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PARADOX MANAGEMENT THROUGH CAUSAL MAPPING IN A WORKSHOP SETTING

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PLAGIARISM STATEMENT

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ABSTRACT

This thesis examines how causal mapping can support paradox management as a problem structuring approach in a workshop setting. First, theoretical findings from relevant literature were used to connect the three main pillars paradox management, workshops and cognitive mapping and to define optimum conditions and risks. Then, a workshop around a complex and paradoxical problem was designed and conducted with international volunteers. Its effectiveness was assessed qualitatively, taking various sources of information into consideration: observed participant behaviour, feedback questionnaires as well as the solution and causal map created during the workshop. Both, the theoretical framework created as well as the case study performed led to the conclusion that causal mapping can be a valuable tool and workshops an appropriate environment to manage paradoxes. Participants were able to gain a common understanding and holistic view of the issue, consider different perspectives, and ultimately agree on a satisfactory solution.

Keywords: Paradox theory; Causal mapping; Problem structuring; Management workshop

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1. INTRODUCTION

Climate change, global pandemics as well as cross-border conflicts and resulting resource shortages represent complex issues with international relevance. Such problems often involve a variety of stakeholders with diverging or even opposing interests and thus require paradoxical considerations, meaning that contradictory but interrelated elements have to be taken into account (Lewis, 2000). A current example for a paradox is resulting from the European reliance on Russian fossil fuels during the Ukraine conflict: while the European Union is sanctioning Russia politically and economically, it still continues to import gas, thereby unintentionally providing financial resources to fund the war (Abnett & Meijer, 2022; Boffey & Rankin, 2022).

Paradox theory has been researched in workshop contexts and in conjunction with cognitive mapping techniques (e.g. Harris & Metcalfe, 2015). However, paradox management, i.e. value creating responses to paradoxes (Johansen, 2019), using this platform and technique remain yet unexplored. This implies that paradox management is often subject to intuition instead of a systematic approach (Poon & Law, 2020), which makes it more difficult to establish the effectiveness of such practices and hinders its replication (Tsang & Kwan, 1999). This thesis addresses this research gap by examining the following research question: How can paradox management be supported by causal mapping in a workshop context?

First, a theoretical framework was developed to connect paradox theory and management, causal mapping and workshops and identify relevant risks and opportunities these tools bear and provide. Afterwards, a case study was developed taking the findings into account. Qualitative data was collected and interpreted to derive relevant conclusions.

This thesis provides a qualitative observational opinion which adds to the scarcity within research for the examined issue by providing an illustrative case of causal mapping for paradox management in workshops and its intensive analysis. The results might not always be applicable to different situations and contexts, but gave interesting indications which contributed to closing this research gap.

Tensions can cause stress and organizational dysfunction which can be reduced by proper paradox management (Johansen, 2019) or even converted into impulses for learning and organizational development (Vince et al., 2018). Therefore, this thesis contributes to the United Nations Sustainability Development Goals “Decent work and economic growth” and “Good health and well-being” (United Nations, 2022). Furthermore, all United Nations Sustainability Development Goals represent complex issues which might benefit from paradoxical considerations and collaboration tools. Therefore, the thesis also indirectly lays a foundation to address other United Nations Sustainability Development Goals.

2. PRESENTATION OF THE CONTEXT

2.1. Main pillars of the theoretical framework

The literature review includes information on the three main pillars of this thesis: paradox theory, workshop theory and cognitive mapping.

The aim is to bring these three elements into juxtaposition in order to examine how causal mapping and workshops with their inherent attributes can support paradox management. Each section starts with definitions before explaining interrelations between the three pillars and particular aspects that need to be considered in the context of this thesis.

Paradoxes represent unstructured and complex problems involving multiple, potentially opposing perspectives and demands. A structured approach in combination with a collaborative platform might be useful to address and manage paradoxes in a systemic way, thereby exploiting the full potential of paradoxical considerations and establishing effective and reproducible practices. However, the use of a systemic approach for paradox management through problem structuring and a collaborative platform remains yet unexplored. This thesis suggests using causal mapping as a problem structuring approach and workshops as a collaborative platform to manage paradoxes in a systemic manner. Causal mapping could be a useful approach, since this problem structuring technique allows for the visualisation of complex issues and their interrelatedness, while workshops could offer an appropriate collaborative platform to exchange and draw on different perspectives in a focussed and unbiased environment.

The following figure summarizes the theoretical framework which is developed and explained in this section.

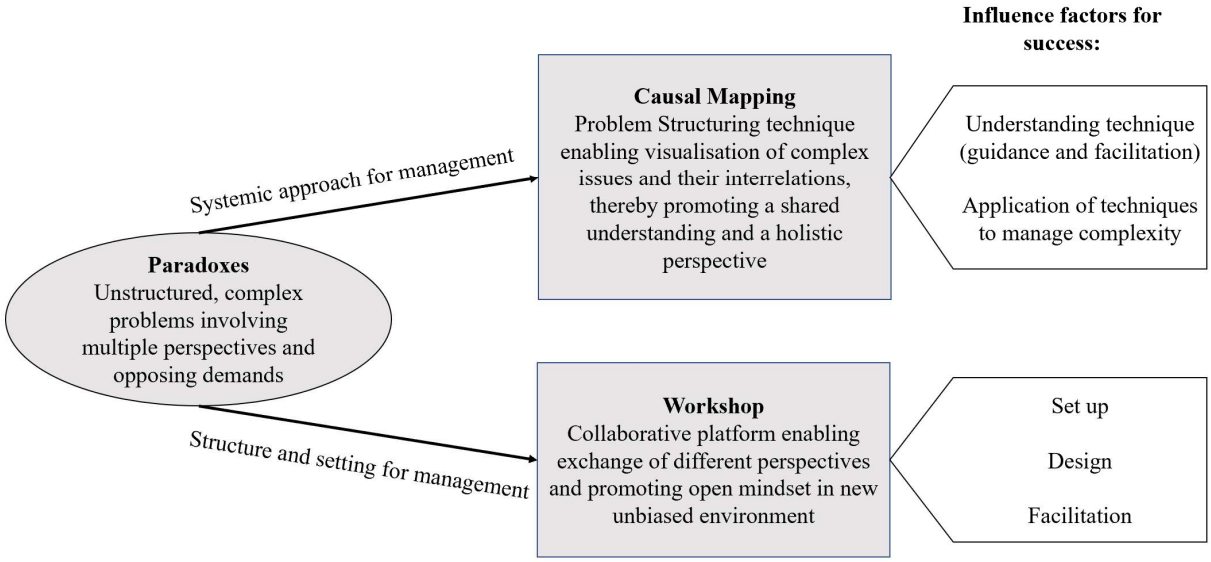

Figure 1. Theoretical pillars of the framework and their interrelations.
Source: own elaboration

2.2. Paradox Theory

2.2.1. Definition

In the literature, the word paradox is often used to describe "conflicting demands, opposing perspectives, or seemingly illogical findings" (Lewis, 2000, p. 760). Lewis defines paradoxes as elements which are contradictory, yet interrelated. In isolation, these oppositional tendencies seem logical. However, when appearing simultaneously, they are perceived as irrational, absurd or inconsistent (Lewis, 2000; Ford & Backoff, 1988). Smith and Lewis highlight that, similar to the taijitu yin and yang symbol, opposites or tensions can exist within a unified whole which encourages synergies by an external boundary while still allowing for an internal boundary creating distinction (Smith & Lewis, 2011). For instance, the paradox of individuality examines the tension between group conformity pressures and uniqueness: it suggests that a group only becomes a group by allowing its members to express their individuality (Miron-Spektor et al., 2017; Smith & Berg, 1986).

The words paradox and dilemma are often used in similar contexts and are related to a certain degree, yet not synonymous (Putnam et al., 2016). A dilemma consists of competing choices which offer various advantages and disadvantages. When these options are contradictory, but still interrelated, leading to eventually resurfacing tension, a dilemma can be considered paradoxical (Smith & Lewis, 2011).

2.2.2. Relevance of the paradox perspective

In our globalized world, most problems have multiple stakeholders trying to maximise competing values (Bozeman, 2007; Ackermann et al., 2016). This is especially true for the international business perspective, which encompasses commercial activities across national borders. Decision making often involves a variety of (culturally) diverse stakeholders and affects not only economic but also social variables. These complex issues often require models that go beyond linear problem solving and take diversity and ambiguity into account. Oversimplified or polarized concepts such as either/ or distinctions or thinking are emphasized by formal logic (Hampden-Turner, 1981), but can conceal sophisticated interrelations and thus do not do justice to the complexity at hand (Lewis, 2000). While choosing among competing tensions might offer suitable short term solutions, the paradox perspective suggests that multiple, divergent demands have to be met in order to ensure long term performance and sustainability of solutions (Cameron, 1986; Smith & Lewis, 2011). Furthermore, considering paradoxical perspectives can help to identify win-win situations preferable to sub-optimal solutions which neglect certain values or interests (Ackermann et al., 2016; Freeman et al., 2010). Therefore, managers need to learn how to recognize and deal with paradoxes in order to become comfortable with or even benefit from them (Lewis, 2000).

2.2.3. Paradox Management

Paradox management can be defined as the attempt to explore and understand paradoxical tensions and to thereby capture the potential energy and insights which can foster change (Lewis, 2000). Acceptance and resolution are powerful strategies for paradox management (Smith & Lewis, 2011). Acceptance means that stakeholders learn to accept or even appreciate paradoxical tensions as natural and persistent while changing their attitude towards rationality and linearity. This might offer a sense of freedom and comfort. Furthermore, perceiving paradoxes as unsolvable can lead to a more open discourse on tensions and enable creative considerations (Lewis, 2000; Smith & Lewis, 2011). Resolution strategies, on the other hand, seek to meet or consider competing demands simultaneously. This can be done by spatial or temporal separation as well as synthesis (Smith & Lewis, 2011). In a business context, spatial separation could mean to allocate opposing forces across separate organizational units. Temporal separation signifies prioritizing one pole of a tension over the other temporally before switching. The synthesis strategy suggests to explore a perspective that accommodates opposing points of tensions. In such management strategies, the existence of emotional and cognitive complexity of stakeholders is crucial (Smith & Lewis, 2011).

When not properly managed, stakeholders can provoke so called reinforcing cycles for tensions. In the following, some of them are named and explained. Splitting for instance can further polarize tension points, e.g. by creating artificial we/ they subgroups which veil similarities. Furthermore, stakeholders could project conflicting feelings onto a repository (projection) or block awareness for these tenuous experiences altogether (repression/ denial). When stakeholders revert towards old and familiar understandings and actions because they provide a certain comfort despite not necessarily being purposeful, they apply regression. Furthermore, stakeholders could decide to evade the threatening feeling caused by paradoxical tensions by excessively manifesting opposite feelings or actions (reaction formation). Lastly, ambivalence is a reinforcing cycle which seeks to find a middle ground between conflicting emotions without accommodating to the vitality of extremes (Lewis, 2000).

Table 1. Paradox management and reinforcing cycles.

Paradox Management	**Reinforcing Cycles**
Acceptance: accept or appreciate tensions to enable creative considerations **Resolution**: meet or consider competing demands simultaneously • Spatial separation • Temporal separation • Synthesis	**Splitting**: polarize tensions **Projection**: project feelings onto repository **Repression/ denial**: block awareness for tenuous experiences **Regression**: revert towards old mindsets **Reaction formation**: manifest opposite feelings to experienced tensions **Ambivalence**: find middle ground without accommodating to vitality of extremes

Source: own elaboration adapted from Smith & Lewis, 2011

Smith and Lewis developed the so called dynamic equilibrium model which consists of purposeful iterations between acceptance and resolution to manage paradoxical tensions. A frequent and dynamic shift in decision making as well as long term acceptance of paradoxes aims at meeting opposing demands simultaneously over time (Smith & Lewis, 2011).

