

Making sense of grand challenges through the design of communicative spaces

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Introduction

Research on collective sensemaking has argued that sensemaking unfolds in the interactions and communications between people (Taylor and Van Every 1999, Maitlis 2005). Thereby, meetings and other forms of social gatherings serve as primary spaces for such sensemaking to take place (Weick 1995). To the extent that the spaces shape the communications and interactions within them, they also shape how the included people make sense of their world. A central tenant of the sensemaking literature is that the more complex the issues people are trying to make sense of, the greater the complexity of the space has to be, in terms of the variety of perspectives available, (Weick 1995). This is also referred to as the “law of requisite variety” (Conant and Ross Ashby 1970). The main mechanism for regulating the complexity of the space is the regulation of the boundaries of the space: the more people are included the greater the range of perspectives available for sensemaking. When issues become very complex, organizations might even set up inter-organizational sensemaking spaces which include people from different organizations resulting in a greater variety of perspectives than the individual organizations could provide for (Teulier and Rouleau 2013).

However, increasing the variety of perspectives in the sensemaking space comes at a cost: the more perspectives are included, the greater the equivocality becomes, that is, the greater the potential conflicts between perspectives. As Weick, Sutcliffe et al. (2008) highlight, in regulating the boundaries of the sensemaking space there is a trade-off between ensuring requisite variety and the danger of introducing too much equivocality: “Too restricted a set of individuals might lead to limited complexity in the sensemaking system, yet too many individuals may lead to multiple, conflicting interpretations of a situation that inhibit action” (Maitlis and Sonenshein 2010: 572). Thus, finding the right balance between ensuring requisite variety and preventing the challenges of equivocality is central in regulating the boundaries of the sensemaking space.

The imperative to find the right balance between complexity and simplicity of the sensemaking space leads to a serious dilemma when it comes to so-called grand challenges (Ferraro, Etzion et al. 2015). Grand challenges have been characterized as “super wicked’ problem(s) because of the(ir) scale, scope, and time horizon” (George, Howard-Grenville et al. 2016: 1886) and highly interrelated causes and mechanisms (Reinecke and Ansari 2015). Thus, to be able to make sense of grand challenges the variety of perspectives has to be extremely high resulting in extreme levels of equivocality likely to lead to a breakdown in the sensemaking process. While the sensemaking dilemma of grand challenges has been widely recognized (George et al., 2016) we know very little about the ways in which organizations can handle it. Against this background, this paper aims to explore how actors use boundary work to complexify and simplify the space for making sense of grand challenges

To answer this research question, we conducted a two-year ethnographic study of two Smart City initiatives from different municipalities in Northern Europe. These initiatives engaged actors across sectors to solve grand challenges such as: climate change resilience; city overcrowding and population mobility; sustainability and resilience in the face of new technologies; transparency, sharing and protection of data; assuring a digital workforce in the city etc. We examined what sensemaking spaces were set up and how the actors defined and redefined their boundaries tracing how this affected the sensemaking process in turn. Our analysis of the data yielded two main results. First, we identify different types of boundary work that allow the simultaneous increase and decrease of complexity, which we refer to as simplexification. Second, we identify temporal patterns in the boundary work, switching between phases of simplification and complexification. With these findings, we contribute to three literatures: the literature on grand challenges, on sensemaking and on space.

Background

1. Sensemaking, space and requisite variety

Sensemaking is the process through which people “produce, negotiate and sustain a shared sense of meaning” (Gephart, Topal et al. 2010). It involves bracketing and labelling puzzling issues, so

called cues. and subsequently selecting and applying appropriate interpretive frames to make sense of these cues (Weick 1979). Cues refer to issues, problems, or challenges that actors try to make sense of, while frames refer to the mental models that guide cue selection and interpretation (Cornelissen and Werner 2014).

Sensemaking is inherently a discursive and collective activity, done in the interaction between people (Weick, Sutcliffe et al. 2005, Maitlis and Christianson 2014). When actors find it difficult to understand aspects of the world, they set up meetings and workshops to discuss them face-to-face (Maitlis and Christianson 2014). These communication spaces (Weinfortner and Seidl 2018) allow them to “define, represent and reproduce social entities as well as relationships” (Weick 1995: 143). For example, Teulier and Rouleau (2013) describe how a group of middle managers created four spaces – “intensive working sessions”, “industrial visits”, “writing sessions” and “organizational meetings and talks” – in order to try to make sense of a change in technology. These spaces allowed different actors to be present and enabled different meanings to arise.

Building on Conant & Ashby’s (1970) law of requisite variety, Weick (1979) argues that in order to ensure appropriate understanding, the complexity of the sensemaking process within the communicative space, i.e., the variety of interpretive frames, need to match the complexity of the cues that it tries to make sense of: *“if a simple process is applied to complicated data, then only a small portion of that data will be registered, attended to, and made unequivocal. Most of the input will remain untouched and will remain a puzzle to people concerning what is up and why they are unable to manage it”*(Weick 1979: 189). Therefore, more or less complexity inside the communicative space will be required, depending on the nature of the issues to be made sense of. The existing literature has treated the regulation of the degree of complexity within communicative spaces as a question of boundary work, that is, as a question of how to draw the boundaries around the communicative spaces (Langley, Lindberg et al. 2019).

For example, Weick (1995, 2005) discusses how the complexity of the communicative spaces regulated through expanding or contracting *social boundaries*. The more actors are included in the communicative space, the greater the variety of interpretive frames available in the communication for making sense of the cues. When cues become particularly complex, organizations might even include actors from outside the organization in the communicative space thereby “pooling expertise” (Hardy et al., 2006: 98) from outside. For example, Seidl and Werle

(2018) describe how a group of managers trying to make sense of highly complex strategic issues invited managers from other organizations to participate in joint workshops to help make sense of those issues. Thus, when faced with cues for which they did not have the appropriate sets of frames they tried “to identify people from other organizations who might have those frames in their interpretive repertoire and invite them to join them” (Seidl and Werle 2018: 839).

In addition to that, other researchers have highlighted the role of *symbolic boundaries* in handling the problem of requisite variety. Symbolic boundaries refer to the way actors define and create distinctions between concepts (Lamont and Molnár 2002, Langley, Lindberg et al. 2019). Studies on the discursive aspects of sensemaking, even though not particularly defined as such, do hint to the way symbolic boundaries can be used to work with frames. As such, Abolafia (2010) describes how, by creating common narratives, members of a policy group try to understand and develop policy for coming out of a recession. Through “glossing”, actors elaborate storylines (frame) according to what is most needed in the situation and craft frames that can “include(s) as many of the positions stated as possible” (Abolafia 2010: 361). In this way, they increase frame symbolic boundaries. Similarly, Kwon, Clarke et al. (2014) present how, through frame re/definitions, such as “frame shifts”, actors manage to create “the boundaries of discussion”. Both of these studies highlight how through dynamic boundary work around the topic of discussion, actors manage to create shared views of the problem and how to proceed, thereby allowing a proper requisite variety in the space.

