

**Messy methods: A problematizing review of selected  
team decision support methods**

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# 1. Introduction

There is hardly a better illustration of the need for high-quality decision making than the World Economic Forum's *Global Risks Report*. This report, issued annually on the basis of a survey of almost 1,500 experts of various backgrounds, provides an evaluation of the challenges facing the world (World Economic Forum, 2024). Rather unsettlingly, the report shows that "the majority of respondents (54%) anticipate some instability and a moderate risk of global catastrophes" in the short term. This figure rises to a shocking 92% for the long term horizon, defined as 10 years from now (World Economic Forum, 2024, p. 6). Some of the major risks identified by the report include extreme weather events, misinformation and disinformation, and societal polarization (World Economic Forum, 2024, p. 8).

In response to such "complex" or "wicked" problems, a number of methods aiming to support decision-makers in dealing with these issues have been developed. These include methods such as Group Model Building (GMB) (Vennix, 1996), Participatory Scenario Development (see for instance Schoemaker (1993), Van der Heijden (1996), or Schwartz (1997)), Group Causal Mapping (Eden & Ackermann, 2018), and Decision Conferencing (Phillips, 2007). Each of these methods outlines procedures that, in one way or another, structure both information flows and decision making, attempting to arrive at analytically better decisions that simultaneously have the support of relevant stakeholders.

In order to provide evidence for these and related claims, scholars engage in evaluative research. This type of research tests the effects of an intervention in practice, hoping either to confirm or to reject hypothesized effects. A number of studies show that there is a modest, tentative case for positive effects resulting from team decision support methods. Indeed, Rouwette & Franco (2024, pp. 233-259) provide an overview of these effects.

However, the above conclusions are typically derived from systematic literature reviews. From a methodological and scientific viewpoint, Alvesson & Sandberg (2020) note some issues with this type of reviews. For instance, literature reviews tend to favor hegemonic big concepts or "hembigs," crowding out alternative terms and concepts. Moreover, literature reviews typically treat a (very) large number of studies, raising questions as to the degree to which the research findings may justifiably be said to have been integrated with each other. More fundamentally, Alvesson & Sandberg criticize the tendency for fields of knowledge to cement around certain assumptions, terms, and concepts which are not properly criticized and reflected upon. This, in turn leads to the siloing of academia into distinct bubbles which rarely communicate with each other. Alvesson & Sandberg note that the current practice of literature reviews reinforces rather than challenges these processes of segmentation.

They offer the “problematizing review” as an alternative research strategy (Alvesson & Sandberg, 2020). This strategy aims to deconstruct established knowledge, concepts and implicit assumptions, rather than reinforcing them. It is based on four principles: “The ideal of reflexivity,” “Reading more broadly but selectively,” “Not accumulating but problematizing,” and “Less is more” (Alvesson & Sandberg, 2020, p. 1297). By developing a study on the basis of these principles and applying it to a field of knowledge, the problematizing review offers a reconceptualization of the field, and raises questions for further research.

This thesis project aims to challenge current conceptualizations of the field of team decision support methods research by identifying, articulating, and evaluating the in-house assumptions and paradigmatic assumptions of Participatory Scenario Development and Group Causal Mapping, and by developing alternatives to the problematized assumptions. Indeed, as will be shown in the next chapter, there is evidence to suggest that research on these methods has fallen into the trap of segmentation. For this reason, we believe that a critical evaluation of the field’s unexamined postulates is in place. In keeping with the principles of the problematizing review, this project will, in fact, aim not so much to *fill* a gap in the field but to *create* a gap in current understandings.

Drawing on Alvesson & Sandberg’s (2013) typology of assumptions, we selected two types to be problematized; in-house assumptions – concerning what is simply accepted as standard practice within a school of thought – and paradigmatic assumptions – describing epistemological principles informing a school of thought. We set out to identify the assumption types described, decide on a narrower set that may be problematized productively, and formulate alternative assumptions. We carried out this procedure for Participatory Scenario Development and Group Causal Mapping. The chapter on Methodology contains a more detailed description of these methodological choices, and substantiates them.

In concrete terms, this study intends to answer the following research questions:

- 1) How can the team decision support method of Participatory Scenario Development productively be problematized?
  - a) What are the in-house and paradigmatic assumptions underlying the field of Participatory Scenario Development?
  - b) Which of the identified assumptions may productively be problematized?
  - c) What alternative assumptions may be developed with an eye to a more fruitful application of Participatory Scenario Development?
- 2) How can the team decision support method of Group Causal Mapping productively be problematized?

- a) What are the in-house and paradigmatic assumptions underlying the field of Group Causal Mapping?
- b) Which of the identified assumptions may productively be problematized?
- c) What alternative assumptions may be developed with an eye to a more fruitful application of Group Causal Mapping?

These research questions will be elaborated on in the third chapter; Methodology. The following chapter, Theoretical Background, sheds light on the process of development of these research questions.

By answering the above research questions, this study hopes to offer novel understandings of the field of team decision support methods. Such novel understandings include bringing to light a number of implicit assumptions and conventional conceptualizations undergirding the field, and ways in which they may be challenged. As a result, the outcomes of this study enable scholars better to target their research in order to shed light on certain understudied but crucial elements of the field. In addition, the dimensions that this study hopes to add to understandings of the methods of PSD and GCM will enable both scholars and practitioners to make informed decisions about the usefulness of team decision support methods in different contexts.

Indeed, a richer understanding of these methods will be helpful for practitioners, as well. Armed with an increased awareness of what the studied methods actually are and do – and what they are not and do not do -, practitioners will find themselves more and more able to identify the needs that these methods are best able to meet. Similarly, prospective users will better be able to determine if team decision support methods are up to the task for the issue they are facing. These effects will facilitate the adoption and dissemination of the methods under study.

The rest of this thesis will achieve the research objective by answering the research questions introduced in this section. The second or next chapter provides a theoretical background to the field in the form of a literature review. Chapter three describes the methodological plan of the proposed study and argues for the choices made in this regard. The fourth chapter describes the procedures for data analysis and the outcomes these procedures yield. Chapter five links the study's findings to the research questions, thus reaching an overall conclusion, and provides a discussion of this conclusion. Finally, chapter six contains practical implications and recommendations for practice on the basis of this study, while reflecting on design choices and researcher positionality.



## 2. Theoretical Background

This chapter contains a literature review leading to a section on conceptualization and problematization of the field. As such, it builds a bridge from the general background to the study, contained in the previous chapter, to the methodology, which is discussed in the following chapter. The literature review both builds on and lends support to the research objective and research questions formulated in the Introduction, while providing a theoretical scaffolding on the basis of which this study's methodology will be explained in greater detail.

In the review, we will study two types of sources. First, studying explications of four different team decision support methods will enable us to identify the strengths and weaknesses, as well as the goals, analytical product, and salient features of these methods. Second, studying three case and/or impact studies allows us to acquire an understanding of research into applications, effects, and impacts of team decision support methods, as well as the gaps in this research. This chapter starts with the literature review, and continues with a section conceptualization and problematization, which summarizes and develops the findings of the review.

### Literature Review

#### *Identification of Sources*

The literature review contains seven sources from the field of team decision support methods. In line with the guidance provided by Denscombe (2019), literature was selected by a combination of textbook consultation and expert advice. For the explication of the different methods, we conform to the sources used in Rouwette & Franco (2024), who compare and contrast four such methods; Group Model Building, Participatory Scenario Development, Group Causal Mapping, and Decision Conferencing. In the case of Participatory Scenario Development, Rouwette & Franco (2024, p. 90) note that "there is no standard agreed-upon approach." For this reason, we simply selected one of the process descriptions they refer to. Franco & Rouwette (2024) doubles as a source in its own right, representing an impact study. For the other two such sources, my supervisor, and co-author of the textbook, prof. E.A.J.A. Rouwette, suggested the study by Franco et al. (2021) (personal communication, November 28, 2023), whereas De Gooyert et al. (2022) was found via the website of the European Journal of Operational Research.

#### *Sources and Discussion*

**Group Model Building.** Vennix (1996) provides an outline of the Group Model Building (GMB) methodology for intervention in groups, which is based on System Dynamics. The method aims at enhancing team learning, fostering consensus, and cultivating commitment, and uses the analytical product of the System Dynamics model to do so. A salient feature is the feedback loop, which is thought to explain system behavior.

Vennix's tome on GMB represents a sophisticated integration of an analytical methodology – System Dynamics – with a social methodology – guidance on group facilitation derived from scientific research. It is especially enriching that the author treats both these methodologies as equally important wings required for GMB to take off. What's more, Vennix embeds the proposed intervention in a discussion of the type of issue it aims to handle, i.e., "messy problems" (Vennix, 1996, p. 1). Finally, the book promises a productive handling of conflict, neither avoiding nor attempting to minimize it, but facilitating productive forms of conflict.

**Participatory Scenario Development.** Huss & Honton (1987, p. 22) describe different approaches to scenario development. The goals of this method is to explore futures and identify robust options, to which end the analytical product of scenario texts is used. Salient features are its accounting for uncertainty & impact of scenarios. The authors give insight into an approach of scenario development that, not unlike Group Model Building, combines an analytical methodology with a social one to achieve robust solutions with high acceptance among participants. This is exemplified in the use of scenario logics, as well as in a workshop design that builds up its analysis by adding new elements in each step. The particular strength of this method is its flexibility on the basis of participant intuition; its weakness is its qualitative (as opposed to quantitative) nature.

**Group Causal Mapping.** Ackermann & Eden (2010) describes the methodology of Strategic Options Development and Analysis (SODA), treated by Rouwette & Franco (2024, p. 117) as Group Causal Mapping (GCM). The goals of GCM are to create insight and generate commitment to identified options, to which end the analytical product of causal maps are used. A salient feature of the method is its focus on negotiation. Like Group Model Building and Participatory Scenario Development, SODA combines a social and an analytical lens (Ackermann & Eden, 2010, p. 138). Like GMB, SODA aims to cultivate commitment in participants to the options selected.

However, SODA stresses the importance of negotiation in both individual and team cognitive and social processes. This is quite unlike GMB, which, as Vennix (1996, p. 5) insists, will "almost automatically" lead to consensus when properly executed. Another difference between GMB and SODA is the versatile nature of the latter, with applications not only at the team level, but also at the individual level or in combination with other modelling methods. Finally, it must be noted that SODA is embedded

in a framework consisting of five levels, one is the method itself, whereas the four other levels provide theoretical background to it (Ackermann & Eden, 2010, pp. 140-144).

**Decision Conferencing.** Phillips (2007) outlines the characteristics, stages, and purposes of decision conferencing (DC). The goals of DC are to generate shared understanding, develop a sense of common purpose, and gain commitment to the way forward. The analytical product used is the value tree, and its salient feature is the comparison of options & objectives. In line with the other three methods discussed in this review, Decision Conferencing is contains both social and analytical elements.

DC is characterized by a relatively high degree of freedom for the facilitator and group, in that the framework offered allows for flexibility. Particularly interesting in this regard is that Phillips (2007, pp. 392-393) explicitly states that the method aims at good enough (“requisite”) models, rather an a be-all and end-all solution. The criterion used for addressing requisiteness is the exhaustion of new intuitions in the group. This criterion sheds light on another strength of Decision Conferencing: its integration, not only of social and analytical processes, but also of rational and emotional processes. A weakness of the method is the significant time investment required on the part of participants; two full days. This requirement, in combination with the requirement of an urgent topic to be tackled, narrows the scope for application of the method.

**Effectiveness of Team Decision Support Methods.** The following three sources in the review deal with impact and/or case studies on the applications, effects, and impacts of team decision support methods. First, the penultimate chapter of Rouwette & Franco (2024) aims to answer the question: how effective are team decision support interventions in addressing shortcomings in team decision making? By giving an overview of claimed impacts in the methods under study, the text under review risks neglecting effects that are not claimed or intended, but real nonetheless. This applies specifically to adverse impacts, which are not treated by the authors.

On the contrary, a strong point of the chapter lies in its discussion of differing standards of evidence in evaluative research. The dearth of systematic evaluations of team decision support methods reported is especially noteworthy in this regard (Rouwette & Franco, 2024, p. 252). Finally, the authors significantly identify three levels at which effectiveness (or lack thereof) of a method may be established: facilitation, complex methods, and building blocks (Rouwette & Franco 2024, p. 249).

**Facilitated Modelling, Cognitive Change, and Consensus Forming.** Second, De Gooyert et al. (2022) contributes an empirical study to the field of behavioral OR by studying the impact of facilitated

modelling on cognitive change and consensus forming, and by studying the relation between experienced and observed outcomes. The significance of this text lies in its illustration that information-sharing and resolution of opposing views may not be postulated as automatic outcomes of facilitated modelling interventions. Moreover, the authors make a significant proposition that facilitated modelling is prone to generating false consensus.

However, the study curiously does not treat cognitive change and consensus formation as experienced by the facilitator(s); this represents a missed opportunity in gathering data on the role, effectiveness, and reflexivity of that most crucial actor in facilitated interventions – the facilitator. For instance, across both individuals and workshops, large differences in effectiveness were found. This is a matter in which the perspective of the facilitator(s) might have been useful; are they able correctly to identify cognitive change and/or consensus forming in participants?

**Review of Behavioral OR interventions.** Third, Franco et al. (2021) maps behavioral OR studies focused on interventions. This article synthesizes and summarizes findings from a great number of previous studies. Although the stock-taking exercise is limited to a small number of journals in behavioral OR, the authors actively break through disciplinary boundaries by incorporating findings from adjacent fields of research in the study, and comparing and contrasting these with the findings of behavioral OR studies. The insight that there is only modest evidence for a number of hypothesized effects and relationships is particularly illuminating. Significantly, the authors conclude by highlighting the challenge of studying the micro-level phenomena of behavioral OR interventions, within the framework of macro-level theory.

## **Conceptualization and Problematization**

Based on the above review, we will now develop a conceptualization and problematization of the field of team decision support methods research, which will serve as input for research design. This conceptualization and problematization takes place on two levels: the intervention methods, and research approach.

First, we have summarized the findings of the comparison of intervention methods in the table below.

**Table 1**

*Summary of discussion of team decision support methods*

<b>Method aspect</b>	<b>Group Model Building</b>	<b>Participatory Scenario Development</b>	<b>Group Causal Mapping</b>	<b>Decision Conferencing</b>
<b>Strengths</b>	<ul style="list-style-type: none"> <li>▪ Equal importance of social and analytic aspects</li> <li>▪ Intervention embedded in target issues</li> <li>▪ Productive handling of conflict</li> </ul>	<ul style="list-style-type: none"> <li>▪ Integration of social and analytical aspects</li> <li>▪ Flexibility on the basis of participant intuition</li> </ul>	<ul style="list-style-type: none"> <li>▪ Integration of social and analytical aspects</li> <li>▪ Versatile application</li> <li>▪ Embedded in elaborate theoretical framework</li> </ul>	<ul style="list-style-type: none"> <li>▪ Integration of social and analytical aspects</li> <li>▪ Flexibility on the basis of facilitator and participant freedom</li> <li>▪ Aims for good enough models</li> <li>▪ Integration of rational and emotional processes</li> </ul>
<b>Weaknesses</b>		<ul style="list-style-type: none"> <li>• Qualitative, as opposed to quantitative, nature</li> </ul>		<ul style="list-style-type: none"> <li>• Significant time investment required</li> <li>• Urgent topic required</li> </ul>
<b>Goals</b>	<ol style="list-style-type: none"> <li>1. Enhance team learning</li> <li>2. Foster consensus</li> <li>3. Cultivate commitment</li> </ol>	<ol style="list-style-type: none"> <li>1. Explore futures</li> <li>2. Identify robust options</li> </ol>	<ol style="list-style-type: none"> <li>1. Create insight</li> <li>2. Cultivate commitment</li> </ol>	<ol style="list-style-type: none"> <li>1. Generate shared understanding</li> <li>2. Develop a sense of common purpose</li> <li>3. Gain commitment to the way forward</li> </ol>
<b>Analytical product</b>	System Dynamics model	Scenario texts	Causal maps	Value tree
<b>Salient features</b>	Feedback loops	Uncertainty & impact	Negotiation	Options & objectives comparison

Due to constraints in time and space, the number of methods for comparison will be narrowed down from four to two. In order to provide for an interesting review, we decided to select two methods that, in one way or another, stand out from the other three. With regard to analytical product, PSD clearly stands out from the other three methods in that its analytical product, scenarios, is text-based. This is in contrast with the more visual products of the other methods. In addition, GCM stands out for its salient feature: facilitation of negotiation. On the contrary, the salient features of the other methods are concerned more one-dimensionally with the analytical process. Therefore, we selected PSD and GCM for problematization.

Second, with regard to research approach, we have summarized the strengths and weaknesses of the case and impact studies contained in the review in the table below. We will discuss the implications of these findings for research design in the next chapter, which is dedicated to methodology.

**Table 2**

*Summary of discussion of case and impact studies*

	<b>Rouwette &amp; Franco (2024)</b>	<b>De Gooyert et al. (2022)</b>	<b>Franco et al. (2021)</b>
<b>Research area</b>	Claimed impacts of team decision support methods	Impact of facilitated modelling on cognitive change and consensus forming	Mapping applications of behavioral OR
<b>Strengths</b>	<ul style="list-style-type: none"> <li>▪ Discussion of standards in evaluative research</li> <li>▪ Discussion of levels of effectiveness of methods</li> </ul>	<ul style="list-style-type: none"> <li>▪ Finding that impacts cannot be postulated as automatic outcomes</li> <li>▪ Proposition that facilitated modelling is prone to false consensus</li> </ul>	<ul style="list-style-type: none"> <li>▪ Interdisciplinary in nature</li> <li>▪ Finding that there is only modest evidence for hypothesized relationships</li> <li>▪ Highlighting challenge of micro phenomena in macro-theoretical frameworks</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>• No treatment of effects not claimed or intended</li> <li>• No treatment of adverse impacts</li> </ul>	<ul style="list-style-type: none"> <li>• No treatment of facilitator perspective</li> </ul>	

In this chapter, we studied, discussed, and summarized seven relevant sources with regard to team decision support methods, and the study of this phenomenon. We selected two such methods as the

focus of this study; Participatory Scenario Development, and Group Causal Mapping. In the following chapter, we will describe and substantiate the methodology of this study.



## 3. Methodology

Having provided both the general background and the scientific background to the subject matter in previous chapters, this chapter describes the methodology of the study. We will describe the research strategy employed, as well as the research questions. Then, we will discuss the methods for data collection and data analysis applied within the framework of this study. This chapter concludes with a discussion on research ethics.

### Research Strategy

In order to meet the research objective, we adopted the research strategy of the *problematizing review* (Alvesson & Sandberg, 2020). The aim of this type of review is to “re-evaluate existing understandings of phenomena, with a particular view to challenging and reimagining our current ways of thinking about them” (Alvesson & Sandberg, 2013, as cited in Alvesson & Sandberg, 2020). It aims to critically examine and question existing literature in order to come up with new ways of thinking about the research object. Rather than defining a clear-cut x-step plan, the authors offer four principles on which this review type is based: the ideal of reflexivity, reading more broadly but selectively, not accumulating but problematizing, and the notion that less is more.

We believe the problematizing review is a fitting research strategy for the proposed study for three reasons. First, the boundaries of the field of team decision support methods are rather unclear. There are many possible ways to define the boundaries of this field. This is exemplified by Rouwette & Franco (2024, p. 43), who limit themselves to facilitated modelling-based approaches, but invoke arguments of accessibility and availability of scientific evidence for their sample selection, as well. The problematizing review actively breaks through random, arbitrary, or underdetermined definitions of a research field by including texts from outside the targeted review domain. This makes the problematizing review suitable for the present study.

Second, in order to move the field forward, an approach is called for that looks for insights on a level that transcends one particular method, and that brings the field in conversation with adjacent areas. On the basis of the literature review documented in the previous chapter, such a transcending view is lacking. Of the studies discussed, only Rouwette & Franco (2024), deals with several different methods, rather than being limited to one, in particular. This study, in turn, is limited in its treatment of effects. The other two studies included call for modesty with regard to claims of impact of team decision support methods.

Third, and finally, as far as we are aware, the problematizing review is new to the field of team decision support methods. A number of review studies aiming to integrate research findings on the effects of team decision support methods have already been carried out. For instance, the previous chapter contains a discussion of Franco et al. (2021), which constitutes such a study. In addition, Rouwette & Franco (2024) discuss empirical evidence on the effects of each of the methods they treat. Indeed, to a certain extent, their book may be seen as an integrative review of team decision support methods. Therefore, we believed it would be more interesting to contribute something novel; we are not aware of any problematizing reviews of team decision support methods or the individual methods treated in the current study.

## Research Questions

This section states the research questions the current study will answer, and argues for the appropriateness of the elements it contains. For the current study, the following research questions were formulated:

- 3) How can the team decision support method of Participatory Scenario Development productively be problematized?
  - a) What are the in-house and paradigmatic assumptions underlying the field of Participatory Scenario Development?
  - b) Which of the identified assumptions may productively be problematized?
  - c) What alternative assumptions may be developed with an eye to a more fruitful application of Participatory Scenario Development?
- 4) How can the team decision support method of Group Causal Mapping productively be problematized?
  - a) What are the in-house and paradigmatic assumptions underlying the field of Group Causal Mapping?
  - b) Which of the identified assumptions may productively be problematized?
  - c) What alternative assumptions may be developed with an eye to a more fruitful application of Group Causal Mapping?