2.2.4. Workshops and causal mapping for paradox management

A positive attitude towards paradoxical tensions can enable creativity and surface opportunities (Lewis, 2011). However, if the identification and management of paradoxes lacks a systemic approach, actors risk to miss out on those opportunities (Harris & Metcalfe, 2015) and establishing effectiveness and replication of successful practices becomes more difficult (Tsang & Kwan, 1999).

There are various strategies which support the identification and exploration of paradoxes. Lewis suggests representing them by using the methods of conceptualizing, mapping and theorizing (Lewis, 2000). Conceptualizing means setting up constructs which allow for simultaneous and interdependent contradictions and mindsets beyond polarity and linearity. Mapping can be a useful tool to display tensions and complexity by creating a dynamic and holistic depiction. Theorizing is a means to develop an understanding of interconnectedness and plurality by studying literature reviews or working on related case studies.

In the literature, various authors also mention the importance of open communication and experimentation to expose opposing viewpoints and foster discussions using a paradoxical lens (Vince & Broussine, 1996; Leonard-Barton, 1992; Lewis, 2000).

Taking these theories into consideration, a workshop could be an adequate means to address paradoxes and support their management. Workshops, when executed accordingly, can boost open communication as well as experimentation in a safe environment (see Chapter 2.3.). Participants could be presented with a case study to support theorizing and use cognitive mapping methods to understand and work through paradoxes.

The literature provides examples for the use of mapping techniques to capture and break down complexity in a workshop setting (e.g. Ackermann et al., 2014). However, paradox management elevated by cognitive mapping beyond their sole identification remains yet unexplored. Since cognitive mapping in a workshop setting proved to be a useful tool to achieve comprehensive views among a variety of actors (Ackermann et al., 2014), this thesis aims at examining how cognitive mapping in a workshop setting can support paradox management.

2.3. Workshop Theory

2.3.1. Definition

A workshop can be defined as an event which involves a small group of people, usually key stakeholders, working intensely on a practical topic in a limited time frame (Lipp & Will, 2008; Philipps & Philipps, 1993). They encompass a combination of group work activities arranged in a framework (Courtney, 2020). Workshops are often characterized by their cooperative and externally moderated nature (Lipp & Will, 2008). The overall goal is to support groups to develop a common understanding of issues and a shared commitment to act (Gregory & Room, 2001).

Lipp and Will (2008) distinguish between various types of workshops. Problem solving workshops aim at solving a certain problem of a group by first defining the problem and goals, analysing influence factors, develop possible solutions, present, evaluate and decide before concluding with a list of measures. Conflict resolution workshops are held to resolve a conflict between two parties by collecting positive aspects, analysing conflicting points, surfacing interests and discussing offers in a negotiation phase. Conception workshops aim at developing a new concept by achieving a shared understanding of underlying conditions and new variables and targets to consider, before exploring and evaluating various ideas. Decision workshops aim at facilitating decision making processes by exploring available options, developing criteria to evaluate them and narrowing down to the most favourable options (Lipp & Will, 2008). All these different kinds of workshops can potentially serve to identify and manage paradoxes, since they usually bring together a variety of perspectives and a complex issue to discuss. The workshop that was used for the case study can be categorized as a decision workshop, but also involves elements of a conception workshop.

2.3.2. Benefits and risks of the workshop setting

In order to properly use workshops as a means to address paradoxes, it is important to understand the benefits and risks they entail. The conflicting feelings and frustrations which can be released by paradoxes could hinder their effective management (see Chapter 2.2.). These difficulties also need to be considered in a workshop setting. Therefore, risks related to the workshop setting need to be addressed through a well thought out set up and competent facilitation. This way, risks can be reduced and opportunities exploited. The section below describes such potential risks and opportunities, since awareness is crucial to manage them.

Workshops can be useful means of learning and collaboration since they provide a platform for key stakeholders to unite and work on issues outside of their usual day to day business. This new environment and limited timeframe can promote intense focus on the topics discussed since participants are less likely to be distracted by daily business interruptions. Furthermore, since

key stakeholders are present and available, relevant perspectives can be considered and decisions can be taken immediately which increases time efficiency. By externally facilitating the process and team dynamics, workshops can allow for increased task orientation and thereby boost creativity and progress (Courtney, 2020). Overall, workshops can promote the efficient development of a shared commitment to act.

However, the workshop setting also bears certain risks. For instance, the limited timeframe and resources available can be challenging and require a realistic goal setting for the workshop as well as appropriate time management for the planned activities. Furthermore, group work can lead to undesirable group dynamics such as group think which is defined as "a deterioration of mental efficiency, reality testing, and moral judgement that results from in-group pressures" (Janis, 1972, p. 9) or "the psychological drive for consensus at any cost" (Ottaviani & Sorensen, 2001, p. 394). This is the result of psychological processes which make individuals seek for group acceptance at the expense of their uniqueness (Philipps & Philipps, 1993). In consequence, alternative and possibly valid perspectives are neglected and the apparent consensus reached is illusionary. It is important to create a climate in which participants feel comfortable to question, disagree with and critically evaluate statements made to avoid group think (McAvoy et al., 2013; Janis, 1972; Von Bergen & Kirk, 1978). Furthermore an external facilitator can support the group in managing anxiety and frustration and increasing their tolerance towards these emotions (Philipps & Phillipps, 1993).

The following table sums up the benefits and risks of workshops, which conditions lead to them and how to manage them.

Table 2. Benefits and risks of workshops.

Workshop conditions	**Potential beneficial implications**
• Key stakeholders are present and available • New environment and short timeframe • No interruptions or distractions • Process is facilitated externally	• Decisions can be taken immediately • Intense focus and task orientation • Efficient development of a shared commitment to act
Workshop conditions	**Potential disadvantageous implications**
• Limited timeframe and resources • Dynamics in group work	• Expectations of workshop outcome are unrealistic • Illusionary consensus and suboptimal solutions due to group think
Recommendations to manage benefits and risks	
→ Exploit benefits through adequate facilitation and workshop design → Manage expectations about workshop outcome and adjust activities to time frame and resources → Promote open environment which allows for questioning of ideas and disagreement	

Source: own elaboration

2.3.3. Workshops as a means towards consensus building and workable certainty

As explained in Chapter 2.3.2., workshops offer some unique benefits for collaboration. Usually, when conducting workshops organisations hope to develop future measures to be implemented thereafter. Workshops are supposed to enhance the productivity of their participants and thereby enable effective collaboration and fast solution finding (Beermann & Schubach, 2019). Since they constitute a platform for multiple stakeholders to exchange in a new setting, they have the potential to promote consensus building among them, which is a relevant factor for tackling complex issues such as paradoxes.

Consensus can be defined as unanimous agreement achieved by efforts to include the perspectives of different stakeholders and to meet their interests (Susskind et al., 1999). A certain degree of consensus and satisfaction with the solution developed within a workshop is considered desirable, since research suggests that group consensus in decision making is necessary for successful implementation as well as for the intermediate and long-term productivity of the group (Priem et al., 1995).

There are certain limitations involved in reaching a consensus and having a group approve a solution. First of all, group consensus does not necessarily lead to the objectively best outcome due to undesirable group dynamics, such as groupthink. Secondly, reaching full consensus among all participants in the limited timeframe of a workshop can be challenging; therefore, the workshop design should seek rather to reinforce general agreement among a majority centred around achieving workable certainty. The concept of workable certainty means that groups manage to tackle one action at a time. This gives them flexibility for behavioural complexity, meaning that they can respond to a variety of situations which might require contradictory behaviours and thereby reflect existing paradoxes in their reactions (Lüscher & Lewis, 2008). Even though opposing behaviours are displayed, the group can still retain integrity and credibility under the premise of workable certainty (Denison et al., 1995; Jay, 2013). This concept matches the nature of paradoxes and related paradoxical thinking, which requires such behavioural complexity (Denison et al., 1995).

2.3.4. Group Building and Trust in Workshops

As explained in Chapter 2.2., paradoxes can represent challenging issues for a group to manage as they can release conflicting feelings such as frustration and anxiety (Lewis, 2000). This demanding environment requires a group to collaborate efficiently. Trust is an important prerequisite for successful collaboration and is usually established during the group building process (Bond-Barnard et al., 2017; Tuckman, 2001).

According to Tuckman, group building consists of various phases called forming, storming, norming and performing which have to be overcome for a group to become a team and tackle challenges (Tuckman, 1965). The phases are characterized by testing boundaries and trust

building towards more acceptance of other team members and enhanced competence and autonomy to address the problem at hand (Tuckman, 2001). A group where members already know each other can benefit from a certain degree of established trust among them which in turn renders time consuming activities to reduce transactional distance or set climate unnecessary (Dixon et al., 2006). However, it is still important to note that even if the participants know each other, new situations and circumstances might still require a group to repeat certain stages of the group forming process (Tuckman, 2001). In the paradox context, a group could particularly benefit from established trust among its members due to the demanding circumstances the group is confronted with. While conflicting emotions and frustrations can be advantageous or even required for creative and effective task performance (Philipps & Philipps, 1993), trust can boost group performance in this challenging setting (Dirks, 1999).

These insights are relevant when explaining the benefits and limitations of the sampling strategy for the conducted case study (see Chapter 3.5.).

2.3.5. Workshop Design

The prerequisites and design of a workshop are major factors for its success and can reduce uncertainties, particularly when complex issues such as paradoxes need to be addressed. Group size, environment and structure need to be carefully thought out.

The literature suggests, that a group size of 7 to 15 participants is ideal for decision conferencing as it enables the group to work creatively in the limited timeframe. A group of this size represents different perspectives which can be discussed in a constructive way while still being small enough to reach workable certainty since individuals have the opportunity to express their views. A high level of participation towards a common understanding is allowed for and boosts the feeling of group ownership (Philipps & Philipps, 1993). Psychological ownership is a state in which individuals experience that the material or immaterial target of ownership – in this case the outcome of the workshop – is theirs (Pierce et al., 2001). This sense of possession "triggers affect-driven behaviours" (Yttemyr & Wennberg, 2021, p. 309) which have shown to improve group performance, e.g. by encouraging a sense of organizational commitment, emotional wellbeing or increased work ethic (Mathieu et al., 2008). Therefore, increasing the sense of group ownership is advantageous.

The environment or physical setting in which the workshop takes place also affects its effectiveness. A group can best concentrate on the task at hand in a focused environment. For instance, the facilities used should allow for eye contact among all group members as well as clear sight lines to visual aids used. Noises or distractions should be avoided. Comfortable chairs, appropriate lighting and refreshments can further foster group focus (Philipps & Philipps 1993).

The workshop structure sets limits and boundaries needed for effective group work. A reasoned agenda with strategic meeting and break times sets temporal boundaries. Furthermore, task

boundaries seek to sequence and connect group activities appropriately. This can be done by dividing big tasks into more workable fragments and finding a reasonable way to integrate them in the overall process (Philipps & Philipps, 1993).