Recently, research has also started to look into the impact of *temporal boundaries* on sensemaking. In a rare example, Strike and Rerup (2016) describe how a consultant used temporal boundaries to regulate the complexity of the communication space of his clients. Expanding the temporal boundaries of the communication space by, amongst others, expanding the time for reflection, the consultant indirectly influenced the number of frames that could be taken into account in the respective sensemaking process. Having more time for discussions allowed the participants to explore more frames and cues in their discussions.

Together, these studies show how different types of boundary work allow adjusting the complexity of the communication space in order to match the requisite variety of the sensemaking process to the complexity of the issues to be made sense of. Such matching of complexity, however, becomes very tricky when it comes to grand challenges that are characterized by excessive complexity.

2. Sensemaking for Grand Challenges: The simultaneous necessity of simplification and complexification

Today's world is increasingly plagued by large scale problems in areas such as climate change, war and political instability (Kolk, Kourula et al. 2017), digital technology's impact on work and the economy (Dodgson, Gann et al. 2015, Colbert, Yee et al. 2016). These so-called "grand challenges" can be characterized as "super-wicked problems" (George, Howard-Grenville et al. 2016) or meta-problems "where neither their full scope nor their detailed nature is understood" (Cartwright 1987: 93). They include a multitude of issues, with ambiguous interrelations making them exceptionally difficult to make sense of.

The difficulty in sensemaking arises from a number of factors. First, grand challenges consist of an overabundance of cues (Norgaard 2011). For example, in their study of sensemaking processes around the grand challenge of water as critical resource Seidl and Werle (2018) highlighted how it consisted of many different issues such as uncertainty over the availability of fresh water, potential conflicts over access to water, and ways of treating wastewater etc. They quote one of the managers struggling to make sense of the grand challenge: "the problem with water is, it's not a single issue. It is about thirty different issues that all just happen to be connected by the molecule of H₂O" (Seidl and Werle 2018: 840-841).

Second, for grand challenges, cues tend to be highly equivocal, lending themselves to multiple interpretations (Sonenshein 2016). Some cues may, through their very nature, suggest particular frames such as a mathematical frame for calculations. However, grand challenges are "are multidisciplinary, cutting across conventional epistemic and professional boundaries (...) the issues at stake cannot be defined as discrete economic, political, or social problems" (Ferraro, Etzion et al. 2015: 366). Therefore, through their very nature grand challenge cues allow multiple interpretations, increasing the number of frames that are available for interpretation, which can harm the sensemaking process (Weick, Sutcliffe et al. 2005).

Third, the different cues are highly interrelated (Cartwright 1987, Ferraro, Etzion et al. 2015), which means that individual cues cannot be understood in isolation. Often there are intricate causal

relations between different issues that one needs to attend to in order to understand individual cues. This tends to “complicate both their diagnosis and prognosis” (Reinecke and Ansari 2016: 299).

Their extreme degree of complexity, makes it highly difficult to come to grips with grand challenges. On the one hand, the law of requisite variety requires the complexity of the sensemaking space, i. e., the variety of frames, to match that of the grand challenge. On the other hand, increasing the variety of frames to such extreme levels also increases the equivocality to such a degree that no understanding might be realized at all. Maitlis and Sonenshein (2010; see also Weick, Sutcliffe et al.,2008: 42) in this regard also speak of a trade-off between requisite variety and the danger of introducing too much equivocality from too many different people. As they write: “Too restricted a set of individuals might lead to limited complexity in the sensemaking system, yet too many individuals may lead to multiple, conflicting interpretations of a situation that inhibit action” (Maitlis and Sonenshein 2010: 572). While this trade-off between requisite variety and equivocality can be found in any sensemaking situation, it is particularly acute in the case of grand challenges. In this case it is not simply a question of finding the right balance between the two aspects but it is about finding ways in which the need for complexity (i. e., requisite variety) and for simplicity (i. e., equivocality) can be achieved at the same time. At present, we know very little about how such trade-offs are managed in practice. Thus, we specify our research question as follows: *How do actors use boundary work in balancing the simultaneous need for complexity and simplicity of the communicative space in trying to make sense of grand challenges?*

Methods

1. Research design – case selection

The study cases were chosen as part of a larger project investigating how organizations strategize grand challenges inter-organizationally. The case selection followed a purposive sampling logic looking for organizations that repeatedly engaged in explorations around grand challenges.

The research is based on a two-year ethnographic study of two Smart City initiatives from two different municipalities in Northern Europe, MiniSmart and MaxiSmart. Smart City projects engage actors across sectors to solve complex problems such as climate change, water problems and social exclusion in the city through the use of new technologies (Bolívar 2015, Martin, Evans

et al. 2018). Therefore actors come from diverse settings and need to make sense not only of the new technology’s potential but also how to solve complex problems such as overcrowding, climate change, or open government.

The cases were chosen on the basis of them engaging in multiple explorations around grand challenges, but also having diversified experience with it. While MaxiSmart had been engaged in making sense of diverse Smart City issues for over 8 years, MiniSmart was just starting up explorations when we approached the organization. This allowed us to verify the robustness of our findings, checking if difficulties in making sense of the issues did not stem from initial inexperience in dealing with grand challenges.

Our embedded unit of analysis is the communicative space. We defined the communicate space as arenas of joint discussions and reflection, differentiating according to who was present at one time working on a common problem. As such, while a meeting in itself could be one communicate space, within a workshop you could find multiple communicative spaces when actors split up into different groups. As such, we borrow from action research literature in our conceptualization of communicative space to highlight the “constructive dialogue and creative problem-solving among stakeholders” (Bodorkós and Pataki 2009) characteristic of the space, rather than power struggle focused space inherent in for example Hardy and Maguire’s (2010) “discursive spaces”.

2. Data

We collected data through a number of sources that allowed access to the different particularities of the spaces (see table 1):

| | MaxiSmart | MiniSmart |
|-------------------------------------|---|-------------------------------------|
| Observation of meetings & workshops | 20 meetings and workshops (>80 hours observation) | 15 meetings (>30 hours observation) |

| | | |
|------------|-------------------------------|-------------------------------|
| Interviews | 37 semi-structured interviews | 15 semi-structured interviews |
| Documents | >150 pages | >50 pages |

Table 1: Data

Observation. We conducted over 110 hours of video and audio observation at, meetings and workshops that were transcribed. Additionally, notes were taken during the events and were transcribed within 24 hours. The observations were used as the main part of the analysis providing most of the data for the analysis of the boundary work.

Interviews. We conducted 52 semi-structured interviews ranging between 30 minutes and 2 hours with participants of the different workshops and with those people who set up and managed the overall project. Interview questions focused on, amongst others, how the actors were setting up the meetings and workshops, what issues they were trying to understand, what were the barriers to understanding the issues, what they felt could not be addressed in the meetings and workshops, and how they managed to reach an understanding of the issue and how to proceed. The interviews were used not only to understand more in depth the boundary work going on during the meetings, but also to track the understanding that evolved as part of the meeting.

