, B. (2009). Individual differences in emotion components and dynamics: Introduction to the special issue. *Cognition and Emotion*, 23(7), 1249-1258.
- Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management review*, 24(4), 691-710.
- Leach, W. (2006). Collaborative public management and democracy: Evidence from western watershed partnerships. *Public administration review*, 66, 100-110.
- Lopes, A. V., & Farias, J. S. (2020). How can governance support collaborative innovation in the public sector? A systematic review of the literature. *International Review of Administrative Sciences*, 88(1), 114-130.

- Maruping, L. M., Venkatesh, V., Thatcher, S. M., & Patel, P. C. (2015). Folding under pressure or rising to the occasion? Perceived time pressure and the moderating role of team temporal leadership. *Academy of management journal*, 58(5), 1313-1333.
- Mohammed, S., & Nadkarni, S. (2011). Temporal diversity and team performance: The moderating role of team temporal leadership. *Academy of Management Journal*, 54(3), 489-508.
- Morse, R. S. (2014). *Developing public leaders in an age of collaborative governance*. In *Innovations in public leadership development*. Routledge.
- MRE, R. (2022, May 23). *Energie regionre*. From <https://energieregionre.nl/zo+doen+we+het/startnotitie+regionale+energiestrategie+metropoolr/handlerdownloadfiles.ashx?idnv=1783923>
- Nationaal programma Regionale Energie Strategie*. (2021, September 9). From <https://www.regionale-energiestrategie.nl/organisatie/default.aspx>
- Parker, C. F., Nohrstedt, D., Baird, J., Hermansson, H., Rubin, O., & Baekkeskov, E. (2020). Collaborative crisis management: a plausibility probe of core assumptions. *Policy and Society*, 39(4), 510-529.
- Purdy, J. M. (2012). A framework for assessing power in collaborative governance processes. *Public administration review*, 72(3), 409-417.
- Rastegary, H., & Landy, F. J. (1993). The interactions among time urgency, uncertainty, and time pressure. In *Time pressure and stress in human judgment and decision making* (pp. pp. 217-239). Boston, MA.: Springer.
- RES. (2021, September 9). *Nationaal programma Regionale Energie Strategie*. From <https://www.regionale-energiestrategie.nl/organisatie/default.aspx>
- RES. (2022, 5 30). *Nationaal programma RES*. From <https://www.regionale-energiestrategie.nl/werkwijze/besluitvorming+en+samenwerking/default.aspx>
- Ridder, H. G. (2017). The theory contribution of case study research designs. *Business Research*, 10(2), 281-305.
- Roberts, N. (2000). Wicked problems and network approaches to resolution. *International public management review*, 1(1), 1-19.
- Sedlacek, S., Tötzer, T., & Lund-Durlacher, D. (2020). Collaborative governance in energy regions—Experiences from an Austrian region. *Journal of Cleaner Production*, 256, 120256.

- Sheremata, W. A. (2000). Centrifugal and centripetal forces in radical new product development under time pressure. *Academy of management review*, 25(2), 389-408.
- Sørensen, E., & Torfing, J. (2012). Introduction: Collaborative innovation in the public sector. *The Innovation Journal*, 17(1), 1.
- Sørensen, E., & Torfing, J. (2017). Metagoverning collaborative innovation in governance networks. *The American Review of Public Administration*, 47(7), 826-839.
- Sousa, J. D., & Klyza, C. M. (2007). New directions in environmental policy making: An emerging collaborative regime or reinventing interest group liberalism. *Nat. Resources J.*, 47, 377.
- Sterman, J. (2000). *Business Dynamics, System Thinking and Modeling for a Complex World*. Boston: Irwin/McGraw-Hill.
- Torfing, J. (2019). Collaborative innovation in the public sector: The argument. *Public Management Review*, 21(1), 1-11.
- Touati, N., & Maillet, L. (2018). Co-creation within hybrid networks: what can be learnt from the difficulties encountered? The example of the fight against blood-and sexually-transmitted infections. *International Review of Administrative Sciences*, 84(3).
- Uyarra, E., Flanagan, K., Magro, E., Wilson, J. R., & Sotarauta, M. (2017). Understanding regional innovation policy dynamics: Actors, agency and learning. *Environment and Planning C: Politics and Space*, 35(4), 559-568.
- Yin, R. K. (2009). *Case study research: Design and methods*. (Vol. 5). sage.