The workshop framework developed by Courtney aims at enabling task orientation by eradicating unproductive busywork and facilitating the process and team dynamics. Scenarios of open discussions or team collaboration are considered time consuming and prone to groupthink (see Chapter 2.3.3.) and are therefore sought to be avoided (Courtney, 2020). Instead, Courtney introduces the principle of "together, alone" (Courtney, 2020, p. 29) which emphasizes individual work without group discussions or negotiations towards a shared goal. Furthermore, the methods used often provide a certain anonymity in order to avoid participant bias and enable more courageous suggestions. For instance, participants can submit or vote for ideas anonymously to ensure that content is considered separately from its creator, enabling the group to remove bias and groupthink and instead prioritize the quality of ideas (Courtney, 2020). Another principle is to boost creativity through workshop design in order to enable all participants to develop innovative solutions, regardless of their perceived inherent creativity (Courtney, 2020).

The framework consists of four phases: collect, choose, create and commit. During the first phase, participants define the scope of work for the addressed project by collecting information, whether that might be challenges, ideas or data. This information is then visualized in a comprehensive way. The choose phase gives the group an opportunity to reduce the scope by setting their focus on certain ideas while disregarding others to give direction and foundation to the group work. During the create phase, the group develops multiple potential solutions to the problem. The commit phase then serves to derive actionable takeaways, a plan of action or next steps which the group agrees to execute (Courtney, 2020). Various alternative frameworks could be used to create a workshop. The framework of Courtney, however, offers hands-on guidance for a wide variety of cases, proved to be effective in practice and seeks to avoid undesirable group dynamics (Courtney, 2020) and is therefore used as a blueprint for the workshop developed for this thesis.

2.3.6. Facilitation

Workshop facilitation plays a key role in enabling effectiveness and efficiency of a workshop. Facilitation can be defined as supporting a group in achieving their goal independently. It seeks to promote active participation and to reveal and include a variety of perspectives by providing a methodical, physical and temporal structure. Facilitation also entails ensuring that participants can overcome undesirable dynamics of interaction and communication (Kaner et al., 1996). This way, the group can focus on the task at hand while process and dynamics are taken care of externally (Courtney, 2020).

Facilitation is different to both, moderation and leadership. Unlike moderation, facilitation does not seek to influence or judge. Instead, facilitators take a neutral and impartial position. Facilitating requires process competence related to groups, change processes and conflict management as well as methodical expertise for communication and creativity (Schwarz, 1994). Facilitating a group can also clearly be distinguished from leading it. While a leader is concerned with the content and operation of group work, a facilitator is not involved in such activities. The facilitator supports the group in the decision making process while a leader is accountable and responsible for decision making (Philipps & Philipps, 1993).

One of the facilitator's key tasks, apart from workshop preparation and guidance, is to observe verbal and non-verbal group behaviour. However, they do so without voicing related interpretations to the group. Instead, facilitators comply to the role of helping externally and use the observations as implications for action (Philipps & Philipps, 1993). As mentioned before, workshops that involve paradoxes can be challenging for participants and bear the risk of frustrations and anxieties arising due to opposing feelings. Competent facilitation can minimize this risk and enable participants to unfold their full potential when managing paradoxes.

2.4. Cognitive mapping

As explained before, cognitive mapping represents a problem structuring technique which could prove to be useful for paradox management in a workshop setting, because complex issues and their interrelations can be illustrated and understood using a systemic approach.

2.4.1. Definitions

Unstructured problems involve multiple actors and viewpoints, divergent or conflicting interests as well as major uncertainties (Rosenhead & Mingers, 2001). In this sense, they display many characteristics that often apply to paradoxes. Problem structuring methods aim at offering decision support for such problems by providing ways to represent the complex situation comprehensively, identify the common issue within and commit to potential solutions (Mingers & Rosenhead, 2004). Therefore, a problem structuring method should allow for several different perspectives to be juxtaposed. Furthermore, it should be cognitively accessible to actors without requiring special trainings or backgrounds in order to enable participation and inclusion of perspectives. An iterative way of operation allows for the problem structuring method to represent the problem and its solving process dynamically and a somewhat decentralized nature enables partial or local improvements which do not necessarily require a global solution to the issue at hand (Mingers & Rosenhead, 2004).

Cognitive mapping is a problem structure approach which unifies three corollaries: individuality, commonality and sociality. Individuality is the unique interpretation of involved

individuals which is expressed and interpreted using a shared language shaped by common understanding (commonality). Sociality represents the common understanding towards a shared goal. In essence, cognitive mapping supports actors to express their individual perceptions and convert them into an interconnected and holistic representation to develop a common awareness and understanding (Ackermann & Alexander, 2016).

Causal mapping is a subcategory of cognitive mapping which focusses on causal connections between items. A causal map is a diagram consisting of statements or perceptions, also referred to as nodes, and arrows which indicate an influence relationship between them (Eden, 1992). This representation supports groups to visualize many different statements, such as values, goals or actions, as well as their implications and interconnections (Ackermann et al., 2016). Exploring the interdependency and causality of issues can help the group to grasp potential consequences of issues and therefore offer a structured approach towards more certainty in problem solving (Ackermann & Alexander, 2016).

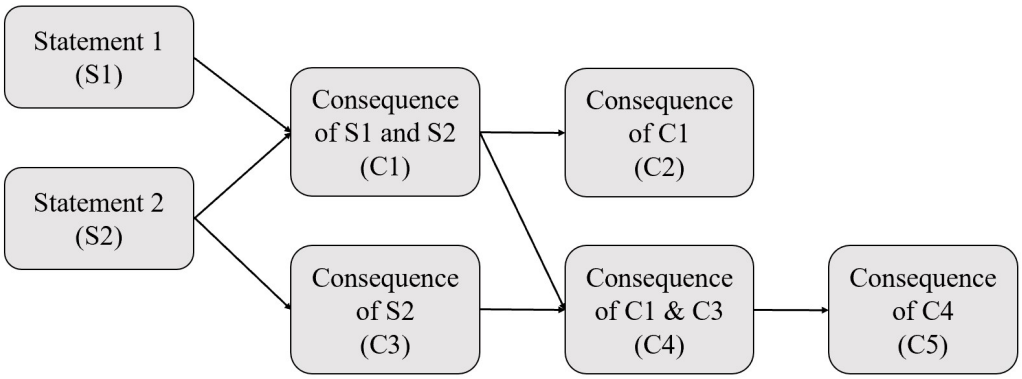

Figure 2. Example of statements and links within a causal map.
Source: own elaboration

2.4.2. Causal mapping in workshops

Causal mapping is a collaborative technique, enabling individual and group contributions. It benefits from and relies on group process facilitation to unfold its full potential. Therefore, a workshop could be the right setting to use this technique and capitalize on its opportunities. Facilitated communication as well as appropriate visual representation support the group to literally see and follow what individuals are saying, to understand each other's perspectives and develop a shared language and eventually common agreement (Ackermann et al., 2016). Due to its reliance on facilitation and its collaborative nature, causal mapping is a suitable tool to be integrated in a workshop setting. It can provide a means for reflecting a broad variety of perspectives, how they are intertwined and subsequent analyses. This abundant network of dynamics helps participants to manage complexity, reduce uncertainties and develop practical solutions to complicated and unstructured problems (Ackermann & Alexander, 2016). Harris

and Metcalfe used mapping techniques in a workshop setting to identify paradoxes and thereby laid the foundation for further research in this area (Harris & Metcalfe, 2015).

While the creation of causal maps can be resource intensive with regards to labour and time needed, developing them in a workshop can be resource efficient if appropriately facilitated and given key stakeholders are present. Under these conditions, causal maps can be created and analysed and conclusions drawn in a matter of hours (Williams, 2004). However, it can be challenging for untrained participants to learn, get used to and apply the causal mapping technique. Therefore, it might make sense to introduce them to this method using synergies with traditional methods (Ackermann & Alexander, 2016).

2.4.3. Managing complexity in causal maps

As described before, cognitive maps can be a useful tool to visualize and break down complexity, which is particularly interesting in a paradox context, involving multiple interests and connections. Below, strategies to manage complexity in causal maps are described, since they could be relevant techniques to support the workshop participants and simultaneously give insight into the purpose of causal maps in complex contexts.

Generally, a high number of elements and links in a causal map stands for great structural complexity. Data elicitation, structuring and analysis are tools to capture and understand this complexity (Ackermann & Alexander, 2016). Data elicitation means collecting and exploring large quantities of qualitative data to support various perspectives, develop a common vision, pinpoint conflicting as well as coinciding viewpoints and identifying solutions which consider different interests, opportunities and risks. Laddering is a causal mapping technique which can be used to deepen comprehension by continuously asking for consequences (laddering up) and explanations (laddering down) of statements to surface underlying causal relationships. Structuring data enables actors to achieve a holistic and systemic view which includes statements as well as their interconnections. Lastly, reflection and sense making encourage the emergence of deep, tacit knowledge (Ackermann & Alexander, 2016). Both, laddering and visualization support this process, further amplified by participant interaction with the map, following the guideline of "how do I know what I think until I see what I say" (Eden & Ackermann, 1998). Analysing existing statements and relations of the map can help participants to identify patterns or interconnections to new data. Furthermore, the map might inspire them to dig deeper, go beyond initial presumptions and question old beliefs (Ackermann & Alexander, 2016).

All these factors could support participants in developing a positive and open mindset towards paradoxes, thereby facilitating both, acceptance as well as resolution strategies and thus, successful paradox management.

2.5. Context Summary

Chapter 2. of this thesis examined the context of the case study and sought to explain the relevance of paradoxes and their management as well as why causal mapping and workshops were considered an adequate approach and platform for this purpose.

Paradox theory was the starting point since paradox thinking gained relevance in the business world due to more complex challenges arising with globalisation and involvement of many different actors. As paradoxes often occur in settings which bring together a variety of perspectives, the workshop was chosen as a setting to address them in a cooperative and potentially efficient way. While the literature lists various management strategies for paradoxes, actors often still seem to lack a systemic approach to tackle them. This lack of a systemic approach can reinforce related anxieties and stress and thereby impede a productive management of paradoxes (Poon & Law, 2020). This research gap is addressed in the scope of this thesis by examining how causal mapping can serve as a systemic means for paradox management.

Cognitive mapping was considered potentially effective, because paradoxes represent unstructured problems which require problem structuring methods. Due to its cooperative, iterative and visual nature, causal maps seem to be adequate tools to break down complexity, reflect different and potentially opposing perspectives and their interrelations. These conditions match the essence of paradoxes and have proved to be beneficial for their identification (Harris & Metcalfe, 2015). Besides the opportunities offered by both, workshops and cognitive mapping, for paradox management, risks were considered as well to understand potential limitations of the methods used.

3. METHODOLOGY

3.1. General process description

3.1.1. Qualitative research design

This thesis consists of various parts which serve to examine how causal mapping can support paradox management in a workshop setting in a holistic and exhaustive way. A literature review provided the necessary context, before a case study was developed and later analysed to draw final conclusions. The research design follows Creswell's qualitative research model for case studies (Creswell, 2013).

The research question was defined to examine how causal mapping can support paradox management in a workshop setting. A qualitative research design is appropriate to answer this question, since the topic needs to be explored in a way that allows to identify variables which might be difficult to measure. Furthermore, qualitative research enables researchers to consider

and understand the context and setting of the issue (Creswell, 2013). Since the workshop setting is explicitly included in the research question, it is reasonable for this case to embed the problem in its setting. Additionally, the thesis seeks to observe and analyse experiences and interactions to answer the research question. A qualitative research design therefore constitutes a good fit for the problem (Creswell, 2013).

The figure below summarizes the methodology of the thesis.