We collected *documents* such as reports, brochures, emails between participants and other written material that actors used during the meetings or produced afterwards. We used these documents particularly in tracing the emerging understanding of the participants to the various meetings and workshops.

3. Data analysis

We followed a highly iterative approach for our data analysis (O'reilly 2012). Firstly, based on the data from the field, we observed that in order to try to make sense of and come up with solutions to the city challenges, actors were setting up meetings and workshops with diverse actors.

We then started to analyze the data by doing line by line coding of the conversations within one workshop or meeting with the general question of how actors were trying to make sense of the

challenges. This way we observed the prevalence of working with boundaries around the topic and who should be involved that the actors were focusing on. This led us to look into the literature on boundary work and space (Bucher and Langley 2016, Langley, Lindberg et al. 2019), which allowed us to identify the temporal boundaries as relevant as well. We coded the rest of the observations and interview data based on references to boundaries – both during the event and around the event (ex: how actors were setting up the event). As such, we observed how the municipal managers tried to delimit the scope of the discursive space through various boundaries: social, symbolic, and temporal boundaries.

In the second stage, we analyzed how the actors made use of these boundaries in their sensemaking efforts. By drawing on the sensemaking literature (Weick 1995, Maitlis and Christianson 2014), we coded the boundary work according to how it aided to the understanding of the challenge. We observed that actors were using the boundary work to increase or decrease the complexity of the space but also, in some cases, to create a combination of the two, which we termed “simplexifying boundaries”. We drew the term from the work of Colville, Brown et al. (2012) that showed that it is possible to combine complexity and simplicity in order to make sense of complex problems.

In the third stage of the analysis, we created timelines of how the boundary work was used by actors throughout the meeting. By analyzing what was being accomplished through each stage, we were able to break down the boundary work into 3 phases. By looking at interviews and the produced materials from these meetings, we differentiated between the different understanding that developed as part of the process: shared vs. scattered; wide vs. narrow; deep vs. shallow. Understanding, which we captured as shared narrative accounts (Gephart, Topal et al. 2010), could be wide or narrow depending on how many interrelated elements of a challenge are captured in their narrative accounts of the challenge. As such, discussing only about the technology required to solve a particular part of the issue would qualify as a narrow understanding while discussing multi-actor partnering, technological and societal (the citizen/benefactor) issues would qualify as a wide understanding. Furthermore, understanding ranged from deep to shallow depending on how detailed the narrative accounts of the challenge were, for example how the technology should be organized for tackling the challenge. Lastly, we categorized the understanding as shared or scattered, depending on the extent to which the narrative accounts were shared between the participants. Linking the different bounding practices to the different understandings led to the

identification of different patterns that the boundary work could exhibit. We identified five different paths leading to the different types of understanding by looking at the intensity of use of different boundary work practices across the meeting phases.

In the next sections, we will present our findings in two steps. First, we show how different types of boundary work were used to increase and decrease the complexity of the communication space. Second, we show how these different types of boundary work shaped the development of collective understanding over time.

Types of boundary work to decrease or increase the complexity of the communication space

Our cases revealed that actors engage in different types of boundary work in managing the complexity of the respective sensemaking spaces: symbolic, social and temporal boundary work. Each type of boundary work was used in order to simplify, to complexify and to simplexify (i. e., increase complexity while decreasing it) the communicative space.

Symbolic boundary work was reflected in attempts to control the topics and aspects of topics that should be discussed. In our cases, the work that actors did around the symbolic boundaries meant setting up what the topic of discussion was and actively increasing, decreasing, or simplexifying complexity. Simplexifying could be done for example by postponing aspects of issues in order to be able to discuss the topic within the confines of the meetings.

Symbolic boundary work increases complexity by increasing the number of cues and/or frames and reduces complexity by decreasing the number of frames or cues. For example, at the start of each meeting at MiniSmart, Andrew began by setting out what aspects of the grand challenge Smart City were to be discussed – and, indirectly, which ones were not to be discussed:

Smart city (...) is a very broad concept (...) [for us] it is very much data focused. It is a lot about sensors and we see it as a tool for our operation. (...) It's just about making some tools that can support our operations. And, in the end, it is of course the citizens who use it, but we do not make anything for the citizen yet, it is primarily for our operations. That is our definition

As can be seen in this quote. Andrew focuses the definition of Smart City on cues relating to data and technology and frames relating to solving existing tasks in the city, thereby excluding cues and frames relating to citizen engagement and focus. By adjusting the definition of what can be included in Smart City, he purposefully limits what could be discussed in the meeting. The very narrow definition simplifies the communicative space, allowing only considerations about technology and data and its connections to the municipality tasks as topics.

Symbolic boundary work was also used to complexify the communicative space. For example, at a MiniSmart meeting, talking about how to set up a climate threat readiness project the initial talk was about setting up measures to assure readiness against water-related problems such as flooding. However, a manager argues for the expansion of this boundary: “Climate adjustment, the way I see it, is not only about water, it is also about heat. (...) Also, it is very expensive to cool something down...it costs a lot of energy”. Therefore by adding the concept of heating into the climate adjustment frame, he expands its original boundaries behind the limited notion of preventing water related disasters.

Symbolic boundary work is also used to complexify while maintaining simplicity or simplify while maintaining complexity. For example, in one of the meetings, the initial topic boundaries were set at creating a more open government by sharing all data from the regional municipalities that have agreed to take part in the project. While discussing the issue, one of the participants starts negotiating the boundaries around the topic:

I think that when we think of open data in the municipalities, we should think it nationwide. So it is the whole country that has to go through (the process). And then it is better that we have a few themes that we just agree that it makes sense on a national level (...). It may well be that it makes a little slower and we do not get a hundred themes on the list right away, but in return there may be some who will be interested in it.

The manager requests a narrowing of the number of cues, thus simplifying the topic, by only focusing on a few data sets, rather than all municipality data. At the same time, however, the complexity of the space is increased by expanding the scope of the project, from a few municipalities to the whole country. As such, the space is simplified in the topics that the actors should focus on while, at the same time complexified through the scope expansion.

Social boundary work refers to who is accepted or invited to take part of in the communicative space. By defining these boundaries, one can increase or decrease the complexity of the communicative space. By allowing more, and particularly also more diverse people to the communicative space, the space becomes more complex and vice versa, by restricting the number and/or diversity of people, it becomes less complex.

For example, in a meeting at MiniSmart, managers were discussing what projects and partners should be included in the Smart City strategy, especially as part of a strategy point to transform the city into a “lab to test applications and improve mobility, energy, the environment”:

Jerry: But do we know what the Buildings department does? I have a feeling that Smart City has entered various areas.

Dale: I just think we should try to focus on the program we have, movement in the organization that we call Smart City.

Jerry: What I'm thinking of is, the water company, (...) they sit and test the river (...)