First, we selected two types of assumptions to be problematized. We present two arguments for the selection of these two assumptions. On the one hand, these two types of assumptions sit on different places in the spectrum of assumptions identified by Alvesson & Sandberg (2013, pp. 255, 257). Whereas in-house assumptions are relatively superficial, paradigmatic assumptions are more fundamental. Selecting one of each allows us to study the methods to be problematized from different

angles. On the other hand, the inclusion of paradigmatic assumptions in the study does justice to Alvesson & Sandberg's (2020, p. 1297) emphasis on "awareness of the paradigm-bound nature of research". We heed their advice to cultivate and apply this awareness by including paradigmatic assumptions explicitly.

Definitions of these two types of assumptions are contained in the table below.

**Table 3**

*Definition of assumptions, according to Alvesson & Sandberg (2013, pp. 254, 260)*

<i>Assumption type</i>	<i>Definition</i>
<b><i>In-house</i></b>	<ul style="list-style-type: none"> <li>• Assumptions that exist within a specific school of thought</li> <li>• In-house assumptions exist within a particular school of thought in the sense that they are shared and accepted as unproblematic by its advocates.</li> </ul>
<b><i>Paradigm</i></b>	Ontological, epistemological, and methodological assumptions underlying existing literature

Root metaphors represent images of a subject, and sit on the assumption spectrum between in-house and paradigmatic assumptions (Alvesson & Sandberg 2013, p. 260). Although they may be expected to stand out in texts rather obviously, we hardly identified any root metaphors in the process of the literature review. As a result, we decided not to include this assumption type in our research.

Furthermore, the research questions call for identifying assumptions (1a & 2a), assessing their suitability for problematization (1b & 2b), and developing alternative assumptions (1c & 2c). This is in line with the second, third, and fourth principles for identifying and challenging assumptions formulated by Alvesson & Sandberg (2013, p. 260).

We decided to specify the sub-question relating to articulation of alternative assumptions with guidance toward the practical application of the method in question. The narrowing down of the research questions in this way is meant to honor the practical nature of the field. There is no need to worry about the permissibility of tweaking research questions in this way, since the framework for generating research questions in the problematizing tradition explicitly recognizes that problematization is not a mechanical act, but necessarily involves some degree of creativity (Deacon, 2000, p. 135, as cited in Alvesson & Sandberg, 2013, p. 256).

As explained in the previous chapter, it proved to be infeasible to perform a problematizing review for all four team decision support methods treated in Rouwette & Franco (2024). Therefore, we selected PSD, for its unique analytical product of text-based scenarios, and GCM, for its emphasis on negotiation.

## **Data Collection**

In order to answer the set of research questions, thus meeting the research objective, we will collect and analyze data. In our case, the research is text-based, since we are dealing with assumptions that arguably manifest most purely in texts. This raises the question: what are the appropriate texts to be selected for the study of the two methods in light of the research questions? In order to come up with an answer to this question, we take guidance from the formulation of the problematizing review in Alvesson & Sandberg (2020). They formulate selection criteria for literature in their discussion of the core principle “Reading More Broadly but Selectively (Alvesson & Sandberg 2020, pp. 1298-9).

### ***First-Level Readings***

The selection criteria consist of three levels. On the first level, the review author “focuses on some core and representative readings within the targeted (sub) domain” (Alvesson & Sandberg, 2020, p. 1298). Alvesson & Sandberg suggest selecting “recognized core studies,” as well as other texts, “perhaps being picked at random out of a sample” (Alvesson & Sandberg, 2020, p. 1298). They suggest subsequently asking domain experts to identify additional studies to be used that are not yet included in the sample.

For the first-level readings, we selected two different types of texts for each of the two methods. These two types are a case study, and an impact study. Both case studies, and one of the impact studies, deal with applications of the respective methods to questions of sustainability and ecology. This increases comparability across the methods and texts.

For Participatory Scenario Development, Oteros-Rozas et al. (2015) is an impact study. The case studies contained in it are all related to stakeholder-inclusive management of ecological resources. Molinero-Parejo et al. (2021), the case study selected for PSD, deals with spatial and planological developments in the greater Madrid urban area. Note that Malinero-Parejo et al. (2021) is not included in the review contained in Oteros-Rozas et al. (2015).

For Group Causal Mapping, Abuabara & Paucar-Caceres (2021) is the impact study selected. It contains a review of applications of Strategic Options Development and Analysis (SODA), a particular form of GCM. Hjortso (2004) is the case study selected for GCM. It discusses the application of this method in

a governance setting. Note that Hjortsø (2004) is included in the review contained in Abuabara & Paucar-Caceres (2021).

The texts included in the first-level readings are contained in the table below.

**Table 4**

*Texts for first-level readings*

	<b>Participatory Scenario Development</b>	<b>Group Causal Mapping</b>
<b>Impact study</b>	Participatory scenario planning in place-based social-ecological research: Insights and experiences from 23 case studies (Oteros-Rozas et al., 2015)	Surveying applications of Strategic Options Development and Analysis (SODA) from 1989 to 2018 (Abuabara & Paucar-Caceres, 2021)
<b>Case study</b>	Mapping disruptive long-term scenarios using a participatory approach (Molinero-Parejo et al., 2021)	Enhancing public participation in natural resource management using Soft OR—an application of strategic option development and analysis in tactical forest planning (Hjortsø, 2004)

### ***Second-Level Readings***

On the second level, the review author “shifts focus and considers some broader texts, addressing, say, five to ten significant texts, either in the immediate neighbourhood of the targeted domain or more broadly relevant for the perspectivation of the review domain,” mainly with the aim to “recognize and counteract the problems of the arbitrariness of a domain” (Alvesson & Sandberg, 2020, p. 1298). After all, scientific domains and labels are not, typically, clearly defined. These readings enable us to look beyond the arbitrariness of these labels and divisions.

We selected three methods that are adjacent to the scope of, but not included in Franco & Rouwette (2024). In turn, we selected a text that provides a detailed description of the respective methods. First, the method of Community Based System Dynamics, being based on facilitated modelling, is rather close to the review domain of team decision support methods. Sociocracy is slightly further removed from the domain, since it is not primarily concerned with problem solving, pertaining to organizational

governance instead. Finally, the Harvard Negotiation Method is more distant from the review domain, describing a particular technique that may or may not be part of team decision support methods.

The texts included in the second-level readings are contained in the table below.

**Table 5**

*Texts for second-level readings*

<i>Method</i>	<i>Text</i>
<b><i>Community Based System Dynamics</i></b>	Hovmand, P. S. (2014). <i>Community based system dynamics</i> . Springer.
<b><i>Sociocracy</i></b>	Endenburg, G. (1988). <i>Sociocracy: The organization of decision-making</i> . Sociocratisch Centrum.
<b><i>Harvard Negotiation Method</i></b>	Fisher, R., Ury, W., & Patton, B. (1991). <i>Getting to yes: Negotiating an agreement without giving in</i> (2nd ed.). Random House Business Books.

### ***Third-Level Readings***

The readings on the third level serve to “encourage a broader perspective” (Alvesson & Sandberg, 2020, p. 1298), as well as to inspire reflexivity and critical reflection. To this end, it is recommended to include a classic text in social science. For selecting readings on this level, we aimed at a text that provides a critical perspective on the scientific endeavour. This led us to select Latour (1988). Remarkably, his approach to science combines a technical viewpoint with a social outlook. In this ambition, Latour is not unlike the team decision support methods up for review. Although seemingly distant from the review domain, a scientific ideal, and, therefore, an understanding of science, are implicit in the methods under review. In addition, this text serves the identification of paradigmatic assumptions, specifically. In order to identify these assumptions, “some familiarity with an alternative world view, without being stuck in the latter” (Alvesson & Sandberg, 2011, p. 257), is required. Latour (1988) is a pre-eminent example of exactly such an alternative world view.

The text included in the third-level reading is contained in the table below.

**Table 6**

*Text for third-level readings*

<b>Discipline</b>	<b>Handbook</b>
<b>Philosophy of science</b>	Latour, B. P. L. (1988). <i>Science in Action: How to follow scientists and engineers through society</i> . Harvard University Press.

## **Data Analysis**

Having outlined a research design, including a research strategy and corresponding questions, and data collection, we now turn to data analysis. This section describes and substantiates the intended analysis for the data gathered. This process contains of four steps: second- and third-level readings, identifying assumptions, selecting assumptions for problematization, and the articulation of alternative assumptions.

### ***Reading Memos***

First, we read the second- and third-level readings. In order to be able to identify assumptions, we wrote reading memos. These memos contain the condensed insights derived from the texts on the second- and third-level readings. In all cases, the memos contain a summary of the most important information of the texts read. In many cases, a brief discussion of the relevance of the text was, and, occasionally, a critical note was directed at the text under discussion. The memos are organized per chapter of each individual text studied, and are, in almost all cases, illustrated with indicative quotes taken from the corresponding chapter. The full memos are contained in Appendix 1.

These memos serve the process of answering the research questions in three ways. First, they enable readers to trace the interpretation process carried out in the section Analyses. By explicitizing the origin of retrieved information, readers are given an insight into the process leading to the problematization of certain aspects of the two methods under study. As a result, the research process is rendered more transparent and seeming randomness is reduced. Second, the reading memos challenged the researcher to study texts thoroughly, integrating, not neglecting, difficult passages in the text. Third, and finally, the memos served the mnemonic purpose of allowing the researcher to refer to information studied earlier.

## ***Reading Reports***

We subsequently read the first-level texts and identified the assumptions contained in them. The identified assumptions are reported in reading reports. These reports contain identified assumptions, a discussion, and indicative quotes. Where applicable, the reports contain references to the reading memos of the second- and third-level texts. For each of the methods studied, one consolidated reading report, based on both first-level texts, was produced. The full reports are contained in Appendix 2

The reading reports serve the process of answering the research questions in two ways. First, they focus the reading of the texts on the assumptions and the problematization potential of these assumptions. This is in line with the research questions. Second, and like the reading memos, including reading reports allows the reader to reconstruct the interpretations arrived at. This, in turn, renders the research process more transparent.

## ***Assessing Assumptions***

We subsequently assessed the identified assumptions for “problematization potential”. Guidance on this step in the research is derived from Alvesson & Sandberg (2013, p. 258), who suggest that those assumptions should be problematized that are widely shared, but are not necessary for a good understanding of the subject. Further criteria suggested are truth (i.e., challenging assumptions that seem untrue), and the degree to which challenging an assumption may inspire new directions for research. The list of identified assumptions was critically examined with these considerations in mind. For PSD, four assumptions were selected for problematization; for GCM, two assumptions were selected.

## ***Articulating Alternative Assumptions***

Finally, answering research questions (1c) and (2c), we developed alternative assumptions for the six assumptions identified in the previous step of the research. As Alvesson & Sandberg (2013, p. 258) note, the development of alternative assumptions should not be seen as isolated from the other steps in research dealing with assumptions. In a certain sense, the identification of an assumption requires a ‘gut feeling’ that alternative assumptions are possible, as well as an idea, however vague, of the content of these alternatives. This step in the study, then, comprised mainly of making the alternative assumptions explicit, and elaborating them on the basis of the readings.

## Research Ethics

Any researcher involved in any research project should involve research ethics. Researchers should avoid harm, and deal fairly with everyone involved. Violations of ethical research principles risk not only causing harm directly to those involved, but may do damage to the academic world at large, as well. In this section, we will explore research ethics in the context of the study, and dispel any doubts that may exist in this regard.

On submission of this report, we submitted a *Research Integrity Form – Master Thesis*. This confirms us having abided by a number of rules and principles with regard to research ethics. For this study, two of these are especially relevant. First, we provided original work, and, wherever we drew on the work of others, we provided proper references. Second, we were and are committed to transparency in the way data is processed and represented. Although no original personal data were gathered over the course of this study, we adequately described our handling of research data in the final research report. Moreover, we abided by the law in the context of the proposed study.

The research was conducted on the basis of academic texts, and involved no human or non-human animal participants. Nor have any participants been recruited for this study, specifically. Ethical risks in this regard were relatively limited. There are, however, secondary personal data; some of the literature consulted is based on data gathered in facilitated modelling sessions. There is a risk of citing data gathered by other scholars without proper consent. In order to minimize this risk, we cited studies published by peer-reviewed journals and/or prominent publishers only. Finally, we do not expect the outcomes of this study to be of a nature that allows anyone to cause another person significant harm.

The researcher carried out this research as the final element of his master's degree program. Therefore, he may be expected to have the requisite research skills for the proper conduct of the study. The researcher does not declare any conflicting interests.

## Conclusion

This chapter discussed the methodology employed for research design, data collection, and data analysis, and addressed research ethics. We now turn to the analysis of the data gathered.



## 4. Analyses

This chapter provides an answer to the research questions, describes the findings of the research, and interprets its results. Assumptions for the methods were identified by studying the second- and third-level literature, and using this background to read the first-level literature. For Participatory Scenario Development (PSD), we identified 10 assumptions. Six of these are in-house assumptions, whereas four are paradigmatic assumptions. The assumptions for PSD, the assumption type to which they belong, and an articulation of the assumption are contained in table 7. For Group Causal Mapping (GCM), we identified 7 assumptions. Five of these are in-house assumptions, whereas two are paradigmatic assumptions. The assumptions for GCM, the assumption type to which they belong, and an articulation of the assumption are contained in table 8.

For PSD, four assumptions, of which two in-house and two paradigmatic, were selected for problematization, resulting in two alternative assumptions, of which one in-house and one paradigmatic. For GCM, two paradigmatic assumptions were selected for problematization, resulting in one alternative paradigmatic assumption. The selection of the assumptions for problematization, as well as the problematization and the resulting alternative assumptions are described below, following the tables containing all identified assumptions in the respective methods.

### **Assumptions in Participatory Scenario Development**

The table below contains the assumptions identified for Participatory Scenario Development.

**Table 7***Assumptions identified for Participatory Scenario Development*

<b>Assumption Number</b>	<b>Assumption Name</b>	<b>Assumption Articulation</b>
1	<b>Educational Trump Card</b> <i>In-house assumption</i>	Lack of rigor of a team decision support method may be compensated by the method's educational utility in getting stakeholders to understand parts of the system at hand.
2	<b>Human Boundaries of Natural Systems</b> <i>In-house assumption</i>	It is feasible to perform participatory scenario development with regard to social-ecological issues within the constraints set by political boundaries.
3	<b>Unproblematic Objective Construction</b> <i>In-house assumption</i>	It is legitimate to carry out participatory scenario development projects without stakeholder consultation on the goals of the projects, and/or in order to further the goals of the researcher(s).
4	<b>Infrequent and Superficial Conflict</b> <i>In-house assumption</i>	Conflict in group settings does not take place too often, and it is meaningful and coherent to speak about "conflict" in the abstract.
5	<b>Conversation Over Complexity</b> <i>In-house assumption</i>	It is defensible to limit the number and/or complexity of scenarios in order to keep group discussions manageable.
6	<b>Short-Term Horizon</b> <i>In-house assumption</i>	It is not necessary for the success of a Participatory Scenario Development project to monitor outcomes beyond the lifespan of the project, or even at all.
7	<b>Positivism</b> <i>Paradigmatic assumption</i>	There is a correct understanding of the working of a problem. Participants and researchers can, however, be biased in arriving at this understanding by their preferences, cultural attitudes, or background.
8	<b>The Mosaic View of Knowledge</b> <i>Paradigmatic assumption</i>	Different sources lead to different knowledge and different types of knowledge. These differences interact with each other and can be bridged through Participatory Scenario Development, leading to a positive added value, higher quality outputs, and more opportunities for stakeholder collaboration. Participatory Scenario Development is the substrate on which the mosaic is formed or created, rather than a tile within it.
9	<b>Homogenous Stakeholders</b> <i>Paradigmatic assumption</i>	"Stakeholders" are a homogenous category that can unproblematically be positioned over against other involved parties, such as researchers and policy makers.
10	<b>Heterogenous Stakeholders</b> <i>Paradigmatic assumption</i>	"Stakeholders" are a heterogenous category whose different constituencies have roles in different parts of the intervention process.

For Participatory Scenario Development, four assumptions, out of a total of ten, were identified for problematization, resulting in two alternative assumptions. The arguments for selecting these assumptions, specifically, for problematization, as well as the alternative assumptions, are described below.

### ***Educational Trump Card & Conversation over Complexity***

We selected these assumptions, specifically, since they fit the criterion formulated Alvesson & Sandberg (2013, p. 258) of “not contribut[ing] significantly to a “good” understanding of the subject matter”, yet nevertheless being “broadly shared within a research area”. Both assumptions were found to be widely shared in the review by Oteros-Rozas et al. (2015), which is based on 23 applications of PSD. At the same time, both point in the direction of a systematic priority for content simplicity over scientific rigor and analytical complexity.

For the Educational Trump Card assumption, this priority manifests in the subordination of scientific scrutiny to the practical utilitarian value of increased system understanding in stakeholders. However, one may question what value there is in using scenarios for group education if the analytical quality of these scenarios cannot be guaranteed. Following the Conversation over Complexity assumption may lead to the exclusion of a large number of scenarios from the discussion, with the ones discussed displaying only modest complexity. If the exclusion criteria are based on subjective preference or an unstructured group process, a potential source of questionable randomness, or even manipulation, is introduced into the method.

As an alternative in-house assumption, we propose the Analytical Trump Card; “Within the context of PSD, it is preferable to prioritize quality of analysis over other considerations, particularly perceived learning benefits. Otherwise, one risks creating false ‘knowledge’ and the illusion of learning. In addition, this assumption hedges against (unintentional) manipulation on the part of the facilitator(s) or other stakeholders.” This alternative promotes rigor, thus increasing not only the analytical, but also the pedagogical value of PSD, while preventing influence on substantive choices of unjustified factors.

### ***Positivism & The Mosaic View of Knowledge***

The assumptions of Positivism and The Mosaic View of Knowledge were selected on the basis of the criterion of inspiring new areas of research (Alvesson & Sandberg, 2013, p. 258). Together, these two constitute a pair of opposing paradigmatic assumptions in PSD, each underlying some applications of that method (Oteros-Rozas et al., 2015). Although complementary in some respects, both share an important similarity in that they do not question or problematize the epistemic and methodological meaning of the method of PSD in general, and working with scenarios in particular.

This means that, in both cases, Participatory Scenario Development as such, and its assumptions, processes, and workings, are not problematized or questioned. Positivism conveniently ignores the attitudes and background of the facilitator, herself, thus cementing a hierarchy of knowledge. The Mosaic View of Knowledge interprets the method of Participatory Scenario Development as the substrate on which the tiles are placed, rather than as an integral part of the mosaic.

We propose an alternative assumption that calls for new research by bringing into focus the scenario as a substantive framework with its own epistemological and methodological background and implications. Its unique contribution consists of its ability to map the combined but divergent development of key variables in the future. This leads to the alternative assumption of The Expanded Mosaic View of Knowledge: "Different sources lead to different knowledge and different types of knowledge. These differences interact with each other and can be bridged through Participatory Scenario Development, leading to a positive added value, higher quality outputs, and more opportunities for stakeholder collaboration. Participatory Scenario Development, and, particularly, the analytical and facilitative device of the scenario, constitute a tile in this mosaic, contributing its unique ability to map the combined but divergent development of key variables in the future."

### **Assumptions in Group Causal Mapping**

The below table contains the assumptions identified for Group Causal Mapping.

**Table 8***Assumptions identified for Group Causal Mapping*

<b>Assumption Number</b>	<b>Assumption Name</b>	<b>Assumption Articulation</b>
1	<b>Individualism</b> <i>Paradigmatic assumption</i>	Individuals have different views of the world. In order to solve problems, these personal views should be made to enter into dialogue with each other.
2	<b>Rational Actors</b> <i>Paradigmatic assumption</i>	The different views of individuals exist primarily on the rational level, and it is at this level that a group intervention operates.
3	<b>Importance of Negotiation</b> <i>In-house assumption</i>	Negotiation is an essential element of Group Causal Mapping. Its role within the process is that of facilitating debate and understanding, resulting in consensus on future actions.
4	<b>Bricolage Allowed</b> <i>In-house assumption</i>	It is both feasible and useful to apply only some of the steps of Group Causal Mapping, rather than all of them, and/or to apply Group Causal Mapping in combination with other methods.
5	<b>Application Beyond Target Setting</b> <i>In-house assumption</i>	Group Causal Mapping has a target setting in which it is to be applied: organizations for corporate and public management. However, the method can successfully be applied beyond these target settings.
6	<b>Unpurposeful Learning</b> <i>In-house assumption</i>	Group Causal Mapping projects may generate learning outcomes for their participants, but this learning is not an explicit purpose of applying the method, and the learning that takes place is not necessarily integrated in an overarching organizational learning process.
7	<b>Purposeful Learning</b> <i>In-house assumption</i>	Group Causal Mapping projects may generate learning outcomes for their participants, and this learning can be an explicit purpose of applying the method. The learning that takes place may be integrated in an overarching organizational learning process.