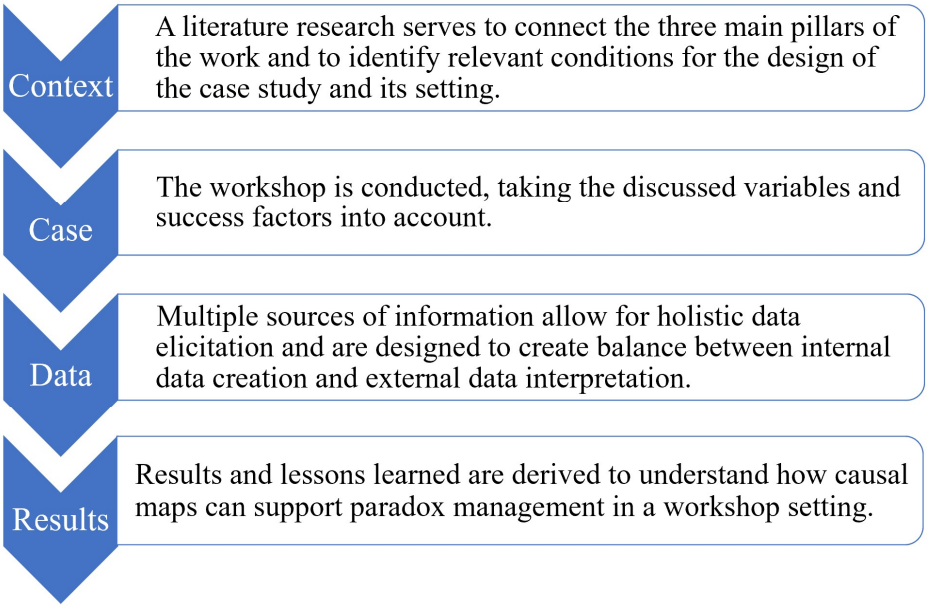

Figure 3. Summary of methodology.
Source: own elaboration

3.1.2. Literature research

In the first step, a literature research was conducted to identify a research gap and according question and define the scope of the project. The literature review on paradox theory, workshops and cognitive mapping was centred around seminal works from the respective fields (e.g. Ackermann et al., 2016; Eden, 1992; Lewis, 2000; Philipps & Philipps, 1993).

The literature research showed that a systemic approach can support the identification and management of paradoxes (Harris & Metcalfe, 2015). However, paradox management through the problem structuring method causal mapping in a workshop setting remain yet unexplored, even though this approach and setting seem to offer interesting benefits worth examining in the paradox context. For instance, causal mapping can help to visualize and understand paradoxical issues through a systemic approach and workshops provide a collaborative platform for stakeholders to share their perspectives and develop a shared commitment to act and thus, manage the paradox at hand.

The literature research provided the necessary theoretical context to explore how causal mapping can support paradox management in a workshop context and to develop the case study.

3.1.3. Case Study: set up and analysis

A case study is an "empirical inquiry that investigates a contemporary phenomenon (the case) in-depth and within its real-world context" (Yin, 2014, p. 16). It serves to understand a case within its context, particularly when the case cannot be fully separated from its background are (Yin, 2014). Since this thesis seeks to examine paradox management in a particular setting, namely the workshop, and through the practical approach of causal mapping, the case study was considered a suitable methodology to address this research question.

Once context was given to the case study through theoretical findings of the literature review (see Chapter 2.), the case study and its subsequent analysis had to be thought out and performed.

The case study of this thesis involves a contemporary case which is analysed to derive current information to the issue at hand: causal mapping supporting paradox management in a workshop setting. In this instrumental case study, one case was selected to illustrate the issue. The case is bounded by time since it covers a 90 minutes workshop session and place as it involves the students which were participating and present the relevant date (see Creswell, 2013). While considering only one single workshop leads to reduced generalizability of the results (Glezne & Peshkin, 1992), the enhanced focus enables an in-depth research and analysis of the case (Creswell, 2013).

In order to set the case study up in a reasonable way, academic papers as well as practical guides on workshops and facilitation were studied to develop a framework which enables favourable conditions for paradox management. As described in Chapter 3.9., Courtney's framework (Courtney, 2020) was used as a general structure and complemented by findings on group dynamics, physical setting and facilitation (e.g. Philipps & Philipps, 1993).

After designing the workshop, it was held and used as a means to gather qualitative data on participant behaviour, opinions and solution finding in relation to paradox management. In line with guidance for qualitative research methods, multiple sources of information were used to collect data (Creswell, 2013). The sources include participant observation, documents, interviews in the form of questionnaires and physical artifacts (Yin, 2009). Subsequently, the results were analysed and interpreted using methods suggested by literature (see Chapter 4.) to then draw final conclusions and lessons learned (Creswell, 2013).

3.2. Desired outcome of case study and criteria for success

In line with the research question, the general aim of the case study was to observe the paradox management of the participants. Research suggests that systemic methods which enable the reflection of interconnectedness and contradictory tensions facilitate the comprehension of complex issues, identification of paradoxes as well as anticipation of their consequences (Harris & Metcalfe, 2015). Therefore, the underlying assumption was that participants are best equipped to manage paradoxes if they gain a common understanding and acquire a big picture of the issue at hand, in the belief that meeting these prerequisites allows them to identify and respond to the paradoxes. The causal map they create is understood to support this process and to help them develop a satisfactory solution based on a certain degree of consensus or workable certainty (see Chapter 2.3.3.).

In the context of this thesis, paradox management, even though potentially difficult to observe, is eventually understood to support the workshop participants in their ability to develop a shared commitment to act for the problem at hand. The following criteria were considered relevant to assess whether participants were successful at solving the problem and thus, at managing the paradoxes they were confronted with: Participants first needed to gain a common understanding of the issue to address. Then, they needed to develop a holistic view involving different and new perspectives of the issue. These considerations should then enable them to develop a sophisticated solution which they are generally satisfied with and agree to pursue and ultimately, derive a shared commitment to act. These aspects are summarized in a figure and further elaborated below and lay the foundation for the results of the case study and their interpretation.

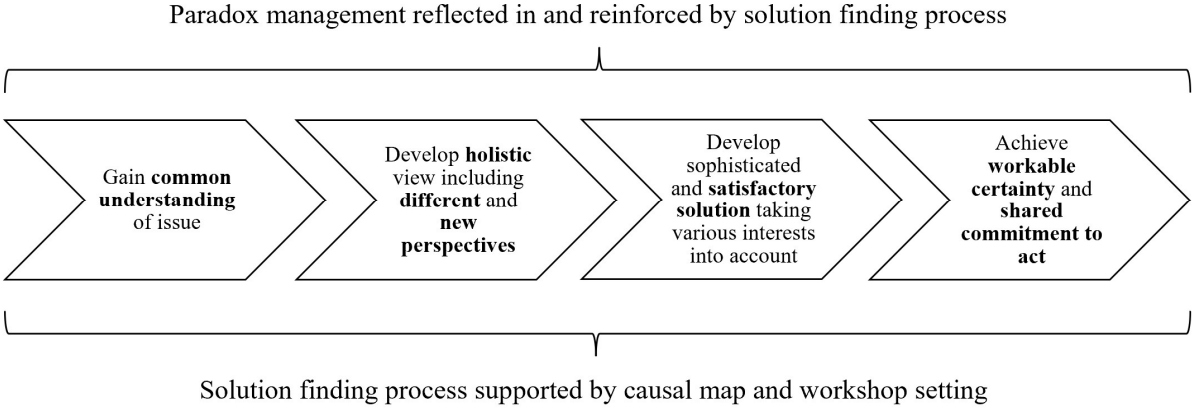

Figure 4. Desired outcome of case study.
Source: own elaboration.

Gaining a common understanding of the issue represents the first step towards consensus building, since it encompasses agreement on certain definitions as well as the identification and prioritization of issues to address. In order to enable the process of building common understanding in the group, participants need to feel comfortable enough to ask questions, raise concerns and clarify misunderstandings. According to the facilitators' background information,

the participants already had a certain level of trust in each other, since they attend the same study programme, know each other and, reportedly, get along well. This should, therefore, be a favourable situation for open communication, one that was reinforced by the facilitator encouraging participants to speak up whenever a question arises. However, the workshop was designed in accordance with workshop literature, which suggests limiting group communication and focusing on individual work activities instead (see Chapter 2.3.5.). While this strategy might be efficient in terms of timing, it could hinder the building of a common understanding.

The holistic perspective adopted helps participants understand the interconnected nature of the issues addressed, thereby making them aware of the need to anticipate the consequences related to the problems and suggested solutions. The causal map should help support this process, since participants can draw lines to connect items and indicate the interrelationship between these items. A holistic view is reflected by systemicity in the causal map, meaning that relationships between items are identified and considered (Ackermann et al., 2014) . While a large number of items and connections should increase the holistic nature of the map, it could also lead to a complexity which impedes the participants from summarizing or prioritizing issues. Clustering could be used as a technique to overcome this difficulty in part (Ackermann et al., 2014).

Lastly, as explained in Chapter 2.3.3., satisfaction with the solution and workable certainty are expected to positively affect the implementation process with follows the workshop. The participants of this workshop were asked to work on a fictional task and, obviously, would not be expected to implement the solutions suggested. Nevertheless, this thesis seeks to derive outcomes that are applicable to organizational workshops; thus, implementation and long-term group performance are still considered relevant factors. Consensus building bears the risk of undesirable group dynamics (see Chapter 2.3.3.). The workshop design seeks to avoid this issue by applying techniques that are discussed in Chapter 2.3.5..

A shared commitment to act which is reached through a satisfactory solution based on shared understanding and holistic considerations could be a strong indicator for successful paradox management in the workshop. Apart from the solution itself and the participants' satisfaction with it, the solution finding process also reflects and reinforces paradox management. For instance, certain observed behaviours might match the paradox management strategies or reinforcement cycles discussed in Chapter 2.2.3. and could be interpreted accordingly. Furthermore, the openness of participants towards different perspectives and their interaction with the causal map could show whether they are willing and able to understand interrelations between items and consider and meet opposing needs.

3.3. Data collection and interpretation

The process that was used to gather and analyse qualitative data on how causal mapping can support paradox management in a workshop setting consisted of various steps. The following

documents were used to capture data: a pre-workshop questionnaire for participants, a post-workshop questionnaire for participants, facilitator notes on participant behaviour and the map and solution developed by participants (see Annex C to F). The research design therefore follows the recommendation to draw from various sources of information (Creswell, 2013, Yin, 2009). The table below summarizes the rationale behind and the limitations of the individual data collection methods.

Table 3. Data collection methods – rationale and limitations.

	Author/ Perspective	**Rationale and implications**	**Limitations**
Pre-workshop questionnaire	Filled in by participants	Data on group diversity, consent form, paradox management tendencies	Response bias, not fully anonymous
Post-workshop questionnaire	Filled in by participants	Feedback on workshop and process, self-assessment on paradox management and its prerequisites	Length of questionnaire might lead to systematic responses, response bias
Facilitator notes	Created and interpreted by facilitator	Outside perspective, observe/ give context to individual behaviour and group dynamics, draw conclusions for paradox management	Subjective, not all behaviours observable, behaviours might not reflect internal emotions
Map	Created by participants, interpreted by facilitator	Analyse prerequisites of paradox management (e.g. systemicity or inclusion of perspectives)	Facilitator interpretation might not reflect the group's intention
Solution	Created by participants, interpreted by facilitator	Analyse diversity and innovation of solutions, patterns and priorities which indicate paradox management strategies used	Facilitator interpretation might not reflect the group's intention

Source: own elaboration

The process of data collection aimed at creating a balance and symbiosis of group internal data creation and its subsequent external and informed interpretation. The figure below shows the perspectives reflected in the data collection and interpretation process. While the conditions for data collection are set by the facilitators, the participants enable data collection by creating content in the form of direct feedback, display of behaviours or physical content created during workshop activities. This data is then interpreted by the facilitators. This approach follows Berg's cycle of communication model which suggests that the activities conducted by the work

group are first influenced by the facilitator's instruction and then also externally explained. This implies that workshop outcomes and their interpretation rely on both, internal and external forces (Berg, 2014). It is important to note that an inherent limitation of case studies, and therefore also of this work, is that their interpretation is always subject to individual perceptions of the respective researchers (Creswell, 2013).