Dale: Yes, they really do a lot of things; you could say, we should cooperate more with them. But, so far, we can't do anything about it (...) The problem is it this is a big organization and many directions are created around the city. But we just focus on making some projects and caring for them.

As it can be seen, Ethan sets up boundaries of who should be invited by allowing only managers with specific profile to take part in the space, the boundary being set according to how their repertoires can contribute to the sensemaking. The boundary simplifies the space by reducing the wide social boundary of “public authorities” to a more narrow subset of people with only specific repertoires.

Even more, social boundaries were used to delimit the roles that participants presented within the space. For example, at the start of a workshop on how to address the challenge of open government, Anna presents herself in the following way: “*My name is Anna, I am employed in MaxiSmart municipality. Today, we primarily represent the OpenGov project*”. By delimiting the role to that of representing OpenGov, an inter-municipality project, topics and discussions that might pertain to the MaxiSmart municipality are eliminated, therefore simplifying the space. These role presentations acted as boundaries that allowed participants to draw on them during the discussions to eliminate responsibility for knowledge of other areas, while at the same time highlighting their knowledge and expanding boundaries in others.

With regards to simplexifying boundary work, social boundaries were created in the form of linking topics to actors not present in the space. While expanding social boundaries creates more complexity by increasing equivocality, it can also reduce complexity at the same time. For example, at MiniSmart, managers were trying to understand how to use new sensor technology to capture the mobility problems in the city and their impact on local actors such as local businesses and citizens. While multiple frames are presented by the participants to the meeting, they are having problems finding out how to start working with the problem. Andrew on the other hand proposes:

we have been talking to a researcher (...) And he works with wearables, and movement in the city. (...) light rail coming to [the city], (...) you could make some measurements in the city center and measure how people are moving now, and how many are in the area, and how cars are moving. Also measure what happens when the light rail comes, which meanings have it for the city

Therefore the actors are dealing with a vaguely defined cue, making it difficult to identify what the cue consists of. That is why, Andrew mentions the possibility of adding the researcher to future communicative spaces, and highlights an example of how the cue of capturing mobility effects could be framed from his perspective. Therefore, a new frame is brought in that was not available before, through which the space is complexified. However, this frame is not actually made use of, since actors don't know the intricacies of it. Bringing in the outside frame however allows the cue to be postponed to other, future spaces, therefore simplifying the space. The practice therefore, allows actors to act as if the problem is already made sense of, postponing actually making sense of the cue for later spaces.

Lastly, *temporal boundary work* can be observed both in terms of how the actors controlled the duration and the setup of the space. As such, the duration of the communication space and duration of discussions become important elements to facilitate sensemaking processes. Yet, while symbolic and social boundaries directly impact the complexity and simplicity of the space, temporal boundaries indirectly affect it by controlling how much time for example is allowed for the discussion of a topic. Short time frames allowed only limited number of cues and frames to be discussed therefore simplifying the communicative space, while the reverse, extended time allowing a more in depth discussion of large amounts of cues and frames. Temporal boundary

work is therefore used as an indirect mechanism of increasing, decreasing or simplexifying complexity.

Temporal boundaries were set by, for example, instituting extremely short deadlines (5-7 minutes) for discussions. As one consultant notes: “set the pace for the workshop in relation to (...) what depths we come to (...) on the breadth and depth”. Thus, extremely short deadlines for conversation limited the “breath and depth” and, as such the amount of cues, frames and connections between them, simplifying the communicative space. The reverse effect intended when organizers extended the time allowed for discussions: “you get a little more time to get into the depth.” (Randy, MaxiSmart)

Furthermore, temporal boundaries were heavily used as a simplexifying practice to simplify the space while maintaining the issue complexity. For example, in workshops, MaxiSmart consistently postpones particular sections of topics, deferring them to other spaces. As such, at the beginning of a workshop, the organizer from MaxiSmart announces:

Data standardization and alignment (...) we know that they are a large challenge and that it has a strong significance to solve the real value creation that sits in open data. But, at least with regards to today, we park these barriers and don't talk standardization in data.

The organizer acknowledges that open government has standardization and alignment as important aspects of the problem. However, he postpones the topic to a different space. Thereby the current space is simplified by postponing cues to different spaces while still maintaining the complexity by not dismissing them entirely.

As it can be seen, boundary work is used by the actors to simplify, complexify and simplexify. The work around symbolic, social and temporal boundaries defines the communication space. However, defining this space is a dynamic process, which is constantly in flux. As actors try to make sense of the problem and decide on a course of action, they repeatedly modify the complexity and simplicity through their boundary work. How this dynamic unfolds over time is the topic of the next chapter.

The influence of boundary work on the development of collective sensemaking over time

In this chapter, we analyze how the different types of boundary work identified above shaped the participants' sensemaking over time. We will first briefly describe the model and then exemplify it by reporting on a workshop that we observed.

A model of boundary work for making sense of grand challenges

In our cases we observed that boundary work displayed three distinct phases – outlining, focusing and adjusting – which can be seen in the figure below.

– Insert Figure 1 Here –

The first two phases of the boundary work process focus on simplifying the space. During the *first phase*, which we refer to the outlining phase, actors do symbolic boundary work by establishing the topic and aim of the communicative space; set social boundaries by defining who should be allowed in the space and in what role; and set temporal boundaries by setting timeframes for the discussions. Discussions within this stage focus especially on filtering, identifying and delineating the number of cues by defining the topic of discussion and eliminating aspects of the topic that should be outside of the space. Therefore, by providing an initial selection of cues to focus discussions on and frames through the people invited, this first stage, simplifies the space, setting its initial outline. If these boundaries are met with at least temporary acceptance by participants, discussions can move into the next stage of focusing.

In the *second phase*, which we refer to as focusing phase, actors set additional boundaries that simplify the space further. Within this phase actors focus especially on creating boundaries around the frames used. As part of the sensemaking process, actors need to connect their frames to the cues. However, this being a joint, shared process, the other actors within the space need to be made aware of each other's frames. That is why actors share their frames and what perspectives they think could help in starting to make sense of the cues. However, as actors have diverse backgrounds and sometimes even come from different sectors, these frames need to be simplified in order to be understood by others. That is why, in this phase, actors use widely known tools in

the form of objects (ex: PowerPoint presentations, templates, maps, etc.), methods and methodologies (ex: design thinking) or models (ex: business model templates) to allow the sharing of frames in simplified forms. By allowing only limited aspects of frames to be communicated, these tools will tend to simplify the space further.

What is important to note is that the second phase, real understanding development and exploration is not yet achieved. Rather, actors still describe current situations with the current frames by using tools and models that they already know. This becomes especially apparent in the wide use of social simplexifying practices in this phase. Therefore, if no frame could be found that could help systematize the space, discussion of the problem was postponed and focused only on whom to add to the discursive space that would be able to provide a simplifying framework. Furthermore, the first two phases focus on simplifying the discursive space by presenting the cues and frames available. These, while creating an oversimplification of the issue, when completed, create a shared understanding among the actors of the present frames and therefore allow discussions within the third phase to focus around expanding understanding and finding joint courses of action.