For Group Causal Mapping, two assumptions, out of a total of seven, were identified for problematization, resulting in one alternative assumption. The arguments for selecting these assumptions, specifically, for problematization, as well as the alternative assumption, are described below.

### ***Individualism & Rational Actors***

We identified the assumptions of Individualism and Rational Actors as suitable candidates for problematization in the case of GCM. This suitability is thanks to their being in line with the criterion described earlier of being widely shared without “contribut[ing] significantly to a “good” understanding of the subject matter” (Alvesson & Sandberg, 2013, p. 258).

Although Individualism and Rational Actors are two separate assumptions, they are similar in their anthropological nature. We believe that, in combination, these assumptions constitute a core anthropology that highlights and focuses on two dimensions of human existence - rational beliefs, and individuality - at the expense of other dimensions. However, the actions and attitudes of humans are determined by a complex interplay of different elements. These elements are heterogenous. They may be rational, emotional, social, physical, or existential, to name just a few dimensions. Furthermore, the formation of rational beliefs may be presumed to be a profoundly social experience; humans are influenced by their friends and family, but also by the education they have received, and the norms and values prevailing in the society in which they live.

Honoring this complexity calls for research into new avenues for Group Causal Mapping: how to incorporate into the group intervention the full emotional, social, physical, and existential experience of being human, as well as doing justice to the social elements of rational belief formation? This leads us to the articulation of an alternative assumption, that of The Versatile Embedded Actor; "Individuals differ widely in many respects. They have different beliefs, emotional inclinations, social contexts, physical experiences, and existential dispositions. In order to solve problems, differences among multiple dimensions should be made to interact and be confronted with each other. Ideally, a group intervention operates at several or all of these levels".

### **Problematized Assumptions and their Alternatives**

Three tables will now follow. The first contains the problematized assumptions, and the grounds on which they were selected for problematization. The second and third contain the problematized assumptions and their alternatives, for Participatory Scenario Development, and Group Causal Mapping, respectively.

**Table 9**

*Assumptions selected for problematization, and their grounds*

<b>Method &amp; assumption type</b>	<b>Assumption name and articulation</b>	<b>Problematization grounds</b>
Participatory Scenario Development <i>In-house assumption</i>	<b>Educational Trump Card:</b> Lack of rigor of a team decision support method may be compensated by the method's educational utility in getting stakeholders to understand parts of the system at hand.	Being widely shared despite not significantly contributing to a good understanding of the subject; systematic priority for content simplicity over scientific rigor and complexity.
Participatory Scenario Development <i>In-house assumption</i>	<b>Conversation Over Complexity:</b> It is defensible to limit the number and/or complexity of scenarios in order to keep group discussions manageable.	
Participatory Scenario Development <i>Paradigmatic Assumption</i>	<b>Positivism:</b> There is a correct understanding of the working of a problem. Participants and researchers can, however, be biased in arriving at this understanding by their preferences, cultural attitudes, or background.	Inspiring new areas for research; not questioning or problematizing the epistemic and methodological meaning of PSD, and of working with scenarios.
Participatory Scenario Development <i>Paradigmatic Assumption</i>	<b>The Mosaic View of Knowledge:</b> Different sources lead to different knowledge and different types of knowledge. These differences interact with each other and can be bridged through Participatory Scenario Development, leading to a positive added value, higher quality outputs, and more opportunities for stakeholder collaboration. Participatory Scenario Development is the substrate on which the mosaic is formed or created, rather than a tile within it.	

Group Causal Mapping <i>Paradigmatic Assumption</i>	<b>Individualism:</b>  Individuals have different views of the world. In order to solve problems, these personal views should be made to enter into dialogue with each other.	Being widely shared despite not significantly contributing to a good understanding of the subject; constructing a one-dimensional core anthropology
Group Causal Mapping <i>Paradigmatic Assumption</i>	<b>Rational Actors:</b>  The different views of individuals exist primarily on the rational level, and it is at this level that a group intervention operates.	

**Table 10**

*Problematized assumptions for Participatory Scenario Development, and their alternatives*

Identified assumption name	Articulated identified assumption	Alternative assumption name	Articulated alternative assumption
<b>Educational Trump Card</b>  <i>In-house assumption</i>	Lack of rigor of a team decision support method may be compensated by the method's educational utility in getting stakeholders to understand parts of the system at hand.	<b>Analytical Trump Card</b>	Within the context of PSD, it is preferable to prioritize quality of analysis over other considerations, particularly perceived learning benefits. Otherwise, one risks creating false 'knowledge' and the illusion of learning. In addition, this assumption hedges against (unintentional) manipulation on the part of the facilitator(s) or other stakeholders.
<b>Conversation Over Complexity</b>  <i>In-house assumption</i>	It is defensible to limit the number and/or complexity of scenarios in order to keep group discussions manageable.		
<b>Positivism</b>  <i>Paradigmatic Assumption</i>	There is a correct understanding of the working of a problem. Participants and researchers can, however, be biased in arriving at this understanding by their preferences, cultural attitudes, or background.	<b>The Expanded Mosaic View of Knowledge</b>	Different sources lead to different knowledge and different types of knowledge. These differences interact with each other and can be bridged through Participatory Scenario Development, leading to a positive added value, higher quality outputs, and more opportunities for stakeholder collaboration. Participatory Scenario Development, and, particularly, the analytical and facilitative device of the scenario, constitute a tile in this mosaic, contributing its unique ability to map the combined but divergent development of key variables in the future.
<b>The Mosaic View of Knowledge</b>  <i>Paradigmatic Assumption</i>	Different sources lead to different knowledge and different types of knowledge. These differences interact with each other and can be bridged through Participatory Scenario Development, leading to a positive added value, higher quality outputs, and more opportunities for stakeholder collaboration. Participatory Scenario Development is the substrate on which the mosaic is formed or created, rather than a tile within it.		

**Table 11***Problematized assumptions for Group Causal Mapping, and their alternative*

<b>Identified assumption name</b>	<b>Articulated identified assumption</b>	<b>Alternative assumption name</b>	<b>Articulated alternative assumption</b>
<b>Individualism</b> <i>Paradigmatic assumption</i>	Individuals have different views of the world. In order to solve problems, these personal views should be made to enter into dialogue with each other.	The Versatile Embedded Actor	Individuals differ widely in many respects. They have different beliefs, emotional inclinations, social contexts, physical experiences, and existential dispositions. In order to solve problems, differences among multiple dimensions should be made to interact and be confronted with each other. Ideally, a group intervention operates at several or all of these levels.
<b>Rational Actors</b> <i>Paradigmatic assumption</i>	The different views of individuals exist primarily on the rational level, and it is at this level that a group intervention operates.		

## 5. Discussion & Conclusions

Having documented the analyses in the previous chapter, we now turn to the conclusions and discussion. This chapter states the findings of the research, and discusses their relevance. First, we will answer the research questions, and interpret these answers in the light of the research objective, research questions, theoretical background. Then, we will critically reflect on the limitations, and provide directions for future research. The chapter concludes with an overall conclusion that summarizes the findings of the study.

### Answers to Research Questions & Discussion of the Results

This section describes the answers to the research questions, and discusses the study's results. The research questions were formulated as follows.

- 1) How can the team decision support method of Participatory Scenario Development productively be problematized?
  - a) What are the in-house and paradigmatic assumptions underlying the field of Participatory Scenario Development?
  - b) Which of the identified assumptions may productively be problematized?
  - c) What alternative assumptions may be developed with an eye to a more fruitful application of Participatory Scenario Development?
- 2) How can the team decision support method of Group Causal Mapping productively be problematized?
  - a) What are the in-house and paradigmatic assumptions underlying the field of Group Causal Mapping?
  - b) Which of the identified assumptions may productively be problematized?
  - c) What alternative assumptions may be developed with an eye to a more fruitful application of Group Causal Mapping?

The answers to research questions (1a) & (2a) are contained in tables 7 & 8. In order to answer research questions (1b) & (2b), six assumptions were selected for problematization. These six assumptions, and the grounds on which they were selected, are contained in table 9. The answers to research questions (1c) & (2c) are contained in tables 10 & 11.

## ***Discussion***

This section discusses the meaning and implications of the study's results, in relation to the research objective, research questions, and theoretical background.

The research objective, on the basis of which research questions were formulated, reads as follows: "to challenge current conceptualizations of the field of team decision support methods research by identifying, articulating, and evaluating the in-house assumptions and paradigmatic assumptions of Participatory Scenario Development and Group Causal Mapping, and by developing alternatives to the problematized assumptions." This challenge was realized in two ways.

First, the identification and articulation of the selected assumption types represents a challenge to current conceptualizations of the field in its own right. By making explicit what was implicit, highlighting contrasts with methods that are different, yet related, and commenting from a philosophical perspective on epistemic and methodological choices embedded in the assumptions, new light was shed on the field of team decision support methods. This serves researchers, facilitators, and other stakeholders in acquiring greater awareness of what these methods mean and encompass, both theoretically and practically. This, in turn, allows these groups to make informed, argued choices with regard to research and facilitation of, and participation in, group interventions. The contrasts, awareness, and choices thus stimulated, will, it is hoped, encourage further elaboration, refinement, and reflection of existing methods.

Second, the alternative assumptions formulated provide points of departure for new research and practice. We will discuss these implications shortly, in the section *Implications for Future Theory and Research*.

In relation to theory and existing literature, our research adds to the reviewed literature by highlighting a number of elements in team decision support methods that are not explicitly treated in this literature. These elements can be subsumed under two headings, relating to the two types of assumptions identified and problematized;

1. Practical choices in the application of methods. Such choices deal with areas of application, priorities within application, as well as time horizons. Examples from this study are Unproblematic Objective Construction, Conversation Over Complexity, and (Un)Purposeful Learning. These are all in-house assumptions.
2. Fundamental features of method construction. Such features deal with the construction of knowledge, of the facilitation process, and of actors and stakeholders. Examples from this

study are Positivism, Individualism, and Homogenous Stakeholders. These are all paradigmatic assumptions.

Finally, this study contributes to the literature and the wider field by bringing the methods of Community Based System Dynamics (CBSD), sociocracy, and the Harvard Negotiation Method into dialogue with two of the team decision support methods in Rouwette & Franco (2024).

## **Limitations**

This section reflects on the limitations of the current study in relation to the quality criteria of reliability and validity. This enables an appropriate qualification of the study's findings.

With regard to reliability, only two sources were used for each method problematized. This is rather few. In addition, the sources are both academic journal articles, which means they are relatively brief. As a result, relevant and significant assumptions of problematized methods may not have been identified. This may be the case if the assumptions in question are not easily identified on the basis of a short text, or on the basis of academic journal articles. The reverse holds, as well: the type of text included in the study may have given undue weight to certain assumptions that do not figure as prominently in other types of texts on the same method. Were the study to be repeated on the basis of different texts, different assumptions may result.

A similar observation holds for the second- and third-level readings. Although these sources are all full-length books, and, arguably, more elaborate than academic journal articles, the selection of the specific texts arrived at informs the identification of assumptions and the development of alternative ones. Had other texts been selected for the second- and third-level readings, the list of identified assumptions may have looked very different. Similarly, the researcher's background informs the findings of the study. His background, theoretical knowledge, and practical experience, are in Group Model Building. Prior to this study, he had virtually no experience with or knowledge of Participatory Scenario Development, and only very limited knowledge of Group Causal Mapping. It is plausible that these experiences inform the findings of the study. This, too, limits the study's reliability by introducing an element of randomness.

With regard to validity, it is well-nigh impossible to obtain and study a pure representation of a team decision support method. Although texts may contain guidance, advice, and steps to be followed, each application takes place in a different context, and no two facilitators are the same. Moreover, it is not possible to know what, exactly, is going on in the mind of the people formulating, studying, facilitating, or participating in a team decision support method. Such mental constructs as intentions, goals, or

biases can only be studied in derived form, as they manifest in behavior or in texts. Even then, humans are not necessarily competent judges of their own psychological processes. Therefore, it is not “Participatory Scenario Development” or “Group Causal Mapping”, as such, that is studied, but a messy approximation of the ideal form of “the method”. This limits the study’s validity.

## **Implications for Future Theory and Research**

This section outlines the implications of the study for future theory and research. These implications are based on the study’s findings and limitations.

One avenue for further research builds on the three alternative assumptions formulated. These alternatives could be operationalized for the respective methods to which they belong. This could lead to improvements, additions, or other changes being made to these methods and their applications. Ideally, empirical research comparing the amended team decision support methods with their conventional counterpart would then be carried out. The outcomes of these comparative studies could subsequently be integrated into two learning loops. First, a learning loop about the method in question, yielding an improved method. But also, second, a learning loop about problematization of team decision support methods in general. The latter learning loop could address such questions as: “does the problematization of certain assumptions yield more useful results than that of other types of assumptions?”; or “what type of source is best suited for the identification of assumptions?”.

Another avenue for future theory and research addresses this study’s limited reliability. By including more, and more diverse, sources, higher reliability could be achieved. In this regard, a veritable ‘quantum leap’ could be made by developing and executing a research program that bases itself not only on texts, but on different types of data, as well. For instance, interviews with intervention inventors, facilitators, and participants, could add to our understanding of team decision support methods. Participant observation and similar research methods could provide radically different types of data. In addition, research collectives could be formed which track, report, and are accountable for inter-rater reliability in coding processes.

Finally, future theory and research could take steps to improve the validity of the current study. One way to do so would be to dissect team decision support methods into smaller elements that are more easily observed, measured, and studied. This represents a movement in the opposite direction to the problematizing review we carried out, which is concerned with methods conceived as coherent and integrated interventions. Notably, Ackermann & Eden (2010, pp. 140-144) and Rouwette & Franco (2024, p. 249) do exactly this; constructing theoretical frameworks within which the operation and effectiveness of team decision support methods are more easily studied.

## Overall Conclusion

This section provides the overall conclusion to the study. It briefly summarizes the development of the research carried out and documented in this report, reiterating key elements and indicating the relevance of this study.

This study set out to challenge current conceptualizations of the field of team decision support methods research by identifying, articulating, and evaluating the in-house assumptions and paradigmatic assumptions of Participatory Scenario Development and Group Causal Mapping, and by developing alternatives to the problematized assumptions. To this end, we formulated corresponding research questions. We carried out a literature review, focusing on four team decision support methods, in particular, as well as impact and case studies. We developed a problematizing methodology, which turns on the confrontation of texts with other texts, some more related, others more distant.

This enabled us to identify a total of seventeen assumptions, ten of which were identified in Participatory Scenario Development (six in-house assumptions, four paradigmatic assumptions), and seven in Group Causal Mapping (five in-house assumptions, two paradigmatic assumptions). We selected a total of six assumptions to be problematized, resulting in the development of three alternative assumptions.

For Participatory Scenario Development (PSD), the alternative assumptions are the Analytical Trump Card, and The Expanded Mosaic View of Knowledge. The Analytical Trump Card gives priority to quality of analysis over other considerations in carrying out a PSD interventions. This is presumed to guarantee the quality of learnings generated during the intervention, and hedges against (unintentional) manipulation on the part of the facilitator(s) or other stakeholders. The Expanded Mosaic View of Knowledge calls attention to the equivalence of different knowledge and different types of knowledge, thus shielding against unjustified hierarchies of knowledge. It explicitly includes PSD and the facilitative device of the scenario as equivalent parts of the mosaic, recognizing that the method, itself, is neither beyond scrutiny, nor should it be taken for granted.

For Group Causal Mapping (GCM), the alternative assumption is The Versatile Embedded Actor. This assumption expresses an anthropology that recognizes that humans are not one-dimensional beings, but have many different skills, functions, and capabilities. It urges facilitators of GCM and other group interventions not only to recognize and respect this versatility, but also to use it in the process of problem-solving.

The relevance of this study is in the stimulation it provides to the field of team decision support methods to further elaborate, refine, and reflect on existing methods. It achieves this stimulation by making explicit what was hitherto implicit, highlighting contrasts with different, but related methods, and by commenting philosophically on choices embedded in assumptions. In addition, three avenues for future research were formulated, suggesting this research build on the alternative assumptions formulated, develop and execute richer, more methodologically robust research programs, and dissect team decision support methods into smaller elements, facilitating the study of these elements.

All in all, this study, although limited in both its validity and its reliability, provides a small but real contribution to the field of team decision support methods. After all else is said and done, its most inspiring element may be that it provides a glimmer of hope that humanity can meet the challenges identified by the World Economic Forum, with a discussion of which this research started.



## 6. Practical Implications, Recommendations, and Reflection

This chapter discusses the practical implications that may be derived from this study, and contains a reflection on design choices, positionality, and strengths and weaknesses of the study.

### Practical Implications & Recommendations

In this section, we will discuss the practical implications of, and recommendations on the basis of the findings of this study for different stakeholder groups. The main findings of this study are the three alternative assumptions formulated. If these assumptions are integrated into Participatory Scenario Development (PSD) and Group Causal Mapping (GCM), they will cause these interventions assume a different form.

For PSD, the alternative assumption of the Analytical Trump Card will lead to a renewed focus on analytical quality of the scenarios developed. This may manifest practically by higher standards for information shared during workshops. Applying The Expanded Mosaic View of Knowledge will lead to different types of knowledge being recognized as equivalent to each other. In practice, this may make it more difficult to reach consensus, since the views of some stakeholder groups cannot be brushed aside anymore. For GCM, integrating the assumption of The Versatile Embedded Actor into the method will lead to very different types of analysis for the creation of insights and cultivation of commitment. In practice, a broader definition of “insights”, and a more embodied understanding of “commitment”, may raise the bar for the attainment of these goals considerably, leading to longer deliberations and more conflict.

For researchers in of team decision support methods, these changes will necessitate the use of different research strategies, methods, and designs. For instance, changing priorities in PSD may lead scholars of this method to develop and apply more measures for the quality of a scenario that is formulated during a group intervention. In some cases, it may mean that researchers have to start again in developing knowledge of (aspects of) team decisions support methods. To the extent that they are not, learning and (self-)reflection will have to be priorities

Participants in PSD- and GCM-based interventions may experience the renewed interventions as more demanding. With renewed priority for analytical quality in PSD, or with an intervention that operates on multiple levels in GCM, a lot is expected of the participant - perhaps more than was previously the

case. However, the updated methods are probably more interesting, as well. The participants will have the opportunity to learn more, and in more different ways.

For practitioners, the changes will arguably be the biggest. Integrating the alternative assumptions into the methods will require flexibility and openness to new perspectives. Practitioners will need to do things differently than before. This requires humility and self-reflection, as well, for doing things differently is an implicit acknowledgement that 'the old way' may not be as correct or helpful as previously thought. The facilitation and handling of (cognitive) conflict will have to be a priority, or become one where this is not yet the case.

## Reflection

This section describes our own reflection on the research process and the resulting study. The main design choices made within the framework of this study, are as follows:

1. To limit the study to two specific methods, i.e., Participatory Scenario Development, and Group Causal Mapping;
2. To include the perspectives for comparison that we selected, i.e., Community Based System Dynamics, the Harvard Negotiation Method, sociocracy, and Latour (1988);
3. To limit the study to two specific types of assumptions, i.e., in-house assumptions, and paradigmatic assumptions.

We are aware that these choices heavily inform the outcomes of the study. The decision to limit the study to two specific methods resulted in a more narrow view of the field of team decision support methods than we had hoped for, leaving out two methods with their own strengths and weaknesses. In addition, we feel that this study brings PSD and GCM into dialogue with points of view from beyond these methods, but not with each other. By ignoring factors that would have contributed to a good problematization of the reviewed methods, this represents a weakness of the study.

On the contrary, we feel that the selection of perspectives for the second-level readings was a fortunate one. The readings provided a lot of food for thought, which can be seen in the elaborate reading memos provided in Appendix x?. Especially pleasing about these three perspectives is that they are all sufficiently close to the methods of PSD and GCM, while also, each in their own way, being distant and different enough to provide a critical eye. We learned a lot from these readings and they very much inspired our problematization. Were the study to be repeated in some way, we would definitely look for readings that are complementary in a similar way.

Latour's (1988) text was equally interesting and inspiring. However, since the text builds a profound and complicated argument, it proved to be more difficult to glean insights from it that can be applied to the identification and problematization of assumptions, except in rather far-fetched ways. This difficult integration into the research, in combination with the fact that it is the only text selected for the third-level readings, accounts for the relatively weak impact of this reading on the research. This is a weakness of this study, and, were we to repeat the research, we would look for different, less theoretically heavy third-level readings that are more easily integrated into the research process.

Finally, researcher positionality affected the research process. I am an able-bodied, cisgender white man. This means I am advantaged in some of the most profound ways in which our society is shaped. I can only hope this favorable position did not lead me to (inadvertently) ignore, dismiss, or minimize perspectives from those positioned less favorably, wherever they manifested in the readings or research process. Closer to the subject matter, my own educational background is in Group Model Building. This method insists especially on the formulation of *correct* models. I hope this background has been a blessing, not a bias, and that the criticism I leveled at Participatory Scenario Development for its weakness on the analytical level will be recognized as justified by other readers with different backgrounds.