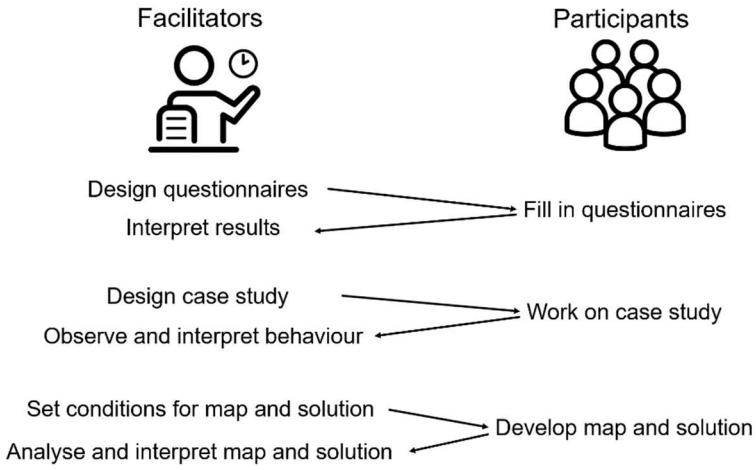

Figure 5. Perspectives and task division in data collection and interpretation.
Source: own elaboration

The pre-workshop questionnaire was sent out to the participants digitally two weeks prior to the workshop. It consisted of information on the workshop and the research behind it, a consent sheet for the participation and related data collection and some questions to capture the group diversity and individual motivation to participate as well as preferences with regards to paradox management. The aim was to inform participants about the event to reduce uncertainties and to get a sense of how comfortable the group is in dealing with paradoxes to anticipate potential frustrations or behaviours.

The post-workshop questionnaire was handed out to all participants in paper directly after finishing the last group activity of the workshop. Participants could give feedback on the workshop itself as well as a self-assessment on the determined prerequisites for paradox management and their satisfaction with the solution they developed. This feedback served to capture the participant's perspective on their behaviour and the working process.

The facilitator notes aimed at adding an informed outsider perspective centred around participant behaviour to the data collected. Facilitators were instructed to put a special emphasis on comprehension, holistic big picture view and paradox management when observing participant behaviour. However, the template was designed to allow for maximum flexibility in note taking. This approach could be categorized as structured observation in terms of variables, but still includes elements of unstructured observation as notes can be taken in a free and open manner (Dudovskiy, 2016). A limitation of the facilitator notes is that they are a time

consuming data collection method and can be somewhat subjective due to observer bias (Dudovskiy, 2016). Furthermore, behaviours might not always be obvious or observable and expressed behaviours do not always reflect internally experienced emotions (Philipps & Philipps, 1993). However, they also offer clear advantages: research phenomena can be accessed directly with great levels of flexibility to record them (Dudovskiy, 2016). In this context, it is interesting to note that one facilitator knows the participants since they attended his lectures and can therefore provide some background and anticipate group dynamics, while the other facilitator does not know the participants which might add some objectivity. In spite of imperceptible dynamics which the facilitators might miss, facilitator notes are still regarded a valuable addition to the data collected due to their external and informed perspective.

The map and solution developed by the participants were also analysed to derive relevant conclusions. The literature suggests various indicators for the interpretation of causal maps. For instance, systemicity can be quantified by comparing the number of statements to the number of links. There might be certain items with more numerous links than others, which shows how interconnected or isolated statements are. Furthermore, the form of the map indicates whether participants aimed for a wide, but superficial examination of the issue or rather a profound in depth analysis of few items. The relation between statements made and number of participants can provide insight into the variety of perspectives included (Ackermann et al., 2014). The detection of clusters shows whether the map consists of isolated parts or rather a highly interlinked network. Furthermore, the so called domain analysis calculates the number of connections towards and originating from nodes, to determine which nodes are particularly cognitively central (Eden & Ackermann, 1992). It might also make sense to compare the map to the final solution developed by the participants. This way, one can check whether key ideas were reflected in the map and therefore originated in the mapping process.

A final solution sheet was handed out to both groups in the commit phase (see Annex H). It served to capture and refine their final solution ideas. The format (see Annex B) encouraged participants to weigh the three solutions they developed so that each solution compensates for a certain percentage of the gas imports. These percentages indicate whether participants perceive the individual solutions as equally valuable. Furthermore, the template required the groups to summarize each solution by formulating specific measures as well as pros and cons. The aim was to create certainty about potential future actions and their implications, as required for an organizational learning workshop. When looking at the pros and cons of the different solutions, patterns could be detected as to how diverse or similar they are. This, in turn, indicates whether certain values or interests were prioritized by participants or whether they tried to meet all needs simultaneously. Overall, analysing the solution can give information on how participants approach paradox management.

3.4. Survey design of questionnaires

The questionnaires were created taking various concerns into account. First of all, the feedback was collected in a manner which allowed for anonymity. Research suggests that participants of surveys are less concerned with social desirability and anxiety when anonymity is ensured, which might lead to more truthful responses. This effect is even stronger when filling in an online survey instead of a paper form (Joinson, 1999). For the post-workshop questionnaire, a paper form was handed out in order to speed up data collection and participation in the survey with the workshop in fresh memory. However, anonymity was still provided since the questionnaire did not include any personal data, thus replies cannot be traced back to any individual. Instead, personal data was collected on a separate sheet in the beginning of the workshop, to track group diversity. The pre-workshop questionnaire was internet-based, but participants gave information on their gender, age and nationality which might have increased concerns about social desirability and anxiety on the remaining questions, especially for those individuals that are outliers in terms of age or nationality and could therefore easily be identified.

The questions of the post-workshop questionnaire were selected taking paradox management and the related defined pre-requisites as well as satisfaction with the workshop and outcome into account. In contrast, the pre-workshop questionnaire was shorter and focused only on paradox management and related preferences. The questions were carefully worded to avoid confusion. For instance, the term “paradox” was avoided and instead paraphrased in more tangible ways (e.g. “conflicting interests or demands”).

The sequence of questions in the post-workshop questionnaire was also considered. The relatively high number of questions could lead to decreasing quality in responses due to participants losing focus and producing systematic responses (Herzog & Bachmann, 1981). Therefore, the questions on satisfaction with the solution found, which were deemed particularly important as they could indicate overall success, were placed at the beginning. Questions were clustered according to their textual value or pre-requisite and the survey concluded with general questions on satisfaction with the workshop, its setting and facilitation.

Regarding the design of the questions, a rated response system was used in order to ensure simplicity for the user and comparability of results. Participants could indicate their agreement to the statements made in the survey on a scale from 1 (strongly disagree) to 5 (strongly agree), while 3 was a neutral option for neither agreement nor disagreement. The statements were all formulated in a way that linked agreement to a desirable outcome in order to avoid confusion. This survey design could lead to response bias towards social desirability and appearing agreeable (DeMaio, 1984), which needs to be considered when analysing the results. For instance, selecting the supposedly neutral option could already indicate a certain degree of disagreement or signal that participants did not fully understand the question. Annex B shows an example of the rated response system used for the question design.

At the end of the post-workshop questionnaire, participants were provided with space for additional remarks to give them the opportunity to comment on concerns they regard as relevant but do not see covered accordingly in the survey.

3.5. Case study sampling: selection of participants

Students enrolled in an undergraduate management course within the Hispanic Studies program of a large public university were invited to join the workshop. Students may participate in this course as part of a study abroad program or independently. A majority of its students is from the United States.

The sampling for this case is both, purposeful and convenient. It can be considered purposeful (see Creswell, 2013), because the students participate in a management course in an international setting and are therefore likely to be confronted with paradoxical tensions during this experience as well as in their professional future (see Chapter 2.2.2.).

Since one of the facilitators taught a course for this programme, the students were easily accessible and the workshop could be included as part of the lecture, rewarding participating students with a participation grade. Students not wishing to participate were offered an alternative activity worth the same grade of approximately equal effort. This approach can be considered convenience sampling (Edgar & Manz, 2017) and has certain advantages and disadvantages for this particular case.

One advantage is that the lecturer already has background information about individuals and how they interact as a group. This enables him to place behaviours observed as a facilitator in a context, compare them to previously observed dynamics and derive corresponding conclusions. Having said that, the other facilitator does not know the participants, which might reduce bias and add a somewhat objective and external perspective in observing their behaviour. Furthermore, the participants already know each other fairly well, which can facilitate the group building process (see Chapter 2.3.4.).

However, the convenient sampling also bears certain disadvantages. First of all, the sample size is limited and the group consists of undergrad students with similar backgrounds. This bears the risk of missing diversity and means that the results of the case study are not necessarily applicable to other groups and contexts. This needs to be considered when drawing conclusions, since they might give certain indications, but still depend on the individual situation. Additionally, some participants might be motivated by extrinsic factors, in this case the participation grade, instead of intrinsic factors such as interest in the topic and workshop. This might adversely affect their engagement in the workshop. Even though researchers have argued that human motivational factors are too multifaceted to be solely divided into two categories, extrinsic incentives were found to undermine intrinsic interest and enjoyment in some studies. However, other studies report no such effect (Reiss, 2012). Lastly, the fact that the group

members know each other can lead to bias from former critical personal views or negative experiences (Powell & Single, 1996).

3.6. Selection of workshop topic

Several aspects were considered when developing the workshop topic. First of all, the topic had to include a number of paradoxes so that participants could come up with a multifaceted solution to address conflicting demands. In line with Mingers definition of unstructured problems, the topic involved multiple actors and perspectives, conflicting interests and major uncertainties which provided a high level of complexity (Mingers, 2004). Furthermore, to address the course objectives, the topic had to have some relation to the field of studies of "International Business". Finally, it had to serve to boost the participants' intrinsic motivation and sense of ownership. Since intrinsic motivation is based on an inherent need to be competent and self-determining, this objective was sought to be achieved by providing some topical relevance and direct or indirect impact on the participants' lives and experiences (Deci & Ryan, 1985). Taking these criteria into account, the European energy crisis caused by the war in Ukraine was considered a suitable workshop topic. The participants were to act as consultants to the German government and asked to develop a set of solutions to decrease national dependence on Russian gas. Since none of the participants are, in fact, European, it might be argued that this topic was somewhat abstract. However, considering they are attending an international programme in Europe, a certain interest in European politics and business can be assumed. The assignment itself, as well as the background information with which participants were provided, highlighted conflicting demands with the aim of triggering paradoxical thinking. For instance, participants were asked to consider "political, economic, social and environmental" factors as well as a "realistic and timely implementation" when developing their solution (see Annex A).

3.7. Timeframe, facilities and materials

The timeframe of the workshop consisted of a standard lecture of 90 minutes. While it can be challenging to discuss and perform a variety of activities in this timeframe, a short slot might still be beneficial to keep participants engaged and ensure that the workshop does not clash with their personal agenda. The timeframe should be adequate for the complexity of the problem discussed, the number of participants and their scheduled commitments (Powell & Single, 1996).