If these simplifications are accepted by the participating actors, the discussions move on to focus on trying to connect cues with the available frames to generate an understanding of the selected cues (arrow A). However, actors can also reject the boundaries presented which can lead either to a breakdown of the communicative space (arrow C) or to the reestablishing of a new set of cues and frames (arrow B). In the latter case, the process starts again, setting new boundaries around the issue.

In *the third phase*, which we refer to as adaptation phase, actors focus on adjusting the previously agreed boundaries to the necessities of the ongoing sensemaking process. The third phase starts when actors begin to explore the possibilities of connecting cues and frames in order to create understanding around the issue. These explorations also mean the start of negotiations around the boundaries of the discursive space - such as what topics should be part of the exploration and which not, what scope and timeframe should be allowed in the discussion etc. At this stage, while discussing in depth the cues and their connections with other cues and the frames, varying degrees of complexity are encountered. Actors observe the interconnectedness between the cues and other cues that have been excluded. Therefore, cues that have been excluded need to be re-included and

frames that have not been taken into account need to be added to the space. Hence, while the first two phases focused primarily on reducing the complexity of the communicative space, the third phase is primarily concerned with a selective increase in complexity – compensating some of the over-simplifications. During the previous phases, on the other hand, actors only focus on describing their positions and finding a common ground from where to start analyzing problems and solutions. That is why, in most cases, the initial tendency will be to complexify the oversimplifications that have occurred in the first two phases.

Boundary work works alongside the sensemaking process to allow understanding to ensue (see figure 2). Therefore, as grand challenge cues are bracketed, in order to create a common space in which to discuss them, only a certain number will be selected together with actors that will be part of the space. Then as actors present their frames to the others, only a simplified version of the frame will be presented and accepted, leading to further simplification. Finally, as actors work to connect frames and cues, the boundaries will expand and contract to allow or reject interconnected cues and frames.

– Insert Figure 2 Here –

The interplay between boundary work and sensemaking leads to different types of understanding at the end of the exploration process. In cases where no agreement could be reached around the boundaries of the space, the understanding that evolved was scattered (arrow B and C) since no consent could be achieved on what the cues and frames up for discussion should be. Therefore, most of the times the scattered understanding already is decided in phase two of the communicative space. In the case where such consent is reached, we find that understanding can further differ in terms of depth and breath. If the participants focused mainly on simplifying (arrow A3) the discursive space by continuously eliminating cues and narrowing frames, this would lead to a narrow understanding by not tackling many cues and preferring a singular frame. However, the limited amount of cues would create a deep understanding within the limited frame discussed. In the case of using both simplifying and complexifying boundaries in alternation, this would lead to an unbalanced exploration (arrow A2) which would create a shallow but wide understanding. In this pattern, participants in our study were expanding the boundaries by including new cues and new frames and then, when seeing its complexity, simplifying again. This would lead to a rapid

change of cues and frames which would allow the participants to explore multiple cues with a multitude of frames, but only shallowly. Lastly, in cases of balanced exploration (arrow A1), actors used mainly simplexifying practices to simplifying while maintaining complexity or complexify while maintaining simplicity. The use of simplexifying practices allows for example the inclusion in the discursive space of cues that have been bounded out but are necessary for the understanding. They allow actors to postpone the discussion of cues that are uncertain or otherwise problematic in order to focus discussion on cues that can be explored. Therefore, by making use of simplexifying boundaries, balanced explorations lead to both wide and deep understanding.

The OpenGov workshop

To exemplify how the discursive spaces can follow different patterns, we present several vignettes from a series of communicative spaces related to the OpenGov project. This project was aimed at making sense of the possibilities and implications of municipal data sharing for local entrepreneurs and SMEs. As such, this is part of making sense of the challenge of dealing with the digitalization of society and its demands for transparency on the one hand and creating digital workforces on the other (Finch and Tene 2018). The project had been stuck for several years, despite wide national support due to the extreme complexity of the topic, which included:

- a) Ambiguity regarding impact of data sharing and the required technology (multiple cues, no frame): could combining data sets put citizen privacy in jeopardy?
- b) Equivocality with regards to open public data potential: businesses see that municipalities only make public non-value adding data; government sees high potential in supporting local businesses to create new services and products; municipalities see it as just an extra cost; citizens see it as a requirement for transparency since it is their own data.
- c) Process equivocality: businesses demand standardized data to be made widely available for them to be able to create value out of it; while municipalities saying that they are waiting for businesses to name what exactly they are looking for.
- d) Ambiguous causal mechanisms: getting buy-in problems since value starts to arise only if minimum scale in use is reached by both municipalities (all) and businesses; data from one municipality is interconnected with that of another (ex: in maps); potential unforeseen consequences when creating data transparency such as scandals.

The workshop was explicitly aimed at developing a joint understanding about how the process of opening data could be done. Three local entrepreneurs, Jack, Dale and Martin and three municipality representatives; Jane, Brenda and Felix, were brought together to try to create common understanding around these challenges and set up initial joint action that would test paths towards their resolution. For the workshop, each entrepreneur was tasked with coming with a business idea (tool) that could be used as a test example to try to find solutions to the challenge. Each entrepreneur came with a business idea that was based on municipal data and that was to be presented in templates provided by the organizers (phase two – tools). During the workshop, the topic for the workshop and ideas were presented. One-on-one roundtables between employees and entrepreneurs were created to find out if joint understanding could be created between the two parties around how to start approaching the challenges. Templates that would guide discussions were presented by the organizers. Finally, parties that agreed to work together on the problem, engaged in more in-depth discussions around the challenge. Further development of solutions and testing was done after the workshop. Figure 2 illustrates how the different spaces unfolded within the workshop.

– Insert Figure 3 here –

Phase one begins with an articulation of the social boundaries where participants present the role they will play the meeting: *“my name is Jane and sit in WaterMuni, where I sit as a Smart City coordinator and project manager on open data. I also sit in OpenGov project, but today I am here as WaterMuni”*. Jane simplifies the multiple roles that she could play by selecting the role of representative of her municipality and its resources. The organizers also provides the initial boundaries around what the topic would be (symbolic boundaries): *“trying out new ways to get the data in public organizations (...) out to create value for you, the companies (...)”*. These initial boundaries simplify the space, by outlining what role the actors will play during the meeting and for what purpose.