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## **Appendix 1: Reading Memos**

#	<b>Text: <i>Community Based System Dynamics</i></b>	<b>Memos</b>
1	“This book is about describing community-based system dynamics (CBSD), an approach to doing system dynamics in community settings” (CBSD, p. v)	<b>In-House:</b> Community-based system dynamics (CBSD) is about system dynamics in community settings. This contrasts with applications outside community settings. What could those be? Individual settings, but these are not, typically, included in team-decision support methods, although it is possible to work with system dynamics on one’s own. Perhaps the contrast here is with government and corporate settings.
2	“FES works with more than 4,200 villages spread across 7 states of India and is involved in restoring over half a million acres of common land and in advocating for better policy and programmatic action for the restoration and conservation of the commons in the country.” (CBSD, p. v)	<b>Paradigm:</b> CBSD works in the Global South as well as in the Global North. It is suitable for questions of ecological governance.
3	“Jagdeesh Rao has through many evening conversations never failed to challenge me to push the approach and description further and was the first to really call out that what we were trying to do was <b>more than just system dynamics given the emphasis in our work on advancing social justice.</b> ” (CBSD, p. vi, emphasis added)	<b>In-house:</b> CBSD aims to advance social justice. Rao (and Hovmand) regard this as something more than simply system dynamics. This implies a distinction between a method and its aims, in other words: a method may usefully be separated from the underlying goal it sets out to achieve.
4	“Mary tells the story of a student being in awe of the causal loop diagram of the situation they just described, the power of that student coming up to the whiteboard to take the marker and edit the diagram, and the impact that had on the students and their learning of system dynamics.” (CBSD, p. vii)	<b>In-house:</b> Hovmand describes the impact of system dynamics on the groups he has worked with. This shows a concern for impact on the communities that are intended to profit from system dynamics projects.
5	“It did not matter whether or not the model was “right” in an objective sense; all that mattered was that she was able to use the diagram to reason longer than her friend to stop the behavior.” (CBSD, p. viii)	<b>Paradigm:</b> Description of a criterion for intervention validity: factual truth is considered less important than practical use in problem solving.

6	<p>“I have learned and changed much in the course of this work and developing CBSD and see the communities and their members as my teachers.” (CBSD, p. viii)</p>	<p><b>Paradigm:</b> Hovmand includes himself and his personality in the work on the method. By considering communities and their members as his “teachers”, he actively inverts a hierarchy in group work.</p>
7	<p>“My hope is that the social innovation continues to improve the methods and the lives of the people in communities around the world, giving people a new way to view situations, empower them to use the methods in their own way, and draw on the rigor that system dynamics has to offer in thinking about feedback systems from an endogenous perspective.” (CBSD, p. viii)</p>	<p><b>Paradigm:</b> The conclusion of the preface lays out a hypothesized pathway through which community-based system dynamics realizes effects: the method allows “people in communities around the world’ to view situations in new ways, be empowered, and hone rigorous thinking, leading to social justice.</p>
8	<p>“Acknowledgements Work that is community based is embedded in relationships, and many have contributed in small ways and large ideas that reflected in this book. I always enjoy reading the acknowledgements in books because they help me understand the relationships and context. They tell me a lot about who the person is and how the ideas emerged. (...)” (CBSD, p. ix-xii)</p>	<p><b>Paradigm:</b> Hovmand takes a long time to acknowledge people and organizations who have supported him in his work. By basing the importance of acknowledgements in relationships and context, this section propagates an alternative ontology; one that regards ideas as being profoundly influenced by the environment in which the person formulating or expressing them, moves.</p>
9	<p>“Logical pictures can depict the world. (Wittgenstein 1974, 10)</p> <p>Today’s knowledge about something is not necessarily the same tomorrow. Knowledge is changed to the extent that reality also moves and changes. Then theory also does the same. It’s not something stabilized, immobilized. (Horton and Freire 1990, 101)</p> <p>One way to focus on this problem is to discover that we have no conception of objectivity that enables us to distinguish the scientifically ‘best descriptions and explanations’ from those that fit most closely (intentionally or not) with the assumptions that elites in the West do not want critically examined.</p>	<p><b>Paradigm:</b> These quotes at the beginning of the first chapter indicate the underlying epistemology of community-based system dynamics. As per Wittgenstein’s quote, knowledge consists of logical pictures that depict the world. Horton and Freire point out that these pictures are changing and are not fixed. Harding shows us that the pictures and their changes are affected by political and social processes, not merely taking place in an academic ivory tower. These assumptions may be juxtaposed with those underlying other theories and methods.</p>

	(Harding 1991, 97)" (CBSD, p. 1)	
10	<p>"CBSD emerged within the GMB discourse as an explicit attempt to involve community members in the modeling process in the spirit of Forrester's critique of the field" (CBSD, p. 6)</p>	<p><b>In-house:</b> CBSD represents an attempt to include community members in modelling processes. This is not self-evident, and different modelling methods may define their target group differently, leading to different guidelines and outcomes for modelling processes.</p>
11	<p>"But here, by the very nature of the activity in CBSD, we need to be conscious that defining the term "community" as well as a specific community is a "speech act" and an act power (sic)." (CBSD, p. 7)</p> <p>"Complex system problems that have the characteristic that what makes them hard to understand are the emergent behaviors of the parts interacting as a system." (CBSD, p. 8)</p> <p>"Participation in CBSD should therefore be seen as a process of building a community of practice around a model that empowers individuals to effectively use a model in a way that is consistent with its purpose and limitation (Lave and Wenger 1991 )." (CBSD, p. 11)</p> <p>"However, this aspect of system dynamics modeling—that modeling can happen multiple times on different topics within the same community—is often overlooked in the group model building literature and privileges views of learning and social capital at the level of individuals, teams, or groups over the larger collectives such as the organizations or communities." (CBSD, p. 12)</p> <p>The central idea in CBSD is therefore recognizing that the continuity in the participatory modeling process comes not from continuity of individual participation in group but instead from continuity of working in the community (hence the term "community based" in CBSD) and emphasis on building models (hence the fit between CBSD and term "model building" in "group model building")."</p>	<p><b>In-house:</b> CBSD is predicated on a number of concepts and ideas. These include dynamic understandings of community, participation, and complex system problems. <i>Dynamic</i> is a key word here, over against <i>static</i> definitions and concepts, which are implied not to do justice to the development of entities over time.</p> <p>CBSD aims for continuity, which is realized both by working in the same community over a longer period of time, and by building models.</p>

12	<p>Chapter 2: Group Model Building and Community-Based System Dynamics Process</p>	<p><b>In-house:</b> The overview of the Group Model Building process used in in CBSD is laid out in this chapter. It is striking how elaborate the process is, and how many sessions and how much time it takes to prepare, execute, and follow up on Group Model Building sessions in the context of CBSD.</p>
13	<p>Chapter 3: Engaging Communities</p>	<p><b>In-house:</b> This chapter goes into detail about how to involve communities in model-building projects. It highlights the role of models as creating shared languages. This adds some sophistication to the causal pathway by which the modelling process is to achieve results. The chapter displays a great sensitivity to the impact of status and other hierarchies in the modelling process, and how to minimize this impact. It makes a distinction between initial community participants and gatekeepers, both of which play a role in engaging a community in the modelling process.</p>
14	<p>Chapter 4: Problem Scoping and Identification</p> <p>“So asking “What is the problem?” carries the risk of presupposing that there is a problem and biasing the conversation from the start.” (CBSD, p. 41)</p>	<p><b>Paradigm:</b> In describing problem definition in the CBSD tradition, this chapter shows some of the underlying assumptions of this school of interventions: success criteria, a categorization of problems which enables the choice of an appropriate method, and the recognition, expressed in the quote, that communities may not have a distinct problem, but, rather, a complex of connected problems.</p>
15	<p>Chapter 5: Core Modeling Team Planning, Training, and Capacity Building</p> <p>“It is also essential that each person on the CMT is someone who will raise questions and challenge assumptions about the design and process, as opposed to deferring to the system dynamics experts in the room.” (CBSD, p. 55)</p> <p>“It is difficult to overstate the importance, especially for new teams inexperienced in group model building, to schedule and go through a rehearsal of the group model building workshop.” (CBSD, p. 59)</p>	<p><b>In-house:</b> Necessity for each core team member to challenge methodological choices, rather than go along with established expertise and hierarchy.</p> <p>The need for rehearsal is emphasized.</p>

<p>16</p>	<p>Chapter 6: Group Model Building Workshop and Facilitation</p> <p>“With the right planning, training, and support, most of us can learn to become good and effective at facilitating group model building workshops.” (CBSD, p. 69)</p> <p>“So, build in the time and space for someone to prepare a good reflection and close on a bang!” (CBSD, p. 75)</p>	<p><b>In-house:</b> The importance of the right attitude, instead of having the right skills, is emphasized, further contributing to the antihierarchical nature of CBSD; arguably, it is easier to adopt a new attitude than to acquire facilitation skills.</p> <p>This chapter frames the success of Group Model Building as being a matter of effectively managing boundary objects at the intersection of the mental models of participants, modeling principles, and already completed boundary objects.</p> <p>Finally, what stands out is the high level of detail in the method. For instance, the right moment, location, and format of post-meeting “debriefs” are laid down. Similarly, would-be facilitators are encouraged to schedule time during a CBSD session to review notes, in order to prepare a good reflection for the wrap-up of a session.</p>
<p>17</p>	<p>Chapter 7: Model Refinement, Integration, Formulation, and Analysis</p> <p>“For argument’s sake, let’s say it takes an individual 10 years to become an expert modeler and that the difference in how fast a novice modeler works in relation to an expert is on the order of 1:100, so that it then takes the novice modeler of 1 year of experience about 100 times longer to build the same structure as the expert of with (sic) 10 years of experience. If we consider that rigorous models can take anywhere from 1 to 5 years to build, then the idea of novices of 1 year or less building rigorous system dynamics models to solve problems seems completely impractical. (...) This tends to leave one with the impression that one can have either high participation through informal mapping or rigorous analytic insights through formal simulation modeling, but not both.” (CBSD, p. 78)</p> <p>“This tension—between extending unconditional positive regard and the need to provide accurate feedback on the</p>	<p><b>Paradigm:</b> Chapter 7 describes some aspects related to the preparation, analysis, and use of system dynamics models. Its significance for the broader discussion: treatment of the contradiction between the demands of rigorous, near-scientific modeling on the one hand, and the lack of relevant expertise in the communities engaged with on the other.</p> <p>Hovmand insists on sticking to the high standards of system dynamics in terms of formulating models; without these standards, much of the value of working with these models in the first place, is lost, and communities will fall victim to the very errors that system dynamics modelling is meant to correct.</p> <p>The need to meet these high standards complicates the relationship between modelling team and community. The modelling team is faced with the task to maintain the rigor of the model built without alienating the community. To make this process easier, Hovmand specifies three different types of transformation of models, and their relation to “ownership of a model as a boundary object” (CBSD, p. 83). This framing further grounds CBSD, and the practical guidelines expounded in the</p>

	<p>status of inferences based on a flawed model—is perhaps one of the most demanding aspects of CBSD.” (CBSD, p. 79)</p> <p>“Part of the goal here has been to stress the different ways of working that maintain continuity with the boundary objects and developing capacity within the core modeling team and larger community.” (CBSD, p. 89)</p>	<p>book, in a theoretical model describing the relationship between a community and the boundary objects created.</p>
<p><b>18</b></p>	<p>Chapter 8: Implementation and Evaluation</p> <p>“No book on community-based system dynamics (CBSD) is complete without talking about implementation, for this is one of the central motivations for pursuing CBSD.” (CBSD, p. 91)</p> <p>“The foundation of CBSD rests on the idea one is working over time and multiple projects to build capacity through education, which is one of the primary motivations for saying this is community based.” (CBSD, p. 91)</p> <p>“The point to make here is that communities do not wait around for the final analysis to come in. Systems start changing almost as soon as we start to bring people together, develop reference modes, and create models.” (CBSD, p. 93)</p>	<p><b>In-house:</b> In this brief but dense chapter, implementation of the outcomes of CBSD, and evaluation of the method are discussed. Hovmand draws on Horton’s (1998) distinction between “organizing” - a time of capacity-building - and “social movement” - a time of exercising previously built capacities in order to effect social change – to describe differing applications of models. In the former, it is education and learning that is most important, whereas, in the latter, practical interventions are carried out, leading to tangible changes.</p> <p>This two-phase model links the method to broader changes and developments both within and outside the community, conditioning application of outcomes on the external situation. In my mind, this is somewhat unsatisfactory. If implementation of outcomes depends on the social tide, should we not include this tide in our modelling endeavors?</p> <p>The chapter briefly touches on the need for evaluation of CBSD, while simultaneously pointing out the difficulties associated with such measurements.</p>
<p><b>19</b></p>	<p>Chapter 9: Conclusion</p> <p>“Although CBSD has a structured process, I do not intend for CBSD to be used in a rigid fashion.” (CBSD, p. 97)</p>	<p><b>In-house:</b> The book’s conclusion is less of a summary of the previous chapters, but rather a very brief analysis of the state of the field of CBSD. Hovmand stresses the development of the method over time, discusses some factors likely to make success of a modelling project more feasible, and expresses his hope for the future.</p>

#	<p><b>Text: <i>Getting to YES: Negotiating an agreement without giving in</i></b></p>	<p><b>Memos</b></p>
20	<p>Acknowledgements and Preface to the Second Edition</p> <p>“This book began as a question: What is the best way for people to deal with their differences?” (p. 4)</p>	<p><b>Paradigm:</b> The acknowledgements and preface situate the work in its context. The book, and the method contained in it, deal with conflict, broadly conceived, which is perceived to be a ubiquitous feature of human life. As such, the book is aimed at a broad audience. The main text is nearly identical to that of the first edition, but answers to frequently asked questions have been added.</p>
21	<p>Introduction</p> <p>“Like it or not, you are a negotiator. Negotiation is a fact of life.” (p. 6)</p> <p>“Everyone negotiates something every day.” (p. 6)</p>	<p><b>Paradigm:</b> The brief introduction further situates the method. It asserts that “negotiation is a fact of life” and that “everyone negotiates something every day” (p. 6). The authors position their method, which they conceive of as being both ‘soft’ and ‘hard’ at the same time, over against alternative negotiation methods, which are either completely soft or hard. Furthermore, they stress that, although circumstances and substance of negotiation may differ, the “basic elements do not change” (p. 7). The authors take care to position principled negotiation as a universal method that applies to many different situations.</p>
22	<p>I: THE PROBLEM</p> <p>Chapter 1: The Problem</p> <p>“There is an alternative If you do not like the choice between hard and soft positional bargaining, you can change the game. The game of negotiation takes place at two levels. At one level, negotiation addresses the substance; at another, it focuses— usually implicitly — on the procedure for dealing with the substance.” (p. 10)</p>	<p><b>In-house:</b> The first chapter describes the problem with conventional negotiation methods, principally the “hard” and “soft” approaches, and briefly touches on the alternative of principled negotiation. The authors adopt three criteria by which to judge negotiation methods: wise agreements, efficiency, and improving or not damaging negotiator relations. Arguing over positions fails on all three criteria. They lay out four principles of principled negotiation, and three stages in which these are to be applied.</p> <p>The absence of references, even passing ones, is particularly striking. The authors make rather bold claims about the conduct and outcome of social processes, but do not cite evidence. This raises doubts as to the truth of the claims they are making.</p>

<p><b>23</b></p>	<p>II: THE METHOD</p> <p>Chapter 2: Separate the P E O P L E from the Problem</p> <p>“A basic fact about negotiation, easy to forget in corporate and international transactions, is that you are dealing not with abstract representatives of the "other side," but with human beings. They have emotions, deeply held values, and different backgrounds and viewpoints; and they are unpredictable. So are you.” (p. 14)</p>	<p><b>In-house:</b> This chapter is one of the first in a series of four detailing the proposed principled negotiation method. The authors advise to separate people problems from substantive problems, and to deal with both separately.</p> <p>Two aspects stand out in this chapter. First, the degree to which negotiation is a social process, in which the personalities, relations, and emotions of the people involved play a role. Second, the ease with which one may get stuck in perceiving and thinking only from one’s own point of view, and the corresponding level of self-reflection required to conduct negotiations successfully.</p> <p>Furthermore, the lack of evidence, or references to evidence, is striking. The authors occasionally refer to examples illustrating the points made, but rarely do so in a systematic fashion.</p>
<p><b>24</b></p>	<p>Chapter 3: Focus on I N T E R E S T S, Not Positions</p>	<p><b>Paradigm:</b> This chapter deals with the principle of focusing on interests, not positions (as is the case in positional bargaining). A number of things stand out.</p> <p>First, the authors do not discuss ethics or morality. The discussion centers on being flexible with the aim of achieving favorable negotiation outcomes instead.</p> <p>Second, when discussing the identification of interests, the authors point to “basic human needs” (p. 27). One may wonder if these needs are really and truly universally basic; this question is not treated in the text.</p> <p>Third, the principled negotiation method presupposes conceptions of interests and problems. These are simply assumed and treated with little theoretical sophistication, as well. One can imagine different cultures, religions or ideologies conceive of these notions in different ways. For instance, authors seem to believe that interests are something individual, personal, and happening in the present, rather than something collective, embedded, and tied up with the past.</p>
<p><b>25</b></p>	<p>Chapter 4: Invent O P T I O N S for Mutual Gain</p> <p>“A negotiator's motto could be "<i>Vive la difference!</i>” (p. 41)</p>	<p><b>In-house:</b> Chapter 4 describes the need for inventing new options that may benefit all parties, as well as the obstacles to doing so, and strategies for overcoming these obstacles.</p> <p>It is remarkable that the book combines many different elements of advice. Some tips are very concrete as to what (not) to do or propose during a negotiation, others are reminders to be borne in mind when preparing negotiations, and yet others are, in fact, principles, rather than tips. This dovetails into another criticism of the book: that it combines two books into one. On the one hand, it elaborates</p>

		<p>on the principles of principled negotiation, but on the other hand, it illustrates the application of these principles, as well.</p> <p>Noteworthy in this chapter, specifically, is the rather uncritical promotion of brainstorming, which ignores that there are other, more fruitful alternatives.</p>
<p><b>26</b></p>	<p>Chapter 5: Insist on Using Objective C R I T E R I A</p> <p>“In short, the approach is to commit yourself to reaching a solution based on principle, not pressure. Concentrate on the merits of the problem, not the mettle of the parties. Be open to reason, but closed to threats.” (p. 43)</p> <p>“The MIT model increased the chance of agreement and decreased costly posturing. (...) The existence of an objective model able to forecast the consequences of any proposal helped convince the parties that the tentative agreement they reached was fair. This in turn strengthened relationships among the negotiators and made it more likely an agreement would endure.” (p. 44)</p>	<p><b>Paradigm:</b> In this chapter, the authors propose using objective criteria independent of the will of any of the involved parties to reach an agreement. One may wonder if this is truly possible. If it is possible to use such criteria, why did the parties end up in a negotiation in the first place?</p> <p>The chapter touches on model-based solutions as part of its discussion of independent criteria. In the example that is used, the model is, at some point, accepted as objective by the parties involved. Here, this negotiation method approaches model-based methods. In this example, the model is used as a boundary object. In fact, all of the objective criteria proposed to be used, may be conceived of as boundary objects. It is quite puzzling, then, that in the case of model-based interventions, participants have to spend a lot of time connecting to and working with a model in order for it to be useful, whereas, in negotiations, these objects seem to be quite unproblematically agreed upon by the parties involved. An explanation for this difference may be that the metaphorical bar is simply lower in the case of negotiations than in the case of model-based interventions.</p> <p>Finally, in this chapter, it is methodologically interesting that the authors assert that principled negotiation is a dominant strategy over positional bargaining. This is a hypothesized causal pathway, one that is not empirical, but conceptual.</p>
<p><b>27</b></p>	<p>III: YES, BUT...</p> <p>Chapter 6: What If They Are More Powerful? (<i>Develop Your BATNA – Best Alternative to a Negotiated Agreement</i>)</p> <p>“People think of negotiating power as being determined by resources like wealth, political connections, physical strength, friends, and military might. In fact, the relative negotiating power of two parties depends primarily upon how</p>	<p><b>In-house:</b> The sixth chapter is the first of the third part of the book, which deals with some objections to the theory formulated in the previous part. This chapter advises on what to do if the other party is more powerful.</p> <p>In this chapter, the authors recognize boundary conditions of principled negotiation. They acknowledge that there is “no method [that] guarantee[s] success if all the leverage lies on the other side” (p. 50). This is perhaps the first explicit acknowledgement in the book that there are factors external to the negotiation that significantly influence the outcome of the negotiation. The authors deal with this challenge quite well by providing an alternative, the</p>

	attractive to each is the option of not reaching agreement.” (p. 52)	“BATNA” (Best Alternative To a Negotiated Agreement), with which to compare a negotiation result, and the advice to improve one’s BATNA.
28	Chapter 7: What If They Won’t Play? <i>(Use Negotiation Jujitsu)</i>	<p><b>In-house:</b> In this chapter, the authors offer advice on how to involve the other party in principled negotiation when they do not, initially, adhere to its rules.</p> <p>From a methodological perspective, this chapter is interesting for the causal pathways proposed or implied by the authors. They rely not on cited evidence, but on the logic of social interaction; if one makes a certain move in a negotiation, the other party is likely to react in a certain way. This dialectical, game-theory-like method supposedly backs up the claims and advice made by the authors. However, for lack of convincing evidence and reasoning, it is more of an indication of the weakness of the method than its strength.</p> <p>The authors, themselves, assert that the method of principled negotiation is "contagious" (p. 54). It would be interesting to learn the mechanisms underlying this contagion. Is principled negotiation a dominant strategy in negotiation games? Or are its principles copied and adopted because humans mimic each other's behavior, copying that behavior which comes off as pleasant, kind, and "nice"? Much like elsewhere in the book, we are left wondering.</p>
29	Chapter 8: What If They Use Dirty Tricks? <i>Taming the Hard Bargainer)</i>	<p><b>In-house:</b> In this final chapter of the main text, the authors describe how one should deal with “tricky bargaining” tactics. Their advice boils down to recognizing these tactics, and starting a principled negotiation process about the very process of negotiation.</p> <p>This elegant solution adds to the coherence of the method. Principled negotiation is presented as an approach to the specific form of human interaction that negotiation represents. It is an approach that, by design, evokes similar behavior in the party engaged with, thus leading to a virtuous cycle.</p>
30	IV: IN CONCLUSION	<p><b>Paradigm:</b> The book’s conclusion is brief, containing three points. The authors stress the intuitive nature of the principled negotiation approach, the need to practice the approach in order truly to master it, and how principled negotiation is not so much about “winning” the game as it is about changing the game one is playing.</p> <p>These are interesting observations. First, one may wonder if correspondence with the intuitions of students in negotiation significantly supports the validity of the</p>