The venue used was a modern university room which offered adequate conditions and a neutral setting for the topic discussed. The tables and chairs were rearranged in a way that allowed the participants to form two groups seated around two big tables. This enabled group members to face each other while collaborating. Two white boards were available for both groups to create

the causal map. While eye contact between group members was encouraging interaction, some participants had to turn around to face the whiteboard behind them, which might have represented a small inconvenience in terms of free sight lines and visual barriers.

Various materials were used to conduct the workshop. A participant list was used to capture data on attendance and group diversity. Furthermore, all participants were provided with a sheet explaining the assignment and giving relevant background information. One solution sheet per group was handed out to formulate the final solutions developed. Furthermore, participants were provided with colour coded sticky notes, markers to write on them and board markers to draw connecting lines between sticky notes on the board. While the small size of the sticky notes allowed for a high number of notes to be placed on the board, it might have made it difficult for participants to read existing ideas from a distance, which in turn could have hindered inspiration.

Overall, the physical setting of the workshop can be considered appropriate for its purpose with few limitations.

3.8. Facilitator behaviour

The workshop was facilitated by two persons. While one facilitator set up the workshop and agenda, explained tasks to participants, handed out resources, tracked the time for activities and took notes on participant behaviour, the other facilitator was concerned with observation and note taking and giving situational advice to react to emerging circumstances. While the facilitator guiding the participants through the workshop did not have major previous experience in workshop settings, the observant facilitator complemented the workshop with his expertise as a trained and experienced coach.

Both facilitators sought to behave in line with the findings from the literature. This involved making sure that the process flows without interrupting it. The facilitators kept a neutral position and did not comment on the content developed by the participants. Instead, they explained tasks, were present in case questions arise, but kept in the background while trying to reduce processual uncertainties. Since the literature suggested that causal mapping can be a difficult technique to learn (Ackermann et al., 2014), participants were instructed to create a map consisting of items and interconnections, referring to traditional methods such as mind maps which they might be familiar with and giving practical examples.

Furthermore, the facilitators observed the participants' behaviour and derived implications for action. For instance, the emergence of distraction in the group could indicate that the participants need a new activity to work on or disengagement could be counteracted with gamification techniques, which proved to increase levels of motivation and engagement in learning contexts (Faiella & Ricciardi, 2015).

3.9. Workshop design

In the following, the workshop design and procedure is explained to provide insight into the activities conducted, their rationale and justification.

Before the workshop started, the facilitator asked the participants to fill in an attendance sheet which consisted of their name, age, gender and nationality. The aim was to gather data on group diversity on a separate sheet in order to ensure anonymity for the feedback questionnaires. The facilitator introduced herself and instructed the students to split up into two groups to reduce the number of people per group. Then, the assignment sheet was handed out and discussed briefly. The facilitator also asked students to speak up whenever questions arise.

The first working phase of the workshop was the so called “collect” phase. Participants were handed sticky notes and were expected to gather as many ideas as possible to solve the problem at hand. Participants used yellow sticky notes for ideas, blue sticky notes for pros and red sticky notes for cons related to the ideas. They were encouraged to limit verbal communication and use the board as a means of communication instead in order to stick to the principle of working together individually (see Chapter 2.3.5.). Furthermore, the facilitator noted that participants could use existing notes on the board as inspiration for new ideas. During this phase, the focus was on creating a large quantity of ideas while their quality was secondary.

The second working phase, or “choose” phase, aims at introducing some qualitative assessment of the collected ideas and narrowing down the focus. Participants were handed three voting dots each and were asked to stick them on the three ideas they were most convinced of. This way, an agreement can be reached within a few minutes through a majority vote without lengthy in group discussions which are time consuming and could lead to undesirable group dynamics (see Chapter 2.3.5.). The facilitator then counted the votes and determined the three winning solutions for each group. All other ideas were removed from the board, so that participants could focus on the winning solutions only without distractions.

In the “create” phase, participants were asked to further develop the ideas they selected. They were instructed to add more sticky notes with specific measures as well as new pros and cons for each idea. The rationale behind this activity was to add depth to the ideas and develop the initial ideas into practicable solutions. Furthermore, the two groups were instructed to criticize the ideas of the other group and then respond to that criticism by adding sticky notes to the board in order to introduce an outsider perspective to their ideas and find ways to justify them. The facilitators used gamification to incentivize engagement: the group which found more criticisms as well as more responses to the criticism they received was rewarded through a point system.

The last phase, or “commit” phase, is meant to create workable certainty (see Chapter 2.3.3.) by formalizing the solutions as a group. Both groups were handed one solution sheet and were instructed to write down all three solutions including their specific measures, pros and cons. Furthermore, they had to weigh every solution with a percentage to indicate its relevance

compared to the other solutions (see Annex B). Both groups presented their final solution set at the end of this phase.

Before concluding the workshop, the facilitator thanked the students for their participation and instructed them to fill in the post workshop questionnaire. The aim was to collect data immediately while the workshop was still in recent memory.

Annex H summarizes the conducted activities and rationale in a table.

4. RESULTS

The results of the case study are derived from various sources, such as observed participant behaviour, analysis of the causal map and solution developed and questionnaires.

The following extracts of the pre- and post-workshop surveys (Figure 6, 7, 8 and 9) show the results of the relevant questionnaire in which participants were first asked about their tendencies towards paradox management (pre-workshop questionnaire) and then gave feedback on the workshop, process and their solution (post-workshop questionnaire). The scale of 1 to 5 indicates their level of agreement with 1 being the lowest and 5 the highest rank (see Chapter 3.4.) and the figures below quantify the number of participants which chose the respective answer. The figures on the right show the average rating which is colour graded according to the level of agreement. Since the scale could promote a response bias (see Chapter 3.4.), only scores over 4 are considered high and the diffusion in responses is carefully considered. The small sample size of 16 participants impedes typical statistical testing. Therefore, the focus lies more on descriptive statistics and the surveys are not considered a standalone source, but rather one additional source of information.

4.1. Participant data

The table below shows information on group diversity which was collected in the beginning of the workshop on a separate “list of participants” sheet.

Table 4. Participant diversity.

	Age				**Gender**		**Nationality**		
characteristic	20-23	>23	*Av.*	*Med.*	f	m	CA	JP	US
number of students	15	1	*22,6*	*21,0*	11	5	1	1	14
share of total	94%	6%			69%	31%	6%	6%	88%
total number of students	16				16		16		

Source: own elaboration

Almost all participants are in their early twenties, the average age being 22,6 years and the median age being 21 years. This difference is driven by an older outlier. Around two thirds of participants are female, one third are male. In terms of nationality, with 88%, a big majority of participants are US citizens. Apart from that, the sample consists of one Canadian and one Japanese participant. With regards to age and nationality, the group is relatively homogenous with few outliers.

In the pre-workshop questionnaire, participants were asked to indicate their motivation to participate in the workshop. The activity was a graded part of their study programme, therefore an external incentive was given. However, students could also opt for a makeup assignment instead. Half of the participants claimed, that they want to participate in the workshop to increase their knowledge in the areas International Business or paradox management, thereby outlying an intrinsic motivation. Seven participants either did not indicate a motivation or claimed they were unsure about their expected personal take away. One participant mentioned the participation grade and therefore a solely extrinsic motivation factor. Whether participants are intrinsically or extrinsically motivated or have specific expectations for the workshop could influence their engagement in it and ultimately, their willingness to deal with paradoxes and contribute to the solution finding.

4.2. Satisfaction with set up

Workshop setting	1	2	3	4	5	Average
						4,73
The workshop environment (facilities/ equipment) was adequate for its purpose.				2	14	4,88
The facilitators helped when necessary without interrupting the process				1	15	4,94
The time frame for the workshop was adequate.			2		14	4,75
I had fun during the workshop.			3	4	9	4,38

Figure 6. Participant feedback on workshop setting.
Source: own elaboration

The participant feedback shows a high level of general satisfaction with the workshop, its facilitation and time frame. In the comment section, one participant noted that the tame frame was “not too long or boring”, which supports the findings of the literature review, stating that a session of 90 to 120 minutes is appropriate, given aligned with the topic, activities and group size (Powell & Single, 1996). While conducting the workshop, a few participants seemed to be distracted by their phones at times, even though the facilitator who also functioned as their lecturer noted, that he usually perceived them as engaged students. This behaviour could suggest that participants were lacking stimulation to engage, for instance by receiving too much time for an activity. Whenever such behaviour was noticed by the facilitators, they suggested to move on to the next activity to create new momentum. Another interesting finding was that one participant described the group size as “awkward”, even though it followed recommendations from relevant literature. However, the participant did not elaborate on why she or he perceived it as awkward or which measures for improvement to consider.

4.3. Feedback on process and prerequisites for paradox management

The figure below shows the participant's feedback on the workshop process and map and is mainly centred around the defined prerequisites for paradox management as well as paradox management in itself.

Process & Map

	1	2	3	4	5	Average
Comprehension						*4,81*
I understood the problem at hand and the assignment.				2	14	4,88
My group developed a common understanding of the problem.				2	14	4,88
I felt comfortable to ask questions to clarify doubts or misunderstandings.			2	1	13	4,69
Systemicity & holictic big picture view						*4,56*
The map we created helped me to understand interconnectedness of issues.		1	1	4	10	4,44
I have gained a "big picture" perspective of the problem at hand.			1	2	13	4,75
Our group managed to identify and visualize the main aspects of the problem.			2	4	10	4,50
Inclusion of perspectives						*4,31*
Our solution finding process includes a variety of perspectives.		1	2	5	8	4,25
My own ideas are sufficiently represented in the map we created.		1	1	5	9	4,38
Improvement of traditional methods/ Go beyond where you know						*4,48*
Our solution finding process was creative.		1	2	3	10	4,38
The map we created fuelled idea generation.		1	2		13	4,56
I discovered new perspectives I would not have considered before the workshop.		1		5	10	4,50
Management of paradoxes						*4,23*
I noticed conflicting points/ demands when creating the map.	2		2	6	6	3,88
I tried to meet competing demands of the problem at hand.			3	2	11	4,50
I tried to accept that certain competing demands cannot be met simultaneously.			2	7	7	4,31

Figure 7. Participant feedback on process and map.
Source: own elaboration

4.3.1. Comprehension

Comprehension represents the first step towards paradox management by providing shared clarity on the problem to address and how to address it.

The participants' feedback on comprehension was fairly positive. Most participants stated that they understood the problem at hand and assignment, developed a shared understanding as a group and felt comfortable to ask questions and clarify misunderstandings. Observing their behaviour, it was difficult to judge the individual and group understanding. One facilitator noted that there seemed to be consensus on a surface level, which could however also display a tendency to "just go along with things". A few participants approached the facilitators with process and content questions which indicates a certain confidence to raise questions. Considering that the workshop process was followed according to the facilitators' expectations, the assignment and activities seemed to be clear. The quality of the solutions developed by the participants also suggests a decent level of understanding for the topic discussed.

4.3.2. Systemicity and holistic big picture view

Systemicity was considered crucial for paradox identification and management, since it helps the group to understand how opposites or contradictory elements are interrelated and develop a solution which takes all aspects and consequences into account (Johansen, 2019).

The participants' feedback on systemicity and holistic big picture view is generally positive with an average score of 4.56. The majority of participants stated that the map helped them to understand how issues are interconnected, that they gained a big picture perspective of the problem and were able to identify and visualize its main aspects.