Even more, the organizers use simplexifying boundary work to highlight the complexity by identifying additional cues, but at the same time eliminating these cues from the discussion. Anna uses her advisory position within the ministry and a municipal coalition body to eliminate the aspect of standardization (see above): *“I know that standardization and alignment are something*

that is in your mind. Take the day today as a step along the way. We also talk to the rest of the municipalities, we also talk with [coalition], about standardization and alignment. But we need to get started talking about the need for data (...) What we arrive at today, I will carry on to [the coalition], and to the [ministry].” (Anna, MaxiSmart). Furthermore, the other organizer postpones other challenging problematic cues to future meetings (data standards): “today we try to park everything here, called barriers or (...) when you in the companies says ‘arh, but the data is not quite good enough’ or ‘it was not exactly the right format’”. This double use of simplexifying boundary work helped to maintain and acknowledge the complexity of the problem. The organizers bring to front the process equivocality (see above), but to postpone this equivocality to future discursive spaces.

Phase two starts with the organizers setting further boundaries around how the conversations should proceed. Simplexifying social boundaries are set by the organizers around the role that the participants are to play. The entrepreneurs and municipality employees should use roles of partners rather than the roles that the participants are used to play in the interaction: “*be each other's business partners rather than being too much in a 'supplier - buyer' perspective*” (Randy, MaxiSmart organizer). The consultants anticipate the potential simplification tendency of participants and put boundaries on it by setting up a frame for complexifying. The emphasis on being open therefore complexifies the space by requiring an attitude against traditional simplifying tendencies, against “jumping to conclusions”.

Next, one-on-one conversations are set between the entrepreneurs and the municipal employees aimed at finding out if some provisional joint understanding can be created between the parties that would allow them to enter in the process to find a way to solve the OpenGov problem together. The conversations are simplified by requiring the entrepreneurs to present potential business models based on municipal data and through the fact that the presentations are required to be presented in set templates (previously prepared). These tools simplify the space by preselecting what cues and frames the participants can focus discussion on. In the following vignettes, we present three of the conversations that took place within this phase.

| |
|--|
| <i>Pattern A: Martin and Jane – Breakdown</i> |
|--|

Martin's idea (entrepreneur) was to develop a mobile application that would display bus schedules to provide a solution to mobility challenges in the city. However, after being presented the idea, Jane (municipal employee) is "immediately challenged with what we can contribute". As such, Martin's business model (tool) is unable to simplify the cues enough to allow a common understanding to start emerging. Therefore, Jane requests narrower boundaries around the frame so she can understand how she could connect her frames to the ideas of the entrepreneur: "*we need more words (...) we just need to know if it is in the Senior Area, it is in our Traffic and Environment area, it is on the population forecasts, is it here that you want data or here we see that we have a need*". However, Martin is unable to focus further – "I also think that it is a little difficult to know what we exactly demand from your side." Rather, he increases the symbolic boundaries even more by taking the frame from bus scheduling, to more general, expanded boundaries of mobility in general: "*But what would be interesting to you to improve on this topic of getting from A to B?*". Despite Jane trying to identify more concrete cues by coming up with ideas of topics around parking challenges, Martin is further unable to set boundaries around the cues and frames he would like to focus on: "It is a little difficult to reach in five minutes because we actually have other ideas that I would like to hear about data." This leads to a breakdown (collapse) of the space with no agreement of how to effectively bound cues and frames in order to create joint understanding of the problem and how to proceed.

Pattern B: Martin & Felix – Reject & Reestablish

Felix's (municipal employee) reaction to Martin's business idea is to come with a data area that they could use to start dealing with the challenge – "*something that might be interesting (...) road work. And it may be something that speaks to this because it means that a road might be blocked for a week or something*". However, Martin himself does not react to this idea. Rather, he prefers expanding the boundaries of the conversation into a wider, more abstract frame - the general needs of the municipality - "*do you have any challenges with public transport in your municipality?*" Afterwards however, Martin rejects his own focused frame and reestablishes a new one, with new, unrelated cues and frames associated with it: "*I would like to ask for something completely different? Elderly. This is because we have an idea of taking modern communication technology and designing it for the elderly*" (Martin). The discussions

afterwards starts revolving around this new topic. New boundaries need to be set around the new issues and the business idea (focusing boundary work) needs to be reestablished: “*I also hear you being very searching. So if it was something concrete, then we could look in that [road work]*” (Felix). The parties agree to try further to explore the challenge, with no clear agreement around what the exact topic would be. At this stage, since no agreement about the general boundaries of the discussion is achieved, the understanding is scattered (this will be observed in the further exploration where the discussions both on mobility and on the elderly topics are started over).

Pattern C: Jack & Brenda – Acceptance of boundaries

Jack’s (entrepreneur) idea is to create a platform for better use of heating in municipal buildings. When Jack presents his idea to Brenda, she initially is skeptical of how she could connect what she knows to this idea. As a response, Jack expands his business idea to include not only heating energy but also electrical energy and therefore energy data in general. This way Brenda is able to see how they could start coming up with a course of action: “*electricity data should at least be possible (...) at least I can do that, these things, I can go home specifically and try to investigate.*” Therefore, by expanding the symbolic boundary to include electricity data as well, Jack creates space for Brenda’s frame to be connected to his, create common understanding. While the expansion of the boundary complexifies the space through the introduction of additional cues, it is at the same time simplifies by allowing shared construction of understanding around the problem.

In **phase three**, the parties that found a common basis for action go in depth into exploring the problem further and trying to develop tentative courses of action for its resolution (20 minutes). Templates are provided again by the organizers to help guide the discussions.

Pattern A1: Dale & Jane - Balanced exploration

Dale (entrepreneur) had initially presented an idea for a home search website for people looking to move to new cities aimed at solving problems of mobility. Together with Jane, they agreed to use this idea for exploring how to develop an open data process for this idea.

As the actors discuss the challenge, the issue of data privacy arises, a bounded out issue by organizers in the first phase. Jane raises the issue of what could be the potential impact of sharing the data, being concerned about the potential of citizens' identity not being private any more as multiple data points are combined. At this point, Dale increases the complexity of the cue by expanding the boundaries around its definition (simplexifying boundary work). He articulates the multiple bundles of cues that one could select in order to allow for the privacy to be maintained: *“the geography needs to be defined. It's a definition thing with regards to data. Geography can be a lot of things -polygons, street names”*. The added cues expand the symbolic boundary around the meaning of “geography” which complexifies the space. However, at the same time, the added flexibility in the boundary simplifies the space by allowing options to come through therefore making the vaguely defined term more concrete. Therefore, complexity is increased while maintaining simplicity. The simplexifying boundary work allows the participants to explore cues that were initially bound out (privacy and standardization concerns), starting to create a frame for understanding the challenge: *“if the geography is large it gives less value (...) one point doesn't give a lot of value. (...) But what is interesting is the distance from a center to a circle”*(Dale).

As such, they to start to develop a course of action that can *“find the sweet-spot where it is possible to both exhibit data on a geographical level, while at the same time is sufficiently rich that it makes sense to work with”*.