		<p>method. Perhaps the sample was biased, or there are other effects that may account for the correspondence.</p> <p>Second, the authors' positioning of negotiation as a practical skill makes for a question to ask the material to be read: to what extent do the supporters of (other) team decision support methods conceive of these methods as skills to be acquired? If so, how? If not, why not?</p> <p>Third, and finally, conceptualizing an intervention in a decision-making process as "playing a different game" is a question to ask the other material to be read, as well. What are the different "games" in the implicit ontologies of these methods? How are they distinguished from each other? On the basis of what criteria may one game be judged to be superior to another?</p>
31	<p>V: TEN QUESTIONS PEOPLE ASK About <i>Getting To YES</i></p> <p>"QUESTION 6: "How should I adjust my negotiating approach to account for differences of personality, gender, culture, and so on?"</p> <p>In some ways people everywhere are similar to one another. We want to be loved, we care about the respect of other people and of ourselves, and we do not like to feel taken advantage of. In other ways, people — even those of similar background — are quite different. Some of us are outgoing, others shy; some verbal and logic-chopping, others more physical and emotive; some people are blunt, others more indirect and tactful; some relish conflict, others will do almost anything to avoid it." (pp. 79-80)</p> <p>"This is a book of general advice. It will not apply in the same way in every</p>	<p><b>Paradigm:</b> The final part of the book answers ten questions about principled negotiation.</p> <p>In this part, the authors distance themselves from the realm of ethics and morality. However, they do point out the advantage in negotiation of having a favorable reputation, which, in turn, is predicated on fair behavior. Morally speaking, principled negotiation calls for a nuanced evaluation. The method is centered on protecting one's interests, regardless of their morality. At the same time, the method stresses the importance of reputation, thus being embedded in a web of communal moral obligations. In addition, the method calls for self-reflection in that it consistently encourages negotiators to join a productive discourse, abandoning unproductive patterns of interaction. At many points is the reader advised to think from the perspective of the other party.</p> <p>In response to the fourth question, the authors advise disentangling relationship problems from content problems. It will be interesting to see how the main methods and texts to be studied deal with relationship problems and content problems, and if there is an overlap or a contrast in these terms.</p> <p>In response to the sixth question, the authors assert that humans are diverse, sharing many similarities, while being different in many respects, as well. However, given their insistence that the principles divulged in the book are "generally applicable", they do not seem to seriously entertain the possibility that it is not just individual people who differ, but that social processes like negotiation</p>

<p>circumstance with every person. But the basic propositions are generally applicable.” (p. 80)</p> <p>“In many ways, negotiation is like athletics: Some people have more natural talent, and like the best athletes, they may gain the most from preparation, practice, and coaching. Yet those with less natural talent have more need for preparation, practice, and feedback, and much to gain by it.” (p. 85)</p>	<p>might differ among contexts, as well. The method thus risks claiming a false universality.</p> <p>In response to the ninth question, a similarity with athletics is asserted. Some people are naturally more talented in negotiation, whereas others need more practice. All, however, are said to profit from training.</p>
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#	<b>Text: <i>Science in Action: How to follow scientists and engineers through society</i></b>	<b>Memos</b>
32	<p>Introduction: Opening Pandora's Black Box</p> <p>"The equipment necessary to travel through science and technology is at once light and multiple." (p. 6)</p> <p>"At the onset of this voyage should be written: ABANDON KNOWLEDGE ABOUT KNOWLEDGE ALL YE WHO ENTER HERE." (pp. 6-7)</p> <p>"'Of course,' says the left side of Janus, 'everyone is convinced because Jim and Francis stumbled on the right structure. The DNA shape itself is enough to rally everyone.' 'No, says the right side, every time someone else is convinced it progressively becomes a more right structure.'" (p. 20)</p> <p>"In doing so I wish to help overcome two of the limitations of 'science, technology and society' studies that appear to me to thwart their impact, that is their organisation by discipline and by object." (p. 16)</p> <p>"By 'rules of methods' I mean what a priori decisions should be made in order to consider all of the empirical facts provided by the specialised disciplines as being part of the domain of 'science, technology and society'. By 'principles' I mean what is my personal summary of the empirical facts at hand after a decade of work in this area." (p. 17)</p>	<p><b>Paradigm:</b> This is the introduction to the book. It describes what Latour's aims and methods are.</p> <p>The author is interested in the process by which science and scientific facts are established. To this end, he makes a distinction between "ready-made science" and "science in action"; established facts vs. the process of establishing them. Latour wishes to study science through the second of these heads of the Janus that science is. This Janus of science simultaneously makes opposed or even contradictory statements.</p> <p>Although this is only the introduction to the book, Latour's examination of science in action may be highly relevant to scholars of team decision support methods. In these methods, facts, intentions, and values somehow become established. This establishment may be understood as a social process. Latour studies a similar process in the case of science. What would it look like to perform a similar examination for team decision support methods? An examination of these methods would provide insight into the social processes underlying the basic conceptual entities used in team decision support methods, thus demystifying much of their working.</p>
33	<p>Part I: From Weaker to Stronger Rhetoric</p> <p>Chapter 1: Literature</p> <p>"A sentence may be made more of a fact or more of an artefact depending on how it is inserted into other</p>	<p><b>Paradigm:</b> In this chapter, the author frames scientific facts as "black boxes" subject to processes of establishment, contestation, and "opening up".</p>

	<p>sentences. By itself a given sentence is neither a fact nor a fiction; it is made so by others, later on.” (p. 25)</p> <p>“These two lessons are so important that this book is simply, I could argue, a development of this essential point: the status of a statement depends on later statements.” (p. 27)</p> <p>“Metaphorically speaking, statements, according to the first principle, are much like genes that cannot survive if they do not manage to pass themselves on to later bodies.” (p. 38)</p> <p>“Rule 2 To determine the objectivity or subjectivity of a claim, the efficiency or perfection of a mechanism, we do not look for their intrinsic qualities but at all the transformations they undergo later in the hands of others.” (p. 258)</p> <p>“The distinction between the technical literature and the rest is not a natural boundary; it is a border created by the disproportionate amount of linkages, resources and allies locally available.” (p. 62)</p>	<p>The author emphasizes the path dependency that arises from accepting certain statements as true or as facts. From a fact or black box, one may move in two directions: upstream or downstream, questioning the fact or reasoning to a new conclusion on its basis.</p> <p>This is a relevant insight for team decision support methods, as well. A session working with such a method may well be comparable to a scientific debate; the question what becomes established fact depends on the question what assertions or sentences are held to be true – not necessarily for ‘good’ reasons -, which may, in turn, be highly contingent.</p> <p>Latour describes rhetorical techniques used by scientists to establish and defend their sentences as facts. These rhetorical techniques can be found in many group interactions. They boil down to citing the authority of others, or of past texts. Through such operations, sentences become fixed as either fact or fiction, speakers/writers positioning previous sentences in line with their own intentions. The same may happen in a team intervention: person A makes a claim, which is, subsequently, adopted as fact, disputed as fiction, or, worse yet, ignored. By going through this process for a large number of sentences, a project group establishes truths on the basis of which it works.</p>
<p><b>34</b></p>	<p>Chapter 2: Laboratories</p> <p>“We came to the laboratory in order to settle our doubts about the paper, but we have been led into a labyrinth.” (p. 67)</p> <p>“The author behaves as if he or she were the mouthpiece of what is inscribed on the window of the instrument.” (p. 71)</p> <p>“Although this controversy has been continuing for nearly a hundred years, the lesson for us is that, with the same equipment and data, the stalemate between dissenting authors may be broken by a simple</p>	<p><b>Paradigm:</b> This chapter deals, ultimately, with the relation between facts and the audiovisual representations on which they are based. This chapter follows the acts of a hypothesized dissenter to an established scientific truth into the laboratory. This dissenter does not accept truth as described in scientific literature and/or discourse, but wants to check the veracity of truth claims herself.</p> <p>Analogies with team decision support methods are less obvious here. One may easily imagine a project group in, say, Group Causal Mapping questioning each other’s claims, but it is much more difficult to imagine such a group or its members to actively engage themselves in the search for truth, especially in</p>

	<p>modification of what it is that ties the data together (...)." (p. 85)</p> <p>"Second principle Scientists and engineers speak in the name of new allies that they have shaped and enrolled; representatives among other representatives, they add these unexpected resources to tip the balance of force in their favour." (p. 259)</p> <p>"Rule 3 Since the settlement of a controversy is the cause of Nature's representation, not its consequence, we can never use this consequence, Nature, to explain how and why a controversy has been settled." (p. 258)</p>	<p>the context of a group intervention. It seems group interventions lean more heavily on discourse <i>about</i> black boxes as described in the previous chapter, than on a direct revelation of these black boxes as described in this chapter.</p> <p>On the other hand, there is a connection. When using a model, or any type of representative object in a group intervention, the facilitator is exposed to possible doubts about the truth of this model or representation. She may be questioned by participants to back up her claims. This questioning could lead down the same path that Latour chronicles in this chapter.</p>
<p><b>35</b></p>	<p>Part II: From Weak Points to Strongholds</p> <p>Chapter 3: Machines</p> <p>"This collective action then raises two more questions. To whom can the responsibility for the game be attributed? What is the object that has been passed along?" (p. 104)</p> <p>"So we are now in a quandary: either the others will not take up the statement or they will." (p. 108) (...) To get out of this quandary we need to do two things at once: to enrol others so that they participate in the construction of the fact; to control their behaviour in order to make their actions predictable." (p. 108)</p> <p>"Third principle We are never confronted with science, technology and society, but with a gamut of weaker and stronger associations; thus understanding what facts and machines are is the same task as understanding who the people are." (p. 259)</p> <p>"Rule 4 Since the settlement of a controversy is the cause of Society's stability, we cannot use Society to explain how and why a controversy has been settled. We should consider symmetrically the efforts to enrol human and non-human resources." (p. 258)</p>	<p><b>Paradigm:</b> The third chapter, which is the first of the second part of the book, investigates the development of established facts or black boxes into technologies that are applied and adopted in society.</p> <p>In fact, even this very brief summary betrays investment in the worldview that Latour questions. It presupposes that "science", "technology", and "society" are stable, independent entities that are not significantly intertwined. In this chapter, however, Latour shows how facts are constructed by tying together human and non-human factors, and how the supposed "application" of scientific findings in innovations and technologies is, itself, part of the process by which truth is established. Much of this process is determined by factors that are not conventionally accepted as "scientific". In the process, the fact undergoes many transformations, which creates a contradiction for the inventor or scientist; on the one hand, she wants to control the permutations of her fact, but, on the other, it is critical for the survival of her fact to surrender control over it and subject it to a social process that necessarily entails transformations.</p> <p>The relevance for team decision support methods is that these may be conceived of as similar to the scientific enterprise, as well. One could study the methods in terms of establishment of</p>

		<p>truth by tying together human and non-human resources. Especially interesting is the lens, mentioned above, of a would-be fact-maker trying to meet the contradictory needs of control over and surrender of facts.</p>
<p><b>36</b></p>	<p>Chapter 4: Insiders Out</p> <p>“The first lesson to 'be drawn from this unfortunate example is that there is a direct relationship between the size of the outside recruitment of resources and the amount of work that can be done on the inside. (...) The second lesson from this example is that an isolated specialist is a contradiction in terms. Either you are isolated and very quickly stop being a specialist, or you remain a specialist but this means you are not isolated.” (p. 152)</p> <p>“The similarity between the proof race and the arms race is not a metaphor, it is literally the mutual problem of <i>winning</i>.” (p. 172)</p> <p>“Fourth principle The more science and technology have an esoteric content the further they extend outside; thus, 'science and technology' is only a subset of technoscience.” (p. 259)</p> <p>“Rule 5 We have to be as undecided as the various actors we follow as to what technoscience is made of; every time an inside/ outside divide is built, we should study the two sides simultaneously and make the list, no matter how long and heterogeneous, of those who do the work.” (p. 258)</p>	<p><b>Paradigm:</b> In this chapter, Latour describes how it comes to be that technoscience is followed throughout society. In order to do so, he treats the supposed distinction between inside and outside. In “technoscience”, there is no such hard separation between inside and outside. Those who advocate for a certain field of science in the public realm make possible the scientific process in the laboratory. In turn, they are only enabled to do so by the laboratory (or whatever the location or institute).</p> <p>The distinction between inside and outside makes little sense, since technoscience cannot be conceived in isolation. A scholar in isolation would not be a scholar, but merely an individual with a thought or a thought system. However, in order to establish a field of science, one needs followers. At the same time, followers typically flock only to established fields of science. The resulting catch-22 is solved by alliances with powerful social forces, such as the government or the military, and by appeals to interest.</p> <p>Team decision support methods were all, at some point, invented. This is even clearer for these methods than for many scientific theories which purport to describe reality. We may ask these methods the question how they established themselves, what interests they mobilized and what social forces allow for their continued existence.</p>
<p><b>37</b></p>	<p>Part III: From Short to Longer Networks</p> <p>Chapter 5: Tribunals of Reason</p> <p>“Given the tiny size of fact production, how the hell does the rest of humanity deal with 'reality'?” (p. 180)</p>	<p><b>Paradigm:</b> In this chapter, Latour deals with the distinction between insiders and outsiders to science. Scientists are presented as being part of a network that depends on its outside to exist in the first place. At the same time, scientists</p>

	<p>“After having peopled the world with irrational minds because we naively wondered why there were so many people who were not scientists, we now understand that it was our wondering that created the problem.” (p. 195)</p> <p>“Fifth principle Irrationality is always an accusation made by someone building a network over someone else who stands in the way; thus, there is no Great Divide between minds, but only shorter and longer networks; harder facts are not the rule but the exception, since they are needed only in a very few cases to displace others on a large scale out of their usual ways.” (p. 259)</p> <p>“Rule 6 Confronted with the accusation of irrationality, we look neither at what rule of logic has been broken, nor at what structure of society could explain the distortion, but to the angle and direction of the observer's <i>displacement</i>, and to the <i>length</i> of the network thus being built.” (p. 258)</p>	<p>cast outsiders to science as ignorant, irrational, or stupid. This is thought to be necessarily true of every system of science.</p> <p>In the case of team decision support methods, one may be inspired to examine the ways in which the advocates and practitioners of these methods construct an inside and an outside to their methods, and how they exclude non-experts. Do the people who carry out team interventions wonder why some people (participants, stakeholders not involved in the intervention) do not "get" what seem like obvious truths to the practitioners? How do they talk about this distinction?</p> <p><i>Contra</i> Latour, the text increasingly makes me wonder if it is not predicated on relativism, and, if so, what the consequences of such an epistemological position would be.</p>
<p><b>38</b></p>	<p>Chapter 6: Centres of Calculation</p> <p>“In other words, 'knowledge' is not something that could be described by itself or by opposition to 'ignorance' or to 'belief, but only by considering a whole cycle of accumulation: how to bring things back to a place for someone to see it for the first time so that others might be sent again to bring other things back.” (p. 220)</p> <p>“Many things can be done with this paper world that cannot be done with the world.” (p. 226)</p> <p>“Most of the difficulties we have in understanding science and technology proceeds from our belief that space and time exist independently as an unshakable frame of reference <i>inside which</i> events and place</p>	<p><b>Paradigm:</b> This final chapter closes the circle of Latour's argument. It allows facilitators of group interventions to be cast as entrepreneurs of sorts, trying to extend the networks constituted by their methods as widely as they can.</p> <p>Scientists and their institutions turn themselves into centers, in which many distant elements are centralized, gathered, and made to assume an equivalent form. The more data from outside these centers are brought in, the stronger the centers become. This analysis could be applied to some team decision support methods, as well. Every time a new element is incorporated in a model or causal map, the latter are strengthened and more of the world is brought under their control. The truth (or lack thereof) of these methods cannot be determined outside of the network that is constituted by them. So-called scientific and empirical questions such as “what</p>

<p>would occur. This belief makes it impossible to understand how different spaces and different times may be produced <i>inside the networks</i> built to mobilise, cumulate and recombine the world.” (p. 238)</p> <p>“Rule 7 Before attributing any special quality to the mind or to the method of people, let us examine first the many ways through which inscriptions are gathered, combined, tied together ~nd sent back. Only if there is something unexplained once the networks have been studied shall we start to speak of cognitive factors.” (p. 258)</p> <p>“(…) every time you hear about a successful application of a science, look for the progressive extension of a network. Every time you hear about a failure of science, look for what part of which network has been punctured.” (p. 249)</p> <p>“Sixth principle History of technoscience is in a large part the history of the resources scattered along networks to accelerate the mobility, faithfulness, combination and cohesion of traces that make action at a distance possible.” (p. 259)</p>	<p>factors increase the adoption of SODA?” or “how does facilitated model building lead to team learning?” may then be reinterpreted as attempts to bring more of reality under the sway of said methods, rather than being simply scientific questions arising from the curiosity of a scholar.</p> <p>By creating networks of knowledge, scientists bring themselves in the position to make predictions and claims about that which is not yet known. Similar things happen in some group interventions; for instance by building a model or causal map, enabling a group or a facilitator to speak beyond that which is present and apparent during the discussion. This includes the weaving together of previously unrelated fields of science and knowledge. For instance, in system dynamics-based interventions, social science and local knowledge are integrated in a mathematical framework based on feedback loops and the notion that “system structure creates system behavior”.</p> <p>At the same time, Latour judges science too harshly. Against the claim that science is so powerful because it <i>works</i>, he objects that this claim is “based on no independent and detailed study” (p. 248), and that facts, theories, or machines are unable to survive outside the networks in which they arose. This seems to me to be simply untrue, and an all too easy dismissal of a powerful claim against Latour’s argument. His injunction to “look for a progressive extension of a network” (p. 249) in order to explain successful applications of science is unconvincing, for it treats an anomaly or exception to his theory as resulting from too little application of his theory.</p>
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#	Text: <i>Sociocracy: The organization of decision-making; “no objection” as the principle of sociocracy</i>	Memos
39	<p>Sociocracy: The Next Step Introduction</p> <p>“Behaviour is determined by the prevailing kind of decision-making” (p. 3)</p> <p>“In my view – a view which has been corroborated by considerable experience – the sociocratic circle organization is a usable blueprint for every individual and every organization.” (p. 5)</p> <p>“The sociocratic model of decision-making does not offer ready-made solutions for all the problems confronting us every day in all kinds of fields, but it does provide us with the control machinery we need to enable us to seek a more ‘human’ solution to literally all problems and conflicts, which is more than the familiar organizational models have been able to do in the past.” (p. 6)</p>	<p><b>Paradigm:</b> Enderburg situates sociocracy in a context of human social evolution and the search for happiness. He claims sociocracy is the outcome of an evolution through stages in decision-making; from a divine/magical stage, through authoritarian, democratic, and chaotic decision-making. At the same time, all these phases are still present in the human being and valid, even within the context of sociocracy, provided <i>consent</i> is given for them.</p> <p>On the one hand, I think the relation between sociocracy and its overarching anthropology is a strength of the model, providing a foundation for choices made. On the other hand, it is a potential weakness, since any grand theory risks overstretching, being unable to make true on the high theoretical promises made.</p>
40	<p>Part One: The Basic Rules of Sociocratic Circle Organization</p> <p>“Sociocracy is the power of argument.” (p. 12)</p> <p>“To avoid any misunderstanding, I would once again stress that the sociocratic circle organization is not intended to replace a particular organizational structure, but that it is an addition to that structure.” (p. 12)</p>	<p><b>In-house:</b> The first part of the book outlines the four basic rules on which sociocracy is founded;</p> <ol style="list-style-type: none"> <li>1. The principle of consent, which governs the decision-making process. Consent is defined as “no argued objection”;</li> <li>2. The circle, not unlike a committee or working group, into which the organization is divided;</li> <li>3. Double-link, or the connection of circles to each other by (at least) two persons; an elected representative, and the “functional leader” (p. 11);</li> </ol>