The table below shows a numerical overview of the nodes and connections in the causal maps the two groups developed. It is divided into two steps, the first one being the initial collection of ideas in the collect phase (see Chapter 2.3.5., Annex H) and the second step being the map created after the groups focussed on three solutions (choose phase), received peer feedback and responded to it in the create phase (see Chapter 2.3.5., Annex H). The overview also displays the category of sticky notes according to their colour coding in order to reveal more information on their creator (group or peer group) and content (idea, criticism, response to criticism, pros or cons).

Table 5. Numerical overview of nodes and connections in causal maps created.

	Step 1		Step 2	
	Group 1	Group 2	Group 1	Group 2
Total post its	**51**	**68**	**58**	**74**
t/o yellow	18	25	33	43
t/o ideas	18	25	3	3
t/o response to criticism			30	40
t/o blue (pros)	17	25	5	7
t/o red (cons)	16	18	4	6
t/o pink (criticism other group)			16	18
Total connections	**38**	**55**		
Between ideas	5	5		
Between ideas & pros/ cons	33	50		

Source: own elaboration

When counting the sticky notes, it becomes clear that Group 2 created a higher number of nodes in both steps. However, since the focus and incentive was centred around quantity, especially in the first step, this is not necessarily an indication for high quality ideas. For instance, some of the criticisms for their peer group displayed humoral elements or were quite simple in their argumentation, which were then often countered by the other group using the same standard.

It is also interesting to note that Group 1 found pros and cons for almost every idea, while Group 2 found pros for every idea but fewer cons. This could suggest that Group 1 tried to develop a

deeper understanding around fewer elements, while Group 2 aimed for a variety of ideas without necessarily always considering their downsides.

When comparing the number of nodes to the number of connections, the following ratios can be calculated:

- Group 1: 51:38 = 1.3:1
- Group 2: 68:55 = 1.2:1

According to Ackermann et al., the typical nodes to connections ratio in causal maps is around 1.3 or 1.4 to 1 (Ackermann et al., 2014). The causal maps developed by the groups show a systemicity ratio which is slightly below, but still close to this benchmark, indicating an average level of interconnectedness. It is interesting to note that most connections can be found between nodes and their relevant pros and cons, or direct consequences, and fewer connections were drawn between two different ideas. This shows that interconnectedness was rather perceived on a smaller scale than on a global problem level. This assumption is also confirmed by the domain analysis of the maps, particularly for Step 2. The individual ideas or solutions represented the most cognitively central items of the maps with most connections towards or away from them, which makes sense considering the assignment focussed on developing a set of solutions eventually. The form of the maps suggests a similar development. While the two maps were relatively spread out and consisted of many different ideas in the first step, in the second step, the three ideas each group focussed on seemed to be perceived more in isolation. The visual distance between the ideas grew when proceeding from the first to the second step.

When it comes to the behaviour of the participants, it can be said that they proactively connected ideas and their pros and cons. When the facilitator instructed them to draw connecting lines in between different ideas if they see some form of relation they seemed to struggle and were more hesitant. While all participants actively contributed to the other activities, now only two or three members of each group walked up to the board to draw the lines.

The solutions developed by the groups also give insight into systemicity. Two of the solutions developed by Group 1 are in fact very interrelated in their essence, since they are both centred around the use of classical renewable energy sources. By contrast, Group 2 developed three distinct solutions which might be less interrelated.

4.3.3. Inclusion of perspectives

Inclusion of perspectives was regarded as a relevant factor for paradox management, since these complex issues require multifaceted considerations of all concerned actors (Johansen, 2019).

The feedback on inclusion of perspectives received a lower score in comparison to other items. While many participants stated that the solution finding process included a variety of

perspectives and that they saw their own ideas sufficiently represented, some rather disagreed or took a neutral position.

Generally, all participants contributed to most activities of the workshop, such as writing down and sticking notes to the board or voting for ideas. However, as mentioned earlier in Chapter 4.3.2., only few group members took part in the global connection of ideas. During the solution formation in the commit phase (see Chapter 2.3.5., Annex H), the two groups were provided with only one sheet each, to ensure that they align among themselves for the final solution. Therefore, only one or two persons per group did the writing, but consulted the other team members while doing so.

When it comes to mutual listening and group discussions, one facilitator noted, that a participant received a great level of attention from her group when she was explaining her ideas in context of experiences based on her professional background.

The sample size and selection also has certain effects on the inclusion of perspectives. Most participants seem to have similar backgrounds and profiles in terms of academic background, nationality and age (see Chapter 4.1.). This fact in itself could reduce the diversity of perspectives, since research suggests that a wider variety of backgrounds and perspectives usually leads to more ideas collected in causal maps (Ackermann et al., 2014). When comparing the number of sticky notes to the number of participants in each group, the following ratios can be calculated:

- Group 1: 51 sticky notes created by 8 group members translates into 6.4 ideas per person
- Group 2: 68 sticky notes created by 8 group members translates into 8.5 ideas per person

With the small sample size, it is difficult to explain why Group 2 was able to develop more ideas than Group 1. Apart from group diversity, different personalities, character traits and attitudes towards the workshop and topic could play an important role.

4.3.4. Improvement of traditional methods

The causal map was supposed to offer an improvement of traditional methods for paradox management by allowing for innovative solution finding and considerations.

The feedback on improvement of traditional methods was generally positive, but also received a few undecisive responses and disagreement. Many participants expressed agreement to statements which asked about the creativity of their approach, idea generation fuelled by the map or new perspectives discovered.

When analysing the map and solutions the participants developed, it becomes obvious that they generated ideas which went beyond the background information provided on the assignment sheets. This information was meant to stimulate the idea generation, without limiting them to the listed suggestions. The groups also made use of humoristic approaches in their idea

development. For instance, one participant suggested to join Russia and another developed a very unconventional idea around the use of methane from livestock. In the literature, various authors have argued that humour is often used to deal with controversy (Hatch & Ehrlich, 1993; Hatch, 1997; Sillince & Barker, 2012; Sillince & Golant 2017; Gylfe et al. 2019). Therefore, this behaviour could suggest that participants tried to overcome ambiguity implied by the assignment and its paradoxical tensions by using humour and thereby unintentionally creating unconventional solutions.

Observations on the participants' behaviour indicate that gamification had a positive effect on idea generation. Challenges between the teams helped to increase engagement and led to a higher quantity of ideas produced. However, since the incentive was set on quantity, the idea quality did not necessarily improve. Therefore, it is important to recognize gamification as a powerful tool when applied appropriately in line with the objectives set.

4.3.5. Management of paradoxes

Paradox management in itself was observed and interpreted by analysing the participants' questionnaires as well as their behaviour and solution finding.

Two questionnaires can be taken into account to assess the participants' paradox management. The pre-workshop survey showed that participants agree to the statement that considering conflicting demands is useful and increases understanding of the issue. However, not all participants seemed to be comfortable to do so. Furthermore, the level of agreement suggested, that participants have a tendency towards resolution compared to acceptance of paradoxes. On average, they would rather find ways to meet conflicting demands than to accept them as unsolvable.

Pre-workshop tendencies towards paradox management	1	2	3	4	5	Average 3,79
When I consider conflicting perspectives, I gain a better understanding of an issue.		1	1	5	9	4,38
I am comfortable dealing with conflicting demands at the same time	1	1	5	7	2	3,50
I feel energized when I manage to address contradictory issues.	2	1	4	5	4	3,50
Accepting contradictions is essential for my success.	1		4	7	4	3,81
I would rather find a way to meet competing demands than to just accept them as unsolvable.			1	10	5	4,25

Figure 8. Tendencies towards paradox management in pre-workshop questionnaire. Source: own elaboration

The post-workshop questionnaire also gave some interesting insights into paradox management. Even though it received a generally positive score of 4.23 on average, paradox management was still the section that received the least agreement of the survey. While many participants stated that they tried to apply resolution as well as acceptance strategies, with a slight preference for resolution, they seemed to struggle to identify conflicting demands in the first place when creating the map. This is somewhat surprising, since they were actively listing pros and cons to the various identified options, which were often contrary to each other, before

evaluating them. For instance, in the map creation process Group 1 suggested the option to keep importing gas from Russia while also mentioning the alternative to import gas from the United States. The two options would obviously have very different, if not opposing political implications, which the group also acknowledged in the pros and cons to the relevant solution. Thus, participants were dealing with paradoxes, despite not always being consciously aware of them. This lacking awareness could be linked to the isolated consideration of issues, which could be observed in the map analysis (see Chapter 4.3.2.).

The participants' behaviour revealed some interesting cues on paradox management. For instance, a group was discussing the implementation of two measures: one which would lead to increased taxes for citizens and another which would affect their life quality adversely in terms of personal freedom of choice and comfort. During this conversation, one participant noted that it would be difficult for the citizens to accept this double burden. While the two measures seemed sensible in isolation, they were perceived as paradoxical in combination, even though the outcome of both measures would have been to reduce the national dependency on gas imports. By refusing to implement both measures at a time, the participant is essentially suggesting a resolution strategy (see Chapter 2.2.3.). An alternative could be to focus first on one, than on the other measure and its consequences (temporal separation) or to apply the two measures individually in different geographical locations (spatial separation). Another interesting situation could be observed during the final formalization of ideas. When the group formalized one of the ideas and summarized its pros and cons, one participant ironically stated that there were no cons to this idea. This humoristic approach could be a result of perceived controversy (Kwon et al., 2020) and indicate a certain discomfort with and maybe even refusal to accept the negative aspects of the solution. It could be interpreted as a use of reaction formation (see Chapter 2.2.3.): participants experienced negative emotions connected to ambiguity and tried to set another mood by introducing irony and humour.

Paradox management strategies can also be perceived when analysing the solutions the two groups developed. In the final phase of the workshop, participants had to finalize the three solutions they chose and quantify the relevance of each to the overall solution by indicating a percentage weighting.

Group 1 weighted all of their three solutions with 33%. This might indicate that they perceive all solutions as equally valuable or seek to apply synthesis (see Chapter 2.2.3.) by addressing different demands simultaneously with equal efforts. Of the three solutions, two are centred around renewable, green energy and represent long term solutions since they would require capital intensive investments and time to build related infrastructure. The third solution was to keep using nuclear power plants and represents a more immediate measure. The three solution complement each other in terms of short- and long-term orientation, therefore covering the demand of fast implementation as well as the need for long-term solutions on two different fronts, thus representing spatial separation. Self-reliance, which is a consequence of all measures was named a common advantage, therefore one might argue that the group considered this aspect as particularly relevant. However, the group also noted that all solutions required certain capital investments as a shared disadvantage, thereby acknowledging but deprioritizing

this issue. This suggests that participants were aware of conflicting economic and social demands, but decided to accept them as inherent to the problem and agreed to pursue the developed solutions regardless.

Group 2 used a weighting of 60%, 30% and 10% for the three developed solutions, thereby indicating a strong preference for one solution over the other two, which suits the resolution management strategy separation, since issues are prioritized and addressed with varying efforts. Their solution set consisted of two long-term measures around the use of liquified natural gas and green energy and one medium-term measure which involved converting methane from livestock into energy. A common disadvantage of all solutions they developed was the difficult and timely implementation of measures due to high and lengthy infrastructure investments and complex distribution schemes. This pattern suggests that they deprioritized timely implementation and instead focussed on other aspects, which could be an indicator of spatial or temporal separation (see Chapter 2.2.3.).