Therefore, Dale and Jane take the time to explore not only how to set courses of action that should create meaning around how to set up the process, but also go against set boundaries by exploring how the data privacy problems could be solved best. While most of the conversation does happen within the set boundaries, the actors do also explore topics outside the boundaries when it is crucial to the further development of the understanding. Even though bounded out, the issue of data privacy is interconnected with the other issues relating to setting up a process of sharing of data

where both parties can gain value. The simplexifying boundary work allows the participants to include the bounded out topic without overly complexifying their communicative space. This balanced exploration creates an understanding that is shared (observed in the joint course of action established), in depth (observed in the plan that was set up for action) but also wide (exploring not only within the allowed boundaries but also other cues that were outside but relevant to start creating meaning around the challenge).

Pattern A2: Martin & Felix - Unbalanced exploration

After the initial conversation with scattered agreement around what the topic could be, Martin and Felix get together again to explore the issues further. However, Martin not only rejects the template offered for discussion – “*It didn't sound like a form that fit into our talk, does it?*” (Martin), but continues to inquire into multiple areas. While initially the conversation is started by Felix around the mobility frame, Martin takes it back to the elderly frame. Multiple attempts by Felix to simplify either frame - “*if you have to go home (back in the municipality) and agree something with someone, then you have to know what department (...) We have to narrow it down*” - are met by resistance from Martin. Further explorations expand the boundary of the discursive space with participants coming up with even more diverse cues and frames that could work to test for creating a process for OpenGov. Therefore, while initially Martin focuses on mobility challenges, then he switched to solving the problem of elderly care by creating a platform for “remote medical visits”. However, when Felix offers data in that field, he rejects his own boundary noting – “*it's another market too, where there are some mid-sized actors. So it may well be that we should just ignore it*”. The topic then switches repeatedly to different topics as each is rapidly abandoned: a) helping elderly with using mobile phones; b) facilitating the communication between municipalities and elderly c) elderly loneliness with new technology. Not only do the actors not reach any agreement about the topic in itself, but when inquired by the organizers, Martin describes the process in the following way: “*This is not super concrete (...) we've been around different things.*”

As can be seen, Martin jumps from cue to cue and from frame to frame, including and then immediately excluding them. This spiraling conversation with continuing expansion and complexifying of the space and immediate contracting and simplifying means that while a lot of

cues and frames are mentioned, the discussions do not go in depth with any of them. This highlights the wide but shallow nature of understanding that is created.

Pattern A3: Jack & Brenda – Focused exploration

The in-depth discussion between Jack and Brenda restarts with a restating of the boundaries that have been agreed on in the previous stage: “*we talked about electricity data for our municipal buildings (...) and it should really be (information we can get) here and now*” (Brenda). These restating of the boundaries of the space strengthens the set boundaries avoiding further complexification. When Jack attempts to expand the set boundaries by trying to add additional cues to the relevant data, this is met with a rejection from Brenda: “*I'm probably a little more doubtful about this, because I believe that it would seem to be too peripheral (...) no, this here (pointing to the agreed written text on the template) is more relevant*”. Therefore, the writing down and reiteration of the boundaries make Jack fail his attempts at complexification.

Further simplification of the space is done by relying exclusively on filling in the template offered by the organizers to guide the exploration: “*But it is probably good to write one-time delivery in this round to put a frame.*” (Brenda). As such, simplification is the main focus, actors narrowing down the boundaries around the space. For example, from the initial temporal boundary set by the organizers of being open in terms of what can be done, Jack and Brenda further simplify this to action that can be achieved “here and now” and then, further, into “ a one-time delivery. So it's nothing to do with ongoing (...)”.

The only practices that are used to provide increased complexity to the space is to draw on the boundaries set by organizers at the beginning of the workshop to be open and not shut ideas down (simplexifying) - “*So that's a big part of what is in it, how to assess... that is, first you need to see what you can get.(...) but if we have to assume (...) you need to evaluate the quality of this dataset.*” (Brenda). This allows the discussion of uncertain cues within the space therefore complexifying it, but still maintaining simplicity in allowing such assumptions to fall through afterwards.

This type of exploration, creates a very in depth understanding but very narrow at the same time, not exploring interrelations between elements.

As it can be seen, the use of different boundary work led to different types of understanding. However, since all included more in depth explorations of the problem (surpassing phase 2), they all achieved shared understanding. Using mostly simplifying practices led to a focused exploration that created an in depth understanding of parts of the challenge, but did not allow exploration of wider aspects of it – therefore, this created an in-depth but narrow understanding. In cases where participants used mostly simplifying and complexifying practices in alternation, it led to an unbalanced exploration. Such an exploration of multiple topics sparingly, led to a shallow and wide understanding. Lastly, engaging in a balanced exploration through the predominant use of balancing practices led to an understanding that was wide and in depth.

Discussion and conclusion

This study was motivated by the observation that organizations are increasingly engaged in trying to make sense of grand challenges (George, Howard-Grenville et al. 2016). As “super wicked problems”, they are extremely difficult to make sense of as they require ensuring, on the one hand, that the communicative space has the requisite variety necessary to make sense of multiple, interrelated cues and, on the other hand, that the communicative space is simple enough (both in terms of cues and frames) to keep equivocality in bay (Ferraro, Etzion et al. 2015). We aimed at investigating how this tension was handled through the boundary work. Through its findings, the study contributes to three streams of literature.

First, we contribute to the literature on grand challenges (George, Howard-Grenville et al. 2016), showcasing how actors make sense of multiple, interconnected cues. As cues are highly interconnected, simplifying the issues will lead to an impoverished understanding of the problem. That is why complexity needs to be allowed back into the discussions. Through simplifying boundary work, i.e., by maintaining simplicity while allowing complexity, actors are able to achieve this balance. The literature that has dealt with grand challenges has already hinted at the inherent difficulties arising from the need to create understanding around these issues. For example, Hardy, Lawrence et al. (2006) identify the importance of and inherent tensions in creating

“a coherent set of understanding regarding the problem, the process used to address it, and the nature of the potential solutions” (pp. 105).

Furthermore, research on grand challenges has started to underscore the tendencies to revert to simplifying the problems when dealing with such meta-problems. Palermo, Power et al. (2017), in their case of an insurance company that was trying to make sense of the financial crisis, illustrate how the company went initially through a phase of increase in complexity followed by a reduction of it. The cases studied by Wright and Nyberg (2017) also hint at a similar problem of reduction of complexity throughout time by reverting to “business as usual”. Our study parallels these cases in showing that at a micro, discursive level such oversimplification can happen (in the focused exploration pattern). However, through the use of simplexifying boundary work a more balanced exploration that maintains the complexity of the issues is possible.