		<p>4. Sociocratic elections, in which people are elected by consent after an open discussion.</p> <p>These principles are rather simple, even deceptively so, according to Endenburg. The philosophical underpinnings of sociocracy are further elaborated here, being tied to the notion of dynamic equilibrium, which sociocracy is supposedly singularly capable of doing justice. Another strength of sociocracy is said to be its ability to recognize the fundamental nature of humans as both individuals and collective beings.</p> <p>What stands out from this chapter is that one may suspect sociocracy to be very labor-intensive, given the linking of circles to each other through double-links, rather than through representative organs, as well as the difficulty I would expect in getting everyone involved to give consent to decisions.</p>
<p>41</p>	<p>Part 2: The Principle</p> <p>“My initial premise is that life is only possible by virtue of a process which is capable of maintain a state of dynamic equilibrium.” (p. 15)</p> <p>“Decision-making within the sociocratic circle organization is ‘ruled’ by the principle of consent or the principle of no objection, as stated by the first three basic rules. The fact that decision-making is ruled by the principle of consent does not mean that all decisions have to be taken according to this principle, but that no other method of decision-making is possible unless its adoption has been agreed by consent.” (p. 22)</p>	<p><b>Paradigm:</b> This part of the book describes the principle of consent, the way circles are interlinked, and the theoretical basis of these two features of the method: the importance of feedback.</p> <p>This reliance on feedback as a central mechanism reminds the reader of system dynamics, which is the basis of both Group Model Building (GMB) and Community Based System Dynamics (CBSD). Like GMB and CBSD, sociocracy recognizes the importance of feedback, which is based on norms, observed gaps, and corresponding corrective action. Sociocracy adds to this the importance of the consent principle. Consent determines the limits within which individuals can “weave”: make mistakes and corrections in a dynamic, goal-seeking equilibrium.</p> <p>As a criticism of Endenburg, we may point to his use of technical examples, such as riding a bicycle or a thermostat in a building, as analogies of human decision-making processes. After all, he fails to argue for the aptitude of these analogies. The main risk is depoliticization – the failure to recognize the contested nature of goals established through collective deliberation and contestation. More simply put, one would expect disagreement <i>about the norm</i>,</p>

		and, at this point in the book, sociocracy fails to account adequately for this expectation.
42	<p>Part 3: Economic Aspects</p> <p>Chapter 1 – Economic Motive</p> <p>“Our planet is capable of providing more than enough of everything to meet every individual’s needs. The problem is to control our affairs in such a way that this situation can be achieved in practice. Sociocracy offers this means of control.” (p. 229)</p> <p>“The closed circle creates the <i>self-regulating unit</i>.” (p. 33)</p> <p>“The self-optimizing property of the circle process, the economic motive, is a characteristic of all circle processes if we are to derive benefit from this property, we must be able to <i>measure</i> and the circle must be <i>closed</i>.” (p. 38)</p>	<p><b>In-house:</b> This is the first chapter of the third part, which is on “economic aspects”. The chapter deals with the “economic motive”, which is defined as “the self-optimizing property of the circle process” (p. 38). This self-optimization is comprised of the process of striving for dynamic equilibrium with minimum deviation from the norm, while not giving up the search for either the equilibrium or optimal conditions.</p> <p>This process can take place only in circles, which are called so for a reason: they take responsibility for a process of adjustment towards a norm, which is always a circular process. If the circle is opened, other decision-making methods than sociocracy risk making their way back into the decision process. The term “circle” is thus not merely defined by a group of people regularly interacting, but also by the substance of their collective process.</p>
43	<p>Chapter 2 – Profit</p> <p>“I exchange with the boiler. The boiler receives from me something which I have and can give, and I receive from the boiler something which it has and which I need. We are both better as a result of the exchange and we each make use of the other’s potential.” (p. 40)</p> <p>“<i>The value of the medium of exchange is linked to the individual’s means of subsistence</i>” (p. 42).</p>	<p><b>In-house:</b> This chapter centers on the notion of profit. The sociocratic notion of profit differs from the conventional one, in that profit is defined as the utility gained by the parties involved in an exchange.</p> <p>The exchange process is described as one consisting of conversion and exchange – during transactions, resources are transformed and transferred. This is not unlike the system dynamics notion of stocks with inflows and outflows.</p> <p>From a philosophical point of view, this chapter is interesting in that humans and machines work together. The machines are described as making decisions, as if they were agents. This is reminiscent of Latour, with his talk of networks in which all kinds of distinctions (subject-object, human-non-human, science-superstition) fade.</p>
44	Chapter 3 – The Subsistence Guarantee	<b>In-house:</b> This final chapter of the part on economic aspects describes Endenburg’s proposal for a Subsistence Guarantee – a

	<p>“In order to guarantee the individual’s means of subsistence, as we discussed in the previous chapter, it is necessary to introduce a Subsistence Guarantee (SG), a guarantee that every individual will receive funds to enable him to subsist for the whole of his life, from cradle to grave.” (p. 42)</p>	<p>proposal not unlike that of the Universal Basic Income (UBI), although this is not explicitly stated.</p> <p>The proposal is concerned with society at large, rather than with specific organizations. What is interesting from a methodological perspective, is that the Subsistence Guarantee is simply an elaboration of the sociocratic notion of moving towards a dynamic equilibrium within the constraints determined by consent.</p>
45	<p>Part 4: Sociocracy in Practice</p> <p>Chapter 1 – The Individual</p> <p>“A person is a complex of interlinked circle processes and the existence of the human individual is made possible by the exercise of constant control over largely unconscious decision-making-processes.” (p. 51)</p> <p>“What is less well known is that man is organized in a similar way [as a vast complex of interlinked circle processes which are designed to maintain the various dynamic balances] as regards to what we might term his ‘personality structure’.” (p. 53)</p>	<p><b>Paradigm:</b> This brief chapter is the first of the fourth part, which deals with sociocracy in practice. In it, Endenburg describes the individual human being as being constituted sociocratically, i.e., as an ensemble of different circle processes which are linked with each other and have autonomy above the threshold defined by mutual consent. This is illustrated for both physiological and social processes.</p> <p>Endenburg’s anthropology is thought-provoking, for it allows us to conceptualize interaction and deliberation among humans (and even within humans, so to say) according to a basic pattern or structure that can be expanded. It will be interesting to see if other team interventions consciously employ an anthropology, as well, and, if so, where this anthropology differs from the sociocratic one.</p>
46	<p>Chapter 2 – The Family</p>	<p><b>In-house:</b> In this concise chapter, Endenburg provides a conceptualization of the family as a sociocratic organization. It contains a reinterpretation of the conventional elements of family life in a sociocratic light.</p>
47	<p>Chapter 3 – Education</p> <p>“The link with other circle organizations is in principle only possible via the top circle.” (p. 68)</p> <p>“The function of the top circle, as the highest body within the organization, is to provide the link with other organizations and to establish policy and supervise policy implementation for the whole of the school organization.” (p. 68)</p>	<p><b>In-house:</b> In this chapter, Endenburg envisions a sociocratically-organized system of education. It is to develop its students not only intellectually, but also ethically and it does so by blurring the distinctions between different parts of life; school, economic activity, parents’ family, own family, etc. Schools are to be organized according to double-linked circles deciding on the basis of consent, and education is to continue throughout one’s whole life.</p> <p>In this chapter, the notions of the “top circle” and “subcircle” are introduced. The top circle occupies the position of the traditional</p>

	<p>“The question we should constantly be asking ourselves and answering is whether there are any ‘open’ circles.” (p. 80)</p> <p>“The answer to the question who is able to join the school community is therefore: everyone who wants to make use of the opportunities offered by the school community.” (p. 82)</p> <p><i>“The external link is the method of linking independent organizations with different objectives according to the principle of the double link. It is the purpose of the top circle to make this external double link possible.”</i> (p. 83)</p> <p>“Within sociocracy, everything can be questioned at all times, provided we ensure that all the circles are closed and it is possible to measure.” (p. 87)</p>	<p>executive and supervisory boards. As the name implies, the top circle is the highest circle of an organization. It is responsible for external coordination with other organizations and external parties. It may contain external experts. Subcircles are presented as dedicated temporary circles for policy preparation.</p> <p>With regard to the general principles of sociocracy, Endenburg constantly reiterates the need for closing circles, for measuring, and for feeding back the results of these measurements. We are left wondering how other team interventions or organizational structures meet the need for learning and feedback.</p> <p>It seems the purpose of this application of sociocracy to education is to show that the method is applicable to essential social functions and services. In addition, it becomes apparent that it is relatively easy to scale up the model to allow for ever larger organizations to be formed, which may in turn be federated into overarching structures.</p> <p>Looking for comparison with other methods, we have to be aware that sociocracy is a rather broad method that deals with both organizational structure and organizational decision-making at once. This observation, in turn, raises questions for the study of these other methods; (how) do they separate structure from decision-making? Why (not)? What are the effects of this particular way of linking structure and decision-making?</p>
<p><b>48</b></p>	<p>Chapter 4 – Work</p> <p>“The question whether free-enterprise production (including the service industries) is the right production system is thus answered in the affirmative. However, this does not mean that the prevailing relationships of ownership within those enterprises, and the power relationships which derive from them, are correct. Nor does it imply the correctness of the current legal frameworks</p>	<p><b>In-house:</b> The chapter on work details the working of a company or enterprise from a sociocratic perspective, as well as a proposed organization of the economy that is in line with the structure of the individual enterprise. In fact, the micro and the macro structures are not fundamentally different; both consist of a stacking of sociocratically-organized circles with double links.</p> <p>For the economy as a whole, Endenburg considers free markets to be necessary in order for the searching mechanism to operate. More concretely, in order to allow individuals to found new organizations. However, Endenburg objects to the unequal ownership and power relations typically found under contemporary capitalism. Under the</p>

<p>within which members of these organizations have to work and co-operate.” (p. 88)</p> <p>“The answer to the Question: ‘Who, according to this concept of the company, should then be the owner?’ is as simple as it is surprising: no-one.” (p. 89)</p> <p>“The concept of ‘non-profit’ must never be used as an excuse for omitting to measure.” (p. 249)</p> <p>“By ‘profit’ I mean in this context the overall result of all the transactions which have taken place within the company.” (p. 249)</p> <p>“In a sociocratic circle organization, power is exercised according to the ‘both/and’ principle, i.e. power is exercised both from top to bottom and from bottom to top.” (p. 92)</p> <p>“A circle is made up of a number of individuals of differing temperament and character.” (p. 96)</p> <p>“It has become increasingly clear to me during the course of many discussion in recent years that the four basic rules of sociocracy can be regarded as some sort of ‘primeval rules’.” (p. 253)</p> <p>“It is extremely important for us to bear in mind always that sociocracy means the <i>power of argument</i> in the practical application of the sociocratic model, this basic concept sometimes tends to be pushed into the background.” (p. 105)</p> <p>“No-one is required to take part in sociocratic decision-making (one can, for example, delegate decision-making to someone else), but when one does take part, one has reasons for doing so and that process of reasoning is ultimately the important thing.” (p. 257)</p>	<p>synthesis proposed in the book, profit will remain, but it is reconceptualized as a form of feedback, which is, after all, so crucial to the method.</p> <p>Since individuals are supposed to be guaranteed a Subsistence Guarantee, the market may function freely; companies can go bankrupt without this becoming a matter of life and death for the individuals involved. The Subsistence Guarantee allows for a high degree of economic flexibility.</p> <p>Remuneration is envisioned to contain both a fixed, basic element to allow for the subsistence of workers, as well as a performance-dependent element. By employing a scheme of structural profit-sharing for employees, Endenburg hopes to reconcile the interests of employer and employee.</p> <p>In this chapter, we learn not only about the economic aspects of sociocracy, but also, more broadly, about some of the basic aspects of the method. For instance, public elections and voting procedures are conceived as furthering the liberation of the individual; these procedures remove the taboo on discussing people (including oneself) and their qualities openly and publicly. This is an intriguing idea. We are left wondering how other team interventions formulate, explicitly or implicitly, an anthropology, which they link to moral and social ideas about, for instance, “liberation”, and how they operationalize these ideas in their methods.</p> <p>Finally, Endenburg makes clear in his discussion of work that rationality and arguments should prevail in sociocracy. The method is supposed to displace other organizational forms (including democracy) that discourage rational discussion and promote power games instead. Empirically, one may wonder to what extent sociocracy succeeds in this ambition. Principally, we may wonder if it is at all possible. On the basis of Latour’s text, for instance, one can problematize the distinction between reason and emotion.</p> <p>We may also wonder if it is problematic if discussions are not always based on arguments and rationality. On the basis of the negotiation method discussed earlier, we may presume that satisfactory and</p>
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	<p>“For me, however, ‘freedom’ does not mean ‘lack of control’ but ‘accessibility’.” (p. 122)</p>	<p>functional outcomes can be attained even on the basis of power play between unequal parties.</p>
<p><b>49</b></p>	<p>Chapter 5 – Government</p> <p>“The basis of the circle organization of government is formed by the neighbourhood circle. The inclusion of the neighbourhood in the circle organization, as part of the organization which administers our society, can be seen as marking the restoration of a social form which has existed for more than a thousand years.” (p. 128)</p> <p>“If we structure the government organization in this way, we shall on the one hand be deviating from the existing structure but, on the other, we shall be clearly linking into that structure. Therefore, what is being presented here should be regarded as a possible model rather than as a fully detailed structure oriented towards current problems.” (p. 131)</p> <p><i>“When our society is structured sociocratically, it will guarantee the equivalence of each individual in decision-making. In subsistence and in self-development.”</i> (p. 143)</p>	<p><b>In-house:</b> This final chapter of the fourth part of the book on sociocracy in practice describes how the administration of all of society could be organized along sociocratic lines. This happens through the integration of organizations in all spheres of life that have already been ‘sociocratized’.</p> <p>Endenburg provides a proposed sociocratic government structure. It covers the administration and linking to each other of neighbourhoods, districts, municipalities, region, countries, international organizations, and United Nations-like worldwide organization.</p> <p>The chapter is, in a sense, rather repetitive; the sociocratic principles and their application are well known at this point in the book, and little is added to them. The main function of this chapter, however, is to endow sociocracy with a universal applicability. At the same time, as Endenburg acknowledges, it is not possible to do full justice to the problems of governance. This chapter raises questions for alternative team decision support methods and organization structuring methods to what extent these alternatives are more widely applicable in what is traditionally called “politics” and “government”.</p>
<p><b>50</b></p>	<p>Part 5: Questions and Answers</p> <p>“The principle of consent is not the same thing as a right of veto.” (p. 146)</p> <p>“Sociocracy is not the power of the minority it is and will remain the power of argument.” (p. 147)</p> <p>“What has struck me in particular over the past few years is that, in contrast to the democratic or authoritarian models, the sociocratic model compels us to ‘uncover’ our motives, to constantly ask for reasons, for arguments.” (p. 155)</p>	<p><b>Paradigm:</b> In this part, Endenburg answers sixteen questions that have been posed to him about sociocracy, its principles, and its application.</p> <p>Asked about the weak points of the method, Endenburg points to four factors that will cause sociocratic decision-making to break down: making exception to the principle of consent governing decision-making, the opening of circles, replacing double links between circles by single links, and a lack of measurement. It is interesting (though not surprising, given the earlier parts of the book) that measurement is so important for the successful implementation of sociocracy. Although sociocracy is ‘agnostic’ as to</p>

	<p>“The withholding of arguments is deleterious to the decision-making process.” (p. 157)</p> <p>“Within the sociocratic structure, measurement indicates what is ‘more or less’ the best, measurement constantly tells us to uncover, gather and utilize the most accurate possible arguments.” (p. 158)</p> <p>“The introduction of the sociocratic model means: adding the circle organization to the existing structure and adopting the four basic rules.” (p. 162)</p>	<p>the type of data gathered, the requirement to measure results and to use these for the attainment of some norm may reasonably be expected to improve the quality of discussion and discourse within the organization. This makes clear once more that sociocracy is not just an organizational structure, but also a format for discussion and decision-making.</p> <p>Another significant contribution of this chapter is its insistence that sociocracy can be introduced by adding it to the existing hierarchy. This raises the question how other team decision support methods are introduced, and to what degree they are compatible with pre-existing hierarchies and structures within an organization.</p>
<p><b>51</b></p>	<p>Part 6: Concluding Remarks</p> <p>“Viewed in that light, this book is a prospectus for a do-it-yourself shop which has not yet been officially opened.” (p. 167)</p> <p>“On many occasions I have been asked to give the ‘sociocratic view of humanity’, to define the philosophy ‘behind’ the sociocratic model. On those occasions I have intentionally disappointed my questioners by making it clear that sociocracy only offers the means of control and not the objective, that sociocracy only raises the decision-making threshold and leaves each individual and each group free to utilize the space above that threshold as they wish, on the basis of their own beliefs and ideals.” (p. 168)</p>	<p><b>Paradigm:</b> This part, consisting of only two pages, functions as an epilogue to the book. Endenburg zooms out, as it were, from the method and sheds a rather existential light on it.</p> <p>As the quote on the left indicates, Endenburg explicitly distances himself from any substantial goal, stating that sociocracy offers only “the means of control and not the objective.” However, on the same page of the book, he discusses sociocracy’s relation to happiness and the consciousness of the individual. These seem to me to be rather substantial goals, not merely “means of control”, but destinations in whose direction one may (or may not) proceed.</p>

## **Appendix 2: Reading Reports**

## Method: Participatory Scenario Development

<b>Identified Assumptions</b> <i>(including indicative quotes)</i>	<b>Notes</b> <i>(including references to reading memos)</i>
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**Educational Trump Card:** *Lack of rigor of a team decision support method may be compensated by the method's educational utility in getting stakeholders to understand parts of the system at hand.*

“Although lack of rigor is a potential weakness in scenario planning exercises, this is often compensated by its utility to clarify, distinguish, and explore social-ecological feedbacks and potential surprises that cannot be easily represented in more formalized modeling approaches (Bennett et al. 2003).” (Oteros-Rozas et al., 2015)

“Five cases reported as a relevant weakness the unavoidable trade-off between the accuracy requested by the science base, which includes high complexity of scientific information, versus the social relevance of the process. In fact, some authors recognized that the methodological choices sometimes reflected the research purposes rather than the social learning objectives.” (Oteros-Rozas et al., 2015)

**In-house:** This assumption deals with the objectives of the method of participatory scenario development. Under this assumption, rigor - the degree to which a method and its products withstand scientific scrutiny and are in accordance with some conception of the scientific method - and practical utility of the method - in this case an educational utility - are juxtaposed. It is implied that the two are, as it were, separate variables: although they can influence each other, they can assume different values at the same time.

One may wonder to what extent this assumption holds. Although it seems possible in principle to formulate models that have scientific value but little educational value, the opposite seems more problematic; if a (set of) scenario(s) does not withstand the test of scientific rigor, is it truly worth using it as an educational tool? If the findings are problematic or uncertain, what good does using these findings for educational purposes do? Under this assumption, however, the two are not only juxtaposed, but the educational value may even compensate for a lack of rigor, filling the gap left by this lack. Implicit in this assumption, then, is a high value placed on using scenarios as an educational tool.

All this is in contrast with Community Based System Dynamics (CBSD), which recognizes the tension between rigor and the demands of science on the one hand, and the need for community engagement on the other hand. However, CBSD embraces this tension and refuses to compromise either of the two (reading memo #17), thus choosing a different way out of the dilemma than under the *Educational Trump Card* assumption. In any case, the perceived trade-off between accuracy and social relevance merits consideration: why are these two constructs seen to be opposed? What does this reveal about underlying methodological, epistemological, or ideological choices and commitments?