Secondly, the study contributes to the literature on sensemaking by illustrating how boundary work is used to manage the trade-off between requisite variety and equivocality. As such, we answer the call for more research on how the balance between requisite variety and equivocality is achieved in practice (Maitlis and Sonenshein 2010). First, we identified specific boundary practices that allowed combining simplification and complexification, such as postponing of issues to other spaces. Second, we show that the trade-off is managed through dynamic switches between complexifying and simplifying boundary practices. We showed how this plays out over time, which we synthesized in a three-stage process model, consisting of outlining, focusing, and adjusting. Research has just now started to look into how this tension is being handled in practice. For example, Seidl and Werle (2018) also look into how requisite variety is achieved when trying to make sense of meta-problems. Similar to their study we observe that as actors encounter cues that they cannot make sense of, they expand the social boundaries, inviting other participants with suitable frames. However, in Seidl & Werle’s (2018) case, the dynamics in the sensemaking process is explained by the interests of the participants, while in our case it is mainly driven by the sensemaking requirements of the space.

The need for combining complexity and simplicity in the sensemaking process has also been observed also by Colville, Brown et al. (2012) and Weick (1995). Colville, Brown et al. (2012), achieve this balance by combining “complexity of thought with simplicity of action” (p.5). Similarly, Weick (1995) advocates for increase in complexity by increasing the number and variety

of frames available, while maintaining simple action rules. Our study adds to these findings in demonstrating how the tradeoff between complexity and simplicity can be achieved in situ, discursively, through the dynamic, constantly negotiated boundary work across the process phases.

Lastly we contribute to the literature on space (Weinfurter and Seidl 2018) and its associated boundary work (Langley, Lindberg et al. 2019). We show how boundary work not only creates the outlines of spaces but that its dynamics continuously reshape its limits. Research has only recently started to investigate how actors use space and boundary work to engender change in understandings. For example, Bucher and Langley (2016) in their study on routine change, describe how reflective spaces, by being temporally and spatially delineated from everyday organizational life and by including diverse actors enabled participants to “envision major changes to the overall routines” (pp. 608). The authors show how the complementarity between reflective spaces and experimental spaces can lead to routine changes. Similarly, Hardy and Maguire (2010) show how the interplay between three spaces within field configuring events – plenary talk, corridor talk and external communication – each distinctive in social, spatial and symbolic boundaries, lead to changes in understandings at the field level. While these studies show how change in understandings is brought about through the interplay between spaces, the studies present a rather static view on the spaces. Our findings on the other hand show that boundaries within one space are continuously redrawn and that new understanding emerge through the interplay between boundary work and the sensemaking happening within the space.

We further contribute to the space literature by foregrounding the dilemmas inherent in boundary work between contracting and expanding of boundaries. On the one hand, there is a need to simplify the space through a contraction of social, symbolic, and temporal boundaries. On the other hand, in order to make sense of the issues, complexity needs to be allowed in, expanding the boundaries of the space. Research on boundary work is already pointing towards this paradoxical character of boundaries of enabling both isolation from external complexities while at the same time enabling connections (Langley, Lindberg et al. 2019). Our research expands this stream of research showcasing, through our process model, how only when exclusions (simplification) has been achieved, can the inclusion begin. Only by following the interconnections between the elements of the space and outside of it does one know what should be allowed back in.

While we do believe that the findings apply to a wide range of situations, one of the boundary conditions that might apply to this case refers to the special role of power and politics. In our cases we did not observe a strong effect of power in the dynamics. This might be, first of all, due to the Nordic European cultural characteristics that exhibit mostly flat hierarchies and power structures. Even more, due to the nature of the problems, none of the parties had a dominant frame that they would have liked to impose, focusing rather on trying to understand the problem and potential solutions. However, power might have a consequential impact on how boundary work is achieved. For example, Maitlis and Sonenshein (2010) suspect that the entire process of creating a balance between requisite variety and equivocality might be driven by power dynamics. As Kaplan (2008) has shown, in such situations framing contests may arise that shape the symbolic and social boundaries of the space according to the interests of the most powerful groups.

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Figure 1: A model of boundary work for making sense of grand challenges

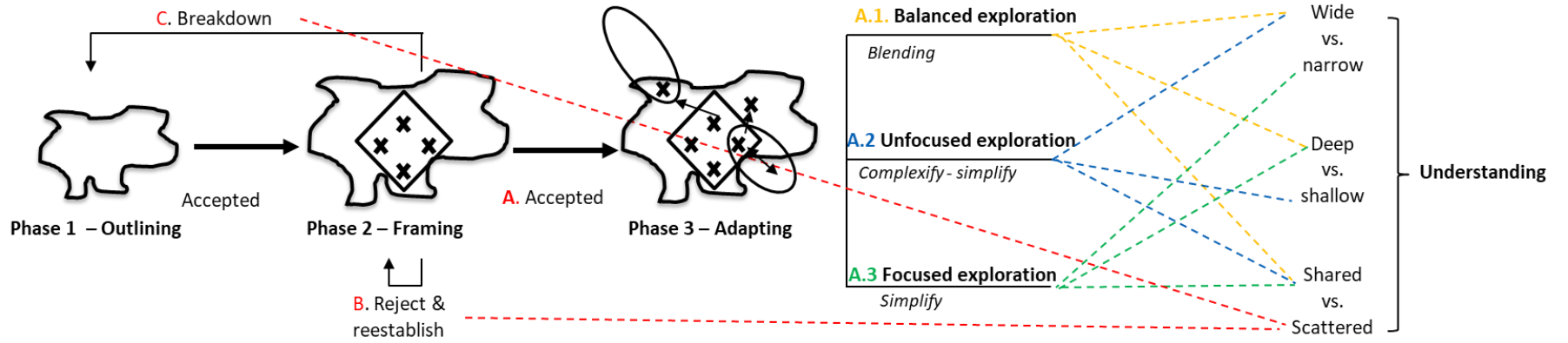


Figure 2: dynamic between boundary work process & sensemaking process

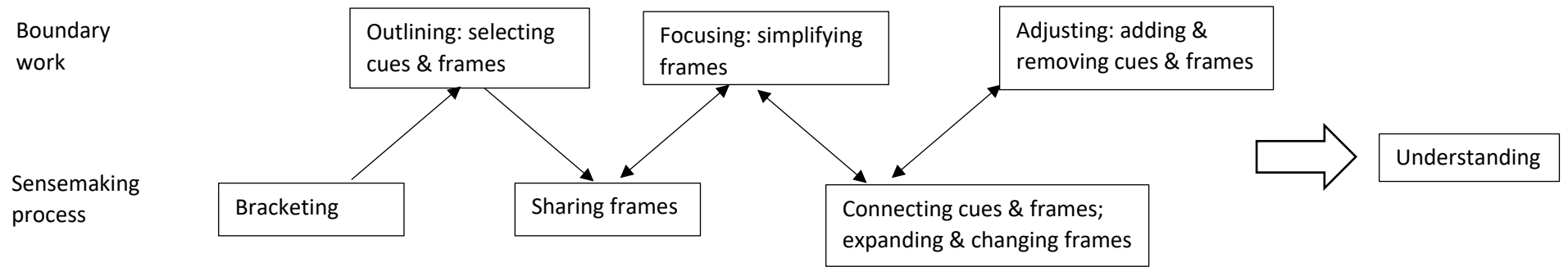


Figure 3: OpenGov workshop