<p><b>Human Boundaries of Natural Systems:</b> <i>It is feasible to perform participatory scenario development with regard to social-ecological issues within the constraints set by political boundaries.</i></p> <p>Almost half of the cases (11) were defined by political boundaries, e.g., municipality, district, province, or officially recognized community boundaries, while another 10 defined their boundaries according to natural features such as watersheds, coastal regions, or landscapes (Appendix 2). In sixteen of the cases, protected areas were included within the research area. Twenty one cases were developed at a local scale, e.g., communities, municipalities or subdistricts, and only six explicitly used a multilevel approach, i.e., included analysis at local, regional, national, and/or global scales.” (Oteros-Rozas et al., 2015)</p>	<p><b>In-house:</b> All of the articles reviewed in Oteros-Rozas et al. (2015) deal with “social-ecological systems”. Such systems sit at the interface of humans and ecology. It is striking that almost half the cases included in the study defined the limits of the study by political boundaries, such as municipal or regional borders. Although this is perhaps understandable from the point of view of attracting funding and institutional support, it is somewhat strange for a method that centers on addressing ecological challenges not to base itself on natural boundaries in most or all cases. After all, it is these natural systems in which one supposedly wants to perform an intervention.</p> <p>By simply copying and remaining within the constraints set by socio-political boundaries and borders, the application of Participatory Scenario Development in Oteros-Rozas et al. (2015) forgoes an opportunity to challenge the construction of these boundaries. Indeed, and as Latour (1988) shows us, these boundaries are by definition manufactured results of a social process that serves some interests rather than others (reading memo #35). It is conceivable that redefining political boundaries to be more in line with the boundaries of natural and ecosystems facilitates the responsible management of these systems. Furthermore, by refusing to question these boundaries, some of the cases possibly reinforce the “black boxes” that work against the stated objectives of these cases. To put it differently, the objectives pursued in the application of Participatory Scenario Development to social-ecological systems may be hampered by their being constrained within political boundaries, rather than natural ones.</p>
<p><b>Unproblematic Objective Construction:</b> <i>It is legitimate to carry out participatory scenario development projects without stakeholder consultation on the goals of the projects, and/or in order to further the goals of the researcher(s).</i></p> <p>“Four main reasons were given for the use of place-based PSP (Appendix 3): (1) to guide and support local stakeholders’ decision making by promoting reflection on likely impacts of future drivers of change in social-ecological systems (9 cases); (2) to generate social learning and knowledge integration among multiple stakeholders to find ways to respond to potential</p>	<p><b>In-house:</b> Under this assumption, the goal of a Participatory Scenario Development exercise is not decided in the course of the project and collectively by the participants, but is determined beforehand by the researchers, possibly in consultation with other stakeholders.</p> <p>By describing a clear and narrow goal to PSD, many things are taken for granted. There is a risk of stakeholders being involved while having only little freedom in deciding on the parameters of the discussion. For instance, in Molinero-Parejo et al. (2021, p. 106), the goal of the collective exercise was specifically to create more disruptive scenarios. This means that facilitators have a clear goal, and that a more fundamental questioning of the parameters within which the exercise happens, is precluded. Why are these disruptive scenarios so desirable? Who decides this? On the basis of what</p>

<p>changes (6 cases); (3) to complement research projects by incorporating stakeholders' views in the research process (5 cases); and (4) to raise local stakeholders' awareness of future changes and to confront skepticism, e.g., about climate change (3 cases)." (Oteros-Rozas et al., 2015)</p> <p>"To imagine different future situations with respect to BAU, it is important to include divergent elements in the design in order to generate more disruptive scenarios (Soria-Lara &amp; Banister, 2018), identified through participatory processes (Junghans et al., 2018). This can facilitate outside-the-box thinking, enriching the visioning process and giving rise to more disruptive scenarios (Saritas &amp; Smith, 2011)." (Molinero-Parejo et al., 2021, p. 106)</p> <p>"To address the abovementioned issues, the aim of the present study focuses on generating maps of disruptive future scenarios related to changes in urban land use and mobility patterns, enabling different types of stakeholder to tackle the planning world through effective and creative spatial ideas." (Molinero-Parejo et al., 2021, p. 107)</p>	<p>indicators is the degree of "disruption" defined and assessed? These are relevant questions, that are not discussed with and decided on by the stakeholders involved, but by the researchers.</p> <p>Problem construction and objective, which are not, typically, straightforward affairs, are thus hidden from view and rendered unproblematic. In Latour's (1988) terms, we are dealing here with a "black box" (reading memos #33 &amp; #35), an epistemic construct that is accepted as fact and left unquestioned, facilitating its subsequent application in social processes.</p> <p>The authors of Oteros-Rozas et al. (2015) identify four main reasons for carrying out "place-based Participatory Scenario Planning", the specific form of Participatory Scenario Development studied in the article. For reasons (3) and (4), the facilitators of the project have a clear, self-motivated goal: to carry out their research or to "raise awareness". These are preconceived notions of what should happen in the course of a Participatory Scenario Development project. When these mainly complement academic purposes, it is apparent that this serves the goal of the researcher(s).</p> <p>However, even in the case of awareness-raising, there are reasons to be critical. Goals like "raising awareness" and "confronting skepticism" suggest instilling certain values in people, or convincing them of the truth of certain claims. This is far removed from a free and open discussion in which the facilitator(s) do not have their own motives with regard to the content of the discussion.</p> <p>It is possible for team interventions to serve a goal set by the facilitators. For instance, CBSD explicitly aims to advance social justice (reading memo #3). However, this is an explicit goal of the method. It is unclear in the case of the place-based Participatory Scenario Planning projects discussed in Oteros-Rozas et al. (2015) if the facilitators have been open and explicit about the goals they are trying to meet, especially vis-à-vis the participants.</p>
<p><b>Infrequent and Superficial Conflict:</b> <i>Conflict in group settings does not take place too often, and it is meaningful and coherent to speak about "conflict" in the abstract.</i></p>	<p><b>In-house:</b> Only 30% of cases included in (Oteros-Rozas et al., 2015) report conflicts. Furthermore, the notion of "conflict" is not developed in the article, e.g., no distinctions are made between different types of or intensity</p>

<p>“Conflicts sometimes emerged during the participatory process (7 cases), mostly between participants with different views but also between participants and researchers (1 case) and between funders and researchers (1 case).” (Oteros-Rozas et al., 2015)</p> <p>“Were there any conflicts during the participatory process? Did conflicts emerge within/between commissioners/researches/participants/etc.? Was the process designed to address conflicts? Did the participatory process help handling the conflicts? How were they handled? Were these conflicts recognized for the first time, or were there any previously acknowledged conflicts? Did these conflicts affect the outcomes?” (Oteros-Rozas et al., 2015)</p>	<p>of conflict, other than by the involved parties: participant-participant, participant-researcher, or funder-research conflict.</p> <p>This assumption stands in contrast to the Harvard Negotiation Method, and, to a lesser degree, to sociocracy. The Harvard Negotiation Method takes conflict as a starting point, and considers it to be ubiquitous in human life (reading memo #20). Sociocracy aims to provide what it considers to be more ‘human’ solutions to conflicts (reading memo #38). By embracing conflict, both these methods intend to channel it and put it to positive use.</p> <p>In addition to comparison with the readings, this assumption may be challenged at face value by facilitators of group discussions, even those relatively unexperienced. It simply seems difficult to imagine many hours of group meetings to take place, with diverse sets of stakeholders and dealing with potentially charged issues relating to the management of natural resources and ecosystems, without the appearance of conflicts between participants in the majority of cases.</p>
<p><b>Conversation Over Complexity:</b> <i>It is defensible to limit the number and/or complexity of scenarios in order to keep group discussions manageable.</i></p> <p>“The content of scenarios in 8 of the cases varied according to mixes of 2 main factors (related to the drivers) in each scenario. (...). Seven cases included scenarios that varied their content according to mixes of 3 main factors in each scenario. (...). Seven cases varied according to mixes of 4 or more main factors in each scenario (Appendix 6 [8 iii]) of which 4 introduced an explicit governance dimension (cases # 4, #10, #17, and #19).” (Oteros-Rozas et al., 2015)</p> <p>“About half of the cases (15) created four scenarios. A common motivation to the number of scenarios created was that it should be a manageable and feasible number for further discussion and deliberative purposes (9 cases).” (Oteros-Rozas et al., 2015)</p>	<p><b>In-house:</b> Under this assumption, facilitators and groups should prioritize manageability and feasibility of discussions over the complexity and number of scenarios. This may lead to a modest number of scenarios discussed, with the ones discussed displaying modest complexity (i.e., there is only a limited number of factors in the ‘mix’ for the scenario).</p> <p>This assumption raises a number of questions.</p> <p>First, one may wonder what the criteria for prioritization and exclusion are. These criteria are of real importance, since scenarios that are excluded, or not even formulated and developed in the first place, are unlikely to be part of the relevant decision-making processes. If the criteria are based on subjective preference or an unstructured group process, a potential source of questionable randomness, or even manipulation, is introduced into the method.</p> <p>Second, the ratio between included and excluded scenarios is a relevant question. The systematic exclusion from the discussion of a large number of scenarios – if that is indeed what Participatory Scenario Development requires – raises doubts as to the degree to which the method is capable of doing justice to the complexity of the subject matter at which it is directed.</p>

	<p>If applicable, this would be a fundamental and severe criticism of the method.</p> <p>Third, there is a relation between this assumption and that of the <i>Educational Trump Card</i> (“lack of rigor of a team decision support method may be compensated by the method's educational utility in getting stakeholders to understand parts of the system at hand”) outlined above. Both point in the direction of a systematic priority for content simplicity over scientific rigor and analytical complexity. This indicates that the assumptions identified here possibly point to a more fundamental weakness of Participatory Scenario Development.</p>
<p><b>Short-Term Horizon:</b> <i>It is not necessary for the success of a Participatory Scenario Development project to monitor outcomes beyond the lifespan of the project, or even at all.</i></p> <p>“Monitoring of PSP impacts, i.e., systematic collection of data to track the extent of progress and achievement of outcomes and impacts using indicators (Appendix 8), was performed in 11 cases (Appendix 9), either solely within the project timeframe (8 cases) or also extending beyond the project timeframe in three cases, which were led by the same research team.” (Oteros-Rozas et al., 2015)</p> <p>“In about half of cases monitoring was impossible because of constraints of time, personnel, or finances (11 cases; Appendix 9). In two cases (#3 and #21) monitoring was not necessary or important to the goals of the PSP. Two cases (#14 and #23) found it impractical to monitor because it was too early or because detecting impacts seemed intractable.” (Oteros-Rozas et al., 2015)</p> <p>“As with monitoring, resource constraints were the main reason for the lack of evaluation of the scenario planning exercise in 9 cases. In 5 case studies it was</p>	<p><b>In-house:</b> A majority of the projects studied in Oteros-Rozas et al. (2015) did not monitor outcomes at all. A sizeable minority monitored outcomes within the lifespan of the project, and a small set monitored outcomes beyond (and, presumably, also within) the lifespan of the project. In Molinero-Parejo et al. (2021), the outcomes are usable for a next phase in decision-making. It is, however, unclear if the outcomes were actually used for such decision-making.</p> <p>This stands in contrast to both Community Based System Dynamics and Sociocracy, in different ways for each of these methods.</p> <p>With regard to the timespan of involvement, Community Based System Dynamics provides a counterpoint to Participatory Scenario Development. In CBSD, researchers and practitioners are involved with a community over an extended period of time (reading memo #11). It is recognized that it may take years to effect meaningful change within a community, which requires a long-term commitment (reading memo #17).</p> <p>With regard to monitoring, it is Sociocracy that contrasts with Participatory Scenario Development. Measurement is an integral part of the circle of governance that sociocratic organizations constitute (reading memos #42, #47, #48 &amp; #50). Opening of these circles is seen by Endenburg as a major factor leading to breakdown of effective sociocratic organizing and decision-making. Moreover, Sociocracy insists that it is always possible and necessary to measure. It may be difficult to do so, but that is not considered a valid excuse.</p>

<p>too soon to evaluate the effects of scenario planning.” (Oteros-Rozas et al., 2015)</p> <p>“The majority of cases (20) did not formally evaluate, and correspondingly did not detect evidence of outcomes or impacts (Appendix 9).” (Oteros-Rozas et al., 2015)</p> <p>“No monitoring – 52 [% of case studies] Some monitoring within project lifespan – 35 [% of case studies] Monitoring beyond project lifespan and/or institutionalization of monitoring program – 13 [% of case studies]” (Oteros-Rozas et al., 2015)</p> <p>“The resulting maps captured possible outside-the-box future scenarios for use as a final product in scenario-based decision-making (Brail, 2008).” (Molinero-Parejo et al., 2021, p. 113)</p>	<p>Both these methods throw into sharp relief the lack of long-term monitoring found in Participatory Scenario Development as described in Oteros-Rozas et al. (2015), and, to a lesser degree, in Molinero-Parejo et al. (2021).</p>
<p><b>Positivism:</b> <i>There is a correct understanding of the working of a problem. Participants and researchers can, however, be biased in arriving at this understanding by their preferences, cultural attitudes, or background.</i></p> <p>“By contrast, in 5 cases, authors reported that the preferences, cultural attitudes, or background of some participants or researchers might have biased the understanding of drivers, e.g., farmers’ belief in fate’s role shaping their daily life, and the way of thinking about the future, e.g., indigenous understanding of time and the future.” (Oteros-Rozas et al., 2015)</p> <p>“This would enable the exchange of ideas to enhance urban management policies, in contrast to the exclusive use of narratives, which are more abstract and difficult to understand for some of the potential</p>	<p><b>Paradigm:</b> This assumption is one of two opposing paradigmatic assumptions, the Mosaic View of Knowledge being the other. In this case, Positivism is the view that there is a correct way to understand reality. Actors may approach this correct understanding to a greater or lesser degree. In a small number of articles in Oteros-Rozas et al. (2015), farmer's belief in fate, and indigenous understandings of time are adduced as leading to a "biased understanding" of drivers in social-ecological matters.</p> <p>This betrays a hierarchical epistemology in which some types of knowledge are more valuable or legitimate than others. Instead of engaging with the worldviews of the farmers and the indigenous groups in question, their worldview is dismissed as biasing a true understanding. Through this act, the "preferences, cultural attitudes, or background" of the positivist researcher herself are conveniently ignored. This further cements a hierarchy of knowledge.</p> <p>On the basis of the second- and third-level readings, there are two contrasts to be made with this assumption. First, Community Based System Dynamics is predicated on the epistemological notion that there are different</p>

<p>stakeholders involved.” (Molinero-Parejo et al., 2021, p. 113)</p>	<p>worldviews or “logical pictures” of the world which may differ and are not necessarily placed in a hierarchy (reading memo #9). Knowledge is conceived as something in flux, and subject to social and political processes. This calls for humility in claims-making about reality, and for engagement with alternative (relative to one’s own) epistemologies.</p> <p>Second, Latour's (1988) examination of knowledge and its production call for a closer examination of the inside and outside that are constructed in knowledge and its production. By casting participants as ignorant, irrational, or stupid, a hierarchy is created between the researcher, who is construed as knowledgeable, and the outsider, who is construed as ignorant (reading memos #36 &amp; #37). In the case of some applications of Participatory Scenario Development, it seems that it is certain participants who are cast as outsiders; they are presented as biased on the basis of their understandings of the world.</p> <p>The identification of the construction of an insider/outsider dichotomy calls for further investigation of the stabilization, contestation, and function of this dichotomy.</p>
<p><b>The Mosaic View of Knowledge:</b> <i>Different sources lead to different knowledge and different types of knowledge. These differences interact with each other and can be bridged through Participatory Scenario Development, leading to a positive added value, higher quality outputs, and more opportunities for stakeholder collaboration. Participatory Scenario Development is the substrate on which the mosaic is formed or created, rather than a tile within it.</i></p> <p>“In 7 cases the inclusion of a diversity of worldviews in the results was mentioned as a strong direct added value of PSP.” (Oteros-Rozas et al., 2015)</p> <p>“Further, by including knowledge and information from a diversity of sources the quality of scenarios and identified policy options can be increased (e.g., Hill et al. 2010, Palomo et al. 2011, Ravera et al. 2011a, Vilardy Quiroga et al. 2011, Martin-Ortega et al. 2014),</p>	<p><b>Paradigm:</b> The Mosaic View of Knowledge is the second of the opposing pair of epistemological paradigms identified in the Participatory Scenario Development literature. It holds that there are different knowledges and different types of knowledge. Contrary to Positivism, these differences are seen as a blessing instead of a curse: by facilitating dialogue, new knowledge can be created. This is an instance of synergy: the whole is greater than the sum of its parts; the different pieces and types of knowledge are tiles, which form a mosaic when combined. <i>The Mosaic View of Knowledge</i> is an assumption on the basis of which different types of knowledge can be integrated, which strengthens the methodology in its ability to deal with the challenges it sets out to address.</p> <p>This epistemology is closer to that of Community Based System Dynamics (reading memo #9) than the assumption of Positivism is. CBSD’s epistemology, as stated above, is based on logical pictures of the world which are not necessarily placed in a hierarchy, and which is situated in social and political processes. As such, this assumption represents an alternative to Positivism. It respects different ontologies and</p>

<p>and innovative strategies and opportunities for collaboration among multiple stakeholders can be identified (Butler et al. 2015).” (Oteros-Rozas et al., 2015)</p> <p>“By bridging multiple knowledge systems PSP can bring together and produce new knowledge for environmental decision making.” (Oteros-Rozas et al., 2015)</p> <p>“PSP has proved to be an arena where multiple knowledge systems interact (e.g., Palomo et al. 2011, Ravera et al. 2011b, Oteros-Rozas et al. 2013, Reed et al. 2013a) to cocreate a new understanding of the present situation and shared visions of possible future developments.” (Oteros-Rozas et al., 2015)</p>	<p>epistemologies, and is thus more inclusive of different stakeholders and their views.</p> <p>However, implicit in <i>The Mosaic View of Knowledge</i> is that the method of Participatory Scenario Development is not, itself, a tile in the mosaic. Rather, it is interpreted as the substrate on which the tiles are placed. Through this sub-assumption, there is a continuity between the Mosaic View of Knowledge and the assumption of Positivism: in both cases, Participatory Scenario Development as such, and its assumptions, processes, and workings, are not problematized or questioned. Addressing this lack of reflexivity is an opportunity for the method to become more theoretically sophisticated.</p>
<p><b>Homogenous Stakeholders:</b> <i>“Stakeholders” are a homogenous category that can unproblematically be positioned over against other involved parties, such as researchers and policy makers.</i></p> <p>“Many of the examined cases demonstrate how PSP processes succeeded in increasing dialogue, resolving conflicts, producing outputs that otherwise were not possible, and enhancing multiple learning outcomes between stakeholders, researchers, and policy makers in natural resource management planning (e.g., Ravera et al. 2011a, Hamann et al. 2012, Oteros-Rozas et al. 2013, Plieninger et al. 2013, Martin-Ortega et al. 2014; Fig. 6).” (Oteros-Rozas et al., 2015)</p> <p>“The scenario processes increased stakeholders’ awareness of the existence of local and global drivers of change and threats, and the need for long-term planning to deal with such changes (I. Brown, J. Martin-Ortega, K. Waylen, and K. Blackstock, unpublished manuscript).” (Oteros-Rozas et al., 2015)</p>	<p><b>Paradigm:</b> This assumption is one of two complementary assumptions with regard to the view of stakeholders involved in Participatory Scenario Development projects. It holds that “stakeholders” are an abstract category of people. They can be positioned in relation to different such categories; researchers, policy makers, community members.</p> <p>This lumping together erases differences between stakeholders. If, as is not only to be expected, but also acknowledged in Oteros-Rozas et al. (2015), it is common for stakeholders to be in conflict with each other within the framework of a Participatory Scenario Development intervention, the usefulness of viewing different parties in such conflicts simply as “stakeholders” risks obscuring the substance and meaning of these conflicts. Instead of focusing on the substance of the challenges to be addressed, the reader may be tempted to view stakeholders as one homogenous group with similar viewpoints.</p> <p>This homogenization precludes questions on aspects of Participatory Scenario Development beyond differences in viewpoints, as well. For instance, differences in engagement with and effects of the method on different stakeholder groups or along the lines of various individual</p>

	<p>characteristics, may be assumed to come into view less clearly when discussions center on “stakeholders” in the abstract.</p>
<p><b>Heterogenous Stakeholders:</b> <i>“Stakeholders” are a heterogenous category whose different constituencies have roles in different parts of the intervention process.</i></p> <p>“Thus, scenario planning requires the involvement of people with a sufficiently expert knowledge of urban systems (urban planners, transport engineers, environmental consultants, and property developers) to be able to identify characteristics of the scenarios and provide a more accurate spatial representation (Larondelle et al., 2016).” (Molinero-Parejo et al., 2021, p. 107)</p> <p>“To this aim, we employed a participatory process that involved conducting semi-structured interviews with 129 residents and commuters, exploring aspects related to transport and urban land uses of the case study.” (Molinero-Parejo et al., 2021, p. 107)</p> <p>“To encourage experts’ interaction and a diversity of perspectives (Junghans et al., 2018), three groups were established (one per scenario) with six experts, ensuring the right variability between professional domains. This variety of perspectives attempts to offer a more complex dialogue, encompassing all potential factors involved in the evolution of urban areas.” (Molinero-Parejo et al., 2021, p. 110)</p> <p>“Within PPGIS context, all phases are considered important in urban planning (Brown, 2015), from local people’s involvement in the elaboration of narratives, to expert collaboration in the urban land uses and transport mapping.” (Molinero-Parejo et al., 2021, p. 113)</p>	<p><b>Paradigm:</b> Heterogenous Stakeholders is the second of the two complementary assumptions with regard to the view of stakeholders involved in Participatory Scenario Development projects. It holds that “stakeholders” are a diverse group of people, whose involvement should be differentiated across the different phases and activities making up a project.</p> <p>For instance, in Molinero-Parejo et al. (2021), ordinary citizens are included in the formulation of scenarios in interviews, but not in the discussions on the basis of the resulting scenarios. These are limited to domain experts. The diversity of domains from which experts are drawn, is perceived as creating a diversity of perspectives.</p> <p>There are two comments to be made on this assumption. First, the divisions between different stakeholder constituencies contrast with Community Based System Dynamics. CBSD emphasizes the need to include communities in the modelling work (reading memo #10), and neither denies nor ignores the differences between community members. Rather, the goals of CBSD are more encompassing and extend over a longer period of time. Admittedly, without CBSD’s goal of achieving social justice for a community in the long run, less stringent demands on the involvement of stakeholders are justified.</p> <p>Second, when the Participatory Scenario Development project is integrated with a more formal modelling effort such as geographical information systems, as is the case in Molinero-Parejo et al. (2021), the PSD project can be analyzed as a “center of calculation” in Latour’s (1988) terms (reading memo #38). The researchers use the inputs of both the geographical data obtained from official agencies and the input gathered from lay people to construct a representation. In this particular case, the use of scenarios is a means to the end of building a model-like image of an area and a number of spatial developments. This image is, in turn, used to make predictions and recommendations about the area’s transportation system.</p> <p>Modelling projects like this potentially have the consequence of widening the gap between experts and members of the community, rather than narrowing or closing it. Although lay people are consulted in the process, their input is processed according to the insights of the researchers and a</p>

	<p>small number of stakeholders selected by them. The latter go on to use this input for making recommendations and publishing a scientific article. This indicates that a team decision support method may not only diminish hierarchies, but also reinforce them.</p>
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## Method: Group Causal Mapping

<b>Identified</b> <i>(including quotes)</i>	<b>Assumptions</b> <i>indicative</i>	<b>Notes</b> <i>(including references to reading memos)</i>
<p><b>Individualism:</b> <i>Individuals have different views of the world. In order to solve problems, these personal views should be made to enter into dialogue with each other.</i></p> <p>“Overall, its theoretical position is underpinned by subjectivism, in that it is based in the belief that each individual has his/her personal view of the world and consequently, of the particular problem in question (Rosenhead &amp; Mingers, 2001).” (Abuabara &amp; Paucar-Caceres, 2021, p. 1052)</p> <p>“The attention to the individual himself/herself is driven by the ‘Theory of Personal Constructs’ (Kelly, 1955) which makes use of concepts (rather than emotions) to bring sense to this individual world, in order to identify the problem, to manage and control it.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1053)</p> <p>“The Individual: SODA methodology works directly with the individuals involved in the problem where each personal subjective view of the ‘real’ problem is explored.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1058)</p>	<p><b>Paradigm:</b> This assumption describes a basic epistemological notion underpinning Group Causal Mapping (here in the form of "SODA"). Individualism positions individual human beings as the core of the theory. Individuals are depicted as rational beings (see assumption <i>Rational Actors</i>). They have different views of the world, which is reflected in different views of the problem to be studied or solved. The different worldviews may be brought into discussion with each other. In SODA, this primarily takes the form of negotiation (see assumption <i>Importance of Negotiation</i>).</p> <p>This stands in contrast to the centering of human <i>groups</i>, or altogether different entities, such as institutions, organizations, and nature. Concretely, the assumption of Individualism may be juxtaposed with Community Based System Dynamics. Under CBSD, it is communities that are the focus (reading memos #10 &amp; #13). Notably, communities are something yet different from groups, since communities may contain many different groups. By prioritizing the individual – and the differences in cognition between individuals – Group Causal Mapping precludes a more social and collective construction of problems and issues. We may expect these problems to appear in a form derived from individuals’ cognition.</p>	
<p><b>Rational Actors:</b> <i>The different views of individuals exist primarily on the rational level, and it is at this level that a group intervention operates.</i></p>	<p><b>Paradigm:</b> This assumption brings into view the focus on rationality of actors that underlies Group Causal Mapping (GCM). It is intellectual or cognitive constructs such as “concepts” that are centered in the approach. By stressing concepts, the method’s commitment to a rational discussion becomes</p>	

<p>“This individual belief is based on his/her wisdom and experiences can be elicited through verbal communication (language). Language (written or spoken) and thinking are taken to be the basis for understanding how people view their idiosyncratic world (Eden &amp; Huxham, 1988).” (Abuabara &amp; Paucar-Caceres, 2021, p. 1052)</p> <p>“The attention to the individual himself/herself is driven by the ‘Theory of Personal Constructs’ (Kelly, 1955) which makes use of concepts (rather than emotions) to bring sense to this individual world, in order to identify the problem, to manage and control it.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1053)</p> <p>“Furthermore, this theory treats the individual as ‘a scientist’ always seeking to make sense of the world in order to act within and upon that world (Eden &amp; Ackermann, 2004).” (Abuabara &amp; Paucar-Caceres, 2021, p. 1053)</p>	<p>apparent. This, in turn, stands in contrast to other possible frameworks, based on more emotional, physical, or existential notions.</p> <p>For instance, the rational focus differs from the Harvard Negotiation Method. The latter, although advocating for a separation of “people” from “problems”, explicitly recognizes both as legitimate and relevant topics of conversation (reading memo #23). Indeed, the personalities and emotions of the negotiators in question merit attention in formulating a negotiation strategy. This contrast brings attention to the way in which Group Causal Mapping deals with these factors, given that they are not part of the main methodology.</p> <p>On a more fundamental level, an examination of this assumption on the basis of Latour (1988) is possible. By casting concepts or ideas as facts (“ready-made science” in Latourian terminology), resources are mobilized that reinforce the process of these concepts and ideas becoming entrenched as facts (reading memo #32). Discussing or stating the assumptions underlying a team decision support method is, therefore, not merely stating a fact, but producing this fact, as well. This is akin to a self-fulfilling prophecy.</p>
<p><b>Importance of Negotiation:</b> <i>Negotiation is an essential element of Group Causal Mapping. Its role within the process is that of facilitating debate and understanding, resulting in consensus on future actions.</i></p> <p>“The model includes three main activities : (a) modelling the situation; (b) providing common understanding; and (c) supporting group negotiation, towards a suitable direction forward.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1054)</p> <p>“(iii) Supporting group negotiation in developing strategies and options: in this case, SODA methodology facilitated strategic debate and promoted active understanding, towards a</p>	<p><b>In-house:</b> This assumption underpins the makeup of the Group Causal Mapping (GCM) process, which contains negotiation as one of its three core elements. Negotiation is not only deemed to be important for the attainment of the goals of the method, it is also ascribed an important functional role. This role consists of “facilitating strategic debate” and “promot[ing] active understanding”, leading to consensus on the next steps and decisions to be taken.</p> <p>One of the readings on the second level deals directly with negotiation. In the Harvard Negotiation Method, a framework for negotiations is outlined. However, this framework is more elaborate than that offered in GCM. It contains different elements in its own right, such as the generation of options, and separating people and the problem (reading memos #23 &amp; #25). However, the Harvard Negotiation Method is, itself, an elaborate group method, whereas “group negotiation” in GCM represents one of three different phases of the facilitation process. As a result, the “negotiation” in</p>

<p>consensual view of strategic actions.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1058)</p>	<p>GCM possibly represents a narrower, more specified activity than “negotiation” in the Harvard Negotiation Method.</p> <p>In addition, the emphasis on negotiation can be contrasted with Community Based System Dynamics (CBSD). In CBSD, negotiation does not figure prominently. Differences between the worldviews and ideas of different participants are to be resolved by discussing the issue on their merits, and collectively understanding more of the problem (reading memos #1, #16 &amp; #17). From this perspective, including negotiation in a group intervention appears a step back; from a collective understanding of problems, we go to a negotiation among individuals. However, negotiation in GCM is preceded by a modelling effort and a phase for “providing common understanding” (Abuabara &amp; Paucar-Caceres, 2021, p. 1055). CBSD arguably includes similar functions in its group process, which centers the use of system dynamics modelling. The modelling process, then, fulfills the functions of providing a common understanding, while simultaneously supporting group negotiation, since group members have to reach consensus on additions and changes to the model.</p> <p>For sociocracy, a similar argument can be made. Although negotiation is not a core element of Endenburg’s (1998) method, the process of collectively setting a norm and taking action to meet it, both within the constraints set by consent, may be conceived as a negotiation process, even if sociocracy, itself, does not use this term (reading memo #41).</p> <p>In conclusion, GCM and the three methods examined on the second level do all share a similarity in that they incorporate some element of negotiation, broadly conceived.</p>
<p><b>Bricolage Allowed:</b> <i>It is both feasible and useful to apply only some of the steps of Group Causal Mapping, rather than all of them, and/or to apply Group Causal Mapping in combination with other methods.</i></p> <p>“In terms of changes over time, the hybrid use of the methodology has been increasingly frequent and stands out in relation to the use of SODA as a pure</p>	<p><b>In-house:</b> This assumption deals with the implementation of Group Causal Mapping - or, rather, the frequent lack of full implementation. In Abuabara &amp; Paucar-Caceres (2021), it becomes clear that, in most of the applications studied, only one or two of the phases of the method were implemented. In the vast majority of cases, "supporting group negotiation" did not take place, nor was a “SODA Workshop” organized. In addition, the article finds that there are many applications in which GCM is applied in a hybrid way, i.e., in combination with other methods.</p>

action research approach.” (Abuabara & Paucar-Caceres, 2021, p. 1061)

“According to this, we can surmise that SODA methodology is mainly destined for (i) modelling and (ii) providing common understanding of the problematic situations. A total of 89% and 91.5% (respectively) of the cases analysed used SODA or its associated technique of the Cognitive Map for both such activities.” (Abuabara & Paucar-Caceres, 2021, p. 1061)

“Finally, in relation to the activity ‘support group negotiation’. It was only in 12.5% of the cases this activity was part of the process.” (Abuabara & Paucar-Caceres, 2021, p. 1061)

“In relation to the Bipolar Constructs (in opposition to the Unipolar Concepts), we found a low use (just 21.5%) of this important element of SODA.” (Abuabara & Paucar-Caceres, 2021, p. 1062)

“The majority of cases (90.5%) did not use a SODA Workshop (group negotiation) as foreseen in the third activity in Fig. 1.” (Abuabara & Paucar-Caceres, 2021, p. 1062)

“Actual negotiation or collaborative problem solving was not feasible due to the present public involvement policy of DFNA, hence the need to modify the approach.” (Hjortsø, 2004, p. 673)

“During activity 1, semi-structured interviews (Kvale, 1996) were held with representatives of the user council. Because of lack of resources it was decided not to include all council members in this phase.” (Hjortsø, 2004, p. 673)

“Since the planning process had at this time come near its closure it was decided not to gather the

This raises questions about the feasibility and usefulness of applying a method only partially, or in combination with other methods. To what extent are team decision support methods integrated units, with interlocking elements that need to be not just conceptualized, but also applied, in connection to each other? To what extent do the different phases of the method build on each other's findings? And how useful is it to apply an element of a method in isolation?

Rather than attempting to answer such questions empirically, which would require new research, we will limit ourselves here to a description of the assumption and how it may be judged from the perspective of the different methods studied in the second-level readings.

First, Hovmand (2014) is silent on the partial or combined application of Community Based System Dynamics (CBSD). However, the book describes the method in high detail (reading memos #15 & #16). It is clear from the context and the discussion in Hovmand (2014) that CBSD is a method that is self-contained to a high degree; it requires a significant time investment on the part of the facilitation team, that is both not only deep in the sense of hours spent on the group sessions, but also wide in the sense of extending over many years (reading memo #17). The descriptions of the process given are highly detailed and the possibility of using merely a part of the method is not seriously discussed. Therefore, it seems unlikely that Hovmand intends for parts of the method to be used in isolation.

Second, the Harvard Negotiation Method consists of four principles (reading memos #23, #24, #25 & #26). It is explicitly stated that the method applies to many different situations, without the elements changing or losing their power. The book (Fisher et al., 1991) contains many examples of real-life negotiations in order to illustrate the principles, supporting the notion that the principles can be applied independently.

Third, and finally, sociocracy does not work when it is not applied (or implemented) with all its tenets and elements. Endenburg (1988) even attributes the failure of sociocracy to such incomplete application or implementation. In this regard, he mentions ignoring the principle of consent, the opening of circles, replacing double links by single ones, and lack of measurement, specifically. (reading memo #50)

<p>council for a discussion of the idea and debate catalogue.” (Hjortsø, 2004, p. 673)</p>	<p>In conclusion, the different methods differ with regard to the feasibility and usefulness of partial application. These differences are associated with the nature of the intervention of the method in question, ranging from a number of principles to be applied flexibly, as in the case of the Harvard Negotiation Method, to a more rigid and formal structure, as in the case of CBSD and sociocracy.</p>
<p><b>Application Beyond Target Setting:</b> <i>Group Causal Mapping has a target setting in which it is to be applied: organizations for corporate and public management. However, the method can successfully be applied beyond these target settings.</i></p> <p>“But, Soft OR has been developed within corporate and public organisational management settings and, typically, these differ from public participation processes in several ways.” (Hjortsø, 2004, p. 667)</p> <p>“The experiences from the case study are interesting because they show that Soft OR can support public participation and help improve the decision processes, despite differences in the structural basis compared to corporate and public management settings.” (Hjortsø, 2004, p. 668)</p> <p>“Public participation is staged in a decision-making environment mainly through the influence of the characteristics associated with a pluralist society (Kekes, 1993).” (Hjortsø, 2004, p. 668)</p> <p>“Over the last decades, SODA (either partially or entirely) has been applied in a vast area of interests. Table 1 details the 32 different areas that were inductively classified during the careful and full reading process of each article and, that can be merged into 11 main topics.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1058)</p>	<p><b>In-house:</b> This assumption relates to the application of Group Causal (GCM) Mapping. It asserts two basic propositions about this topic. First, that GCM was developed within a specific setting: that of corporate and public organisational management. As a result, one would expect that salient features of the method were defined and formulated with this setting in mind. Possibly, applications beyond the target setting may not perform as well, or exactly as intended. Second, and contrary to the first proposition, GCM can productively be applied to other settings beyond this intended use. Hjortsø (2004, p. 668) finds that it is possible to apply GCM in a public participation setting, and with positive results.</p> <p>Interestingly, Abuabara &amp; Paucar-Caceres (2021), having surveyed applications of GCM in areas that vary from urban planning and public management to supply-chain management and quality of life assessment do not mention any specific issues with this wide application, or differences in such salient features as outcomes or facilitation strategy. Similarly, the survey does not make any claims about the intended area in which GCM is to be applied. Rather, it is implicitly presented as a general method.</p> <p>Hjortsø (2004), on the other hand, claims that GCM was developed within a specific matrix: that of corporate and public organisational management. The article is, then, a case study in the application of the method beyond this setting, and finds that such application is indeed possible and has positive outcomes. The focus in the method that is identified by the article is thus, simultaneously, deemphasized.</p> <p>With regard to application contexts, GCM contrasts with the other methods studied in the first-level readings. First, Community Based System Dynamics (CBSD) is aimed at applications in a community setting (reading memo #1). This may encompass a wide range of different applications, both in a geographical and in a functional sense. Arguably, the contrast is with</p>

<p>“Table 1: SODA application areas. Strategic Management – Sustainable Development – Healthcare Management – Urban Planning – Public Management – Information Systems – Education Management – Organizational Management – Performance Appraisal – System Engineering – Others” (Abuabara &amp; Paucar-Caceres, 2021, p. 1059)</p>	<p>commercial applications. CBSD is clear about this focus, and the preoccupation on working with communities is reflected in the prescribed method; CBSD chooses a focus area and implements this focus throughout the method (reading memos #11 &amp; #13). CBSD, then, is a method that is "narrow" (with limited application) as well as "deep" (with an elaborate process).</p> <p>Second, the Harvard Negotiation Method is somewhat different in that it provides principles to be applied in a wide range of settings. The principles are intended to be applicable widely, and, as a result, the framework of the method is rather minimal (reading memo #21). Contrary to CBSD, the Harvard Negotiation Method is "wide" (with broad application) and "shallow" (with a minimal basic structure). This represents a contrast with CBSD.</p> <p>Third, and finally, Sociocracy is explicitly intended to be applicable in any organization (reading memo #39). This is further exemplified by the elaborations given in Endenburg (1988) on applying the method in the contexts of education, enterprises, and government (reading memos #47, #48 &amp; #49). The method is thus "wide" (with broad application) and "deep" (with an elaborate process).</p> <p>As a result of this comparison, a pattern of different applications and degrees of detail emerges among the methods studied.</p>
<p><b>Unpurposeful Learning:</b> <i>Group Causal Mapping projects may generate learning outcomes for their participants, but this learning is not an explicit purpose of applying the method, and the learning that takes place is not necessarily integrated in an overarching organizational learning process.</i></p> <p>“SODA is a participative methodology designed to provide dialogue, reflection, learning, consensus and commitment, but the sample of articles surveyed indicate that its use has been limited to helping modelling the problematic situation and providing a</p>	<p><b>In-house:</b> This assumption is one of two complementary assumptions with regard to learning within the context of Group Causal Mapping, the <i>Purposeful Learning</i> assumption being the other. Under this assumption, which, among the relevant readings, was exemplified mainly in Abuabara &amp; Paucar-Caceres (2021), learning may take place during or as a result of Group Causal Mapping. However, this learning is not an explicit purpose of the application of the method, and the learning process in the context of the project is not necessarily integrated in an overarching organizational learning process. The purpose of the method, then, is rather to solve a problem with which stakeholders are dealing, or to provide an analytical tool to this end.</p> <p>This stands in contrast to the methods treated in the second-level readings. First, Community Based System Dynamics (CBSD) aims to advance social justice (reading memo #3). In addition, the method emphasizes capacity-</p>

<p>common understanding to participants.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1051)</p> <p>“Rather, systems concepts can be convenient in structuring our thinking and learning about the situation, a fertile field in which to debate and accommodate around the nature of the problem, rather than to ‘solve’ it (Checkland, 1999).” (Abuabara &amp; Paucar-Caceres, 2021, p. 1052)</p> <p>“(ii) Providing a common understanding to participants: in this case, SODA was acting as a learning approach about participants themselves, the others’ worldviews and the organizations/institutions in question, thereby, establishing and increasing a knowledgebase about the context.” (Abuabara &amp; Paucar-Caceres, 2021, p. 1058)</p>	<p>building in the community by stimulating learning (reading memo #18). As can be seen, learning is a purposeful part of CBSD.</p> <p>The Harvard Negotiation Method, being a more flexible, principle-based method to be applied in many different situations, does not explicitly aim at effecting learning. However, Fisher et al. (1991, p. 85) emphasize that, regardless of one’s natural aptitude for negotiation, anyone can benefit from “preparation, practice, and feedback” in the principles of the method. Learning, then, is conceived not as an outcome of the method, but as a factor conditioning its successful application (reading memo #31).</p> <p>Third, and finally, there is a contrast with sociocracy, as well. Sociocracy provides for organizational processes that are aimed at feedback (reading memo #41), and the opportunity for every decision to be questioned, since every decision is, it is hoped, based on feedback (reading memo #47). Due to the centrality in sociocracy of feedback aimed at meeting a predetermined norm, learning processes are thoroughly integrated into the method. Endenburg (1988) even adds an existential note to learning by relating it to the liberation of the individual (reading memo #48).</p> <p>All in all, it is somewhat surprising for learning not to feature so prominently in a team decision support method. Based on Abuabara &amp; Paucar-Caceres (2021), the conclusion seems justified that Group Causal Mapping is primarily aimed at solving a specific problem, and is not typically integrated in a structure of learning.</p> <p>The main reason why one would expect a group intervention to provide for learning, is that these group interactions potentially create great insight into the causes and working of a problem or system, and into the functioning of the group. One would hope for these potential learnings to be cherished and elaborated on for improvements in the long run. Indeed, this might be the case why someone would decide to seek recourse to a group intervention in the first place.</p>
<p><b>Purposeful Learning:</b> <i>Group Causal Mapping projects may generate learning outcomes for their participants, and this learning can be an explicit purpose of applying the method. The learning that</i></p>	<p><b>In-house:</b> This assumption is one of two complementary assumptions with regard to learning within the context of Group Causal Mapping. Under this assumption, which, among the relevant readings, was exemplified mainly in Hjortsø (2004), learning may take place during or as a result of Group Causal Mapping, and this learning is an explicit purpose of the application of the</p>

<p><i>takes place may be integrated in an overarching organizational learning process.</i></p> <p>“Soft OR recognises and integrates participants’ subjective perspectives, the importance of mutual learning, iterative process design and adaptive decision-making.” (Hjortsø, 2004, p. 670)</p> <p>“Table 2: Questionnaire used for evaluation of SODA applied to public participatory tactical forest planning (...)”</p> <p>Q2 To what degree did you learn something new about the planning situation from reading the Catalogue?” (Hjortsø, 2004, p. 674)</p> <p>“Most council members felt that they had learned something new from working with the facilitative device (Q2).” (Hjortsø, 2004, p. 676)</p>	<p>method. The learning process in the context of the project may be integrated in an overarching learning process.</p> <p>It is unclear, in the case of Hjortsø (2004), if the learnings generated as a result of the group intervention were integrated in an overarching organizational learning process.</p> <p>Without repeating the comparison and contrast with alternative methods carried out in the discussion of the previous assumption, it becomes clear that, although learning is not necessarily or fundamentally an aim of Group Causal Mapping, it does seem to be the case that the method is compatible with the explicit objective of learning.</p>
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