Overall, the fact that both groups eventually chose and formalized a set of solutions shows a certain degree of acceptance for paradoxical tensions. They understood, that their solutions all have downsides which sometimes seem paradoxical when juxtaposed with the multifaceted problem they were trying to solve. However, they reached workable certainty despite this ambiguity, thereby accepting the inherently paradoxical nature of the problem and its solution. This acceptance combined with the resolution strategies that could be observed resemble the dynamic equilibrium model developed by Smith and Lewis (Smith & Lewis, 2011) mentioned in Chapter 2.2.3.. It is interesting that this elevated stage of paradox management could be reached within the very limited timeframe of the workshop. This suggests that the creation of a causal map could have helped the participants in the process of dealing with paradoxes and developing a solution. However, participants also displayed rather ineffective reinforcing cycles such as reaction formation, which show a certain discomfort when confronted with paradoxical tensions. While these behaviours might usually lead to unproductive results, it is still interesting to note that the use of humour, for instance, also generated a creative and unconventional solution in Group 2. Therefore, one might conclude that originally unproductive reinforcing cycles can result in new ideas when properly managed.

From a process point of view, it might be interesting to note that all ideas as well as most related pros and cons were reflected in the map before they were included in the final solution formulation. This means that these items were identified in the mapping process and supports the hypothesis that the creation of a causal map can help to collect ideas and get a broad perspective on a problem. At the same time, using a new format such as the solution sheet might be useful to prioritize and structure the collected ideas and develop a detailed solution, in order to not get lost among the many collected items which could lead to confusion.

4.4. Satisfaction with solution

Satisfaction with the solution found was considered one of the most crucial indicators for the workshop's success, since it represents a shared commitment to act and facilitates subsequent implementation (Priem et al., 1995).

Satisfaction with the solution found						Average
	1	**2**	**3**	**4**	**5**	**4,08**
I am happy with the solution we developed for the assignment.	1		2	4	9	4,25
I see my own contributions reflected in the solution finding process.			4	4	8	4,25
In our group, all participants contributed about equally to the solution finding.		2	6	2	6	3,75

Figure 9. Feedback participant on satisfaction with the solution found.
Source: own elaboration

The participant's feedback shows a decent level of overall satisfaction with the solution found. Many participants stated that they were happy with the solution found and saw their own contributions reflected in the solution finding process, even though some perceived the relative contributions of their group members as unequal.

5. DISCUSSION

So, does causal mapping support paradox management in a workshop setting? Both, literature and the conducted case study helped to develop some key findings and derive according recommendations as well as new questions to be answered through future research.

5.1. Theoretical framework and its application

The theoretical findings discussed in Chapter 2. give strong indications for causal mapping being an adequate tool and workshops an appropriate setting for paradox management (see Chapter 2.). As explained, paradox management seeks to use paradoxical tensions as inspiration for value creating responses (Johansen, 2019). A value creating response could be to gain common understanding of a complex issue and to reach workable certainty and a certain degree of consensus on how to deal with it. Due to their inherent properties and features, workshops and causal mapping were considered a valuable platform and tool for this purpose. Workshops represent the setting which brings together stakeholders and creates beneficial conditions for paradox management, while causal mapping is considered a problem structuring method used in this context to understand and structure complex issues such as paradoxes.

Workshops can be a good platform to bring together important stakeholders for immediate decision making and thus, to achieve workable certainty and a shared commitment to act. The externally facilitated setting and process enables enhanced task orientation amongst participants and ideally promotes achievement of consensus and development of a satisfactory solution to a

problem in a short time (Philipps & Philipps, 1993). This can be very useful for paradox management which requires a shared understanding of a complex issue and the group's commitment to act. Workshops bear the risk of undesirable group dynamics which could endanger successful paradox management. Therefore, facilitators need to consider and counteract these behaviours through appropriate workshop design and facilitation techniques (Courtney, 2020).

Causal mapping has been found an appropriate tool to depict various perspectives, bring them into juxtaposition and illustrate the interrelatedness of items until a holistic view of an issue is achieved (Harris & Metcalfe, 2015; Hodgkinson et al., 2004). Paradoxes represent complex and unstructured problems which benefit from systemic approaches to manage them. Causal mapping as a problem structuring method can offer opportunities towards reaching a shared understanding of complex issues and can therefore help to lay the foundation for developing a solution and commitment to act amongst a group.

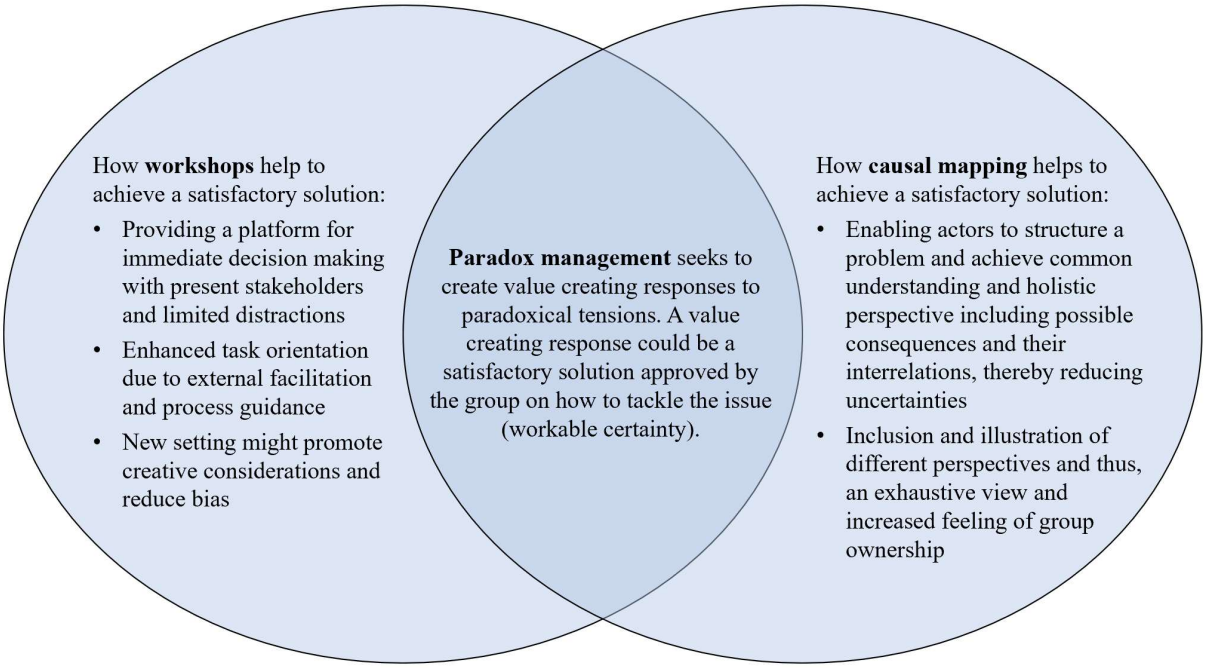

Figure 10. How workshops and causal mapping support paradox management.
Source: own elaboration.

Generally, the outcomes of this case study confirmed the theoretical findings, since the workshop proved to be effective to reach a satisfactory solution for a complex issue.

General agreement on a way ahead to tackle the problem and satisfaction with this developed solution was one of the main goals for the case study (see Chapter 3.2.). For the workshop scenario, this is a very desirable outcome which implies successful cooperation and application of activities and techniques. The fact that 14 out of 16 participants were rather or fully satisfied with the developed solution is an indicator for a fruitful workshop session and an outcome which is backed by a great majority of participants. This could suggest that the methods used

were appropriate for their purpose and therefore supports the causal map as key item of the workshop as a suitable tool for paradox management within this workshop setting.

In this context, one other aspect might be interesting to note: Workshops and causal mapping both seem to support paradox management or its ultimate purpose to develop value creating responses to paradoxes, by helping actors to gain a shared understanding involving different perspectives, promoting efficient decision making and an approach towards workable certainty and a shared commitment to act. However, while actors might be satisfied with the solution found at the time of creating it, the downstream process of implementing the solution might truly reveal its effectiveness or ineffectiveness later in time. Thus, workshops and causal mapping can help to achieve workable certainty and a way forward based on different perspectives and a shared understanding, but do not guarantee that the developed solution is or will be considered optimum in the long term.

Paradoxes recognize the inherent complexity of issues and show how both, reflexion *and* action are crucial to deal with issues. This also involves accepting and aiming for current workable certainty and a commitment to act which will be carefully reiterated in the implementation process. Such organizational agility might help to deal with complexity in a sustainable way (Armstrong & Manitsky, 2022).

5.2. Recommendations for practitioners resulting from case study

Despite the limited sample size, the conducted case study can give interesting insights into the conditions and behaviours relevant for causal mapping workshops for paradox management, especially when juxtaposed with relevant literature. This section serves to highlight and interpret the main findings and derive recommendations for practitioners in the field. A summary is included in the following table.

Table 6. Recommendations for practitioners resulting from case study.

	Concern	Recommendation
Set up	The literature considers a group size of 7 to 15 people optimum in a workshop setting. This recommendation was followed but criticized by one participant in the feedback questionnaires	Workshops are individual situations requiring customized conditions. Facilitators need to observe group behaviour carefully and act accordingly. Still, outlier opinions might not always be fully representative of a group's needs.
Inclusion of perspectives	A few participants were not fully satisfied with the inclusion of perspectives in the workshop. Whether voices get heard seems to depend on various factors, one being cultural aspects such as task- or relationship-based trust. Participants reported mixed feedback on equal contribution towards the solution finding within their group, which might reduce overall satisfaction.	Facilitators need to promote an open environment through adequate workshop design and atmosphere. Facilitators need be culturally sensitive and attentive to group dynamics in order to promote inclusion of all perspectives. Facilitators need to promote equal contribution and raise awareness on relative contribution bias.
Systemicity	Participants were hesitant to connect ideas in the causal map on a bigger scale beyond mere pros and cons.	Facilitators need to make sure that the group understands the assignment at hand and promote the recognition of interrelatedness, e.g. by introducing clustering techniques early into the process.

Source: own elaboration

5.2.1. Set up

For the set-up of the workshop, recommendations of relevant literature was considered. For instance, the group size followed the recommendation of 7 to 15 people to ensure both, a variety of perspectives as well as opportunities to exchange (Philipps & Philipps, 1993, see Chapter 2.3.5.). However, one participant still complained about the group size as being inadequate, thereby breaking with previous findings. This suggests that facilitators might need to adjust the group size to individual circumstances instead of general guidelines and observe the group life continuously to notice unwanted frictions and react to them accordingly.

This finding highlights that workshops are always individual situations and might require customized conditions dependent on the group and topic. While theoretical guidance can provide valuable indications, it might still not always be fully applicable to individual cases. However, one might also question as to what extent to consider outlier opinions and whether reacting to them could create disadvantageous conditions for the group, too, especially when not conducted carefully.

5.2.2. Inclusion of perspectives and equal contribution

Inclusion of perspectives was recognized as an important element for paradox management since paradoxes require multifaceted consideration of multiple actors to unfold their full potential and therefore benefit from all stakeholders outlining their points of views (Johansen,

2019). Therefore, a special focus was given to the observation of this matter and the participants' feedback.

The feedback questionnaires revealed that few participants were not fully satisfied with the inclusion of perspectives. Since group discussions were limited and participants could individually decide whether to place ideas to the board and which ideas to vote for, it is hard to judge why there was still a certain dissatisfaction in this regard. This outcome might suggest, that even though the workshop design sought to eliminate undesirable group dynamics, superficial and illusionary consensus were still displayed in part. Possibly participants still hesitated to place ideas on the board. Another explanation could be that the voting system for ideas implies that the opinion of a minority might be neglected, since majority votes decide about its outcome. Facilitators have to ensure maximum inclusion of perspectives through workshop design and by promoting an open environment.

Furthermore, it is also interesting to note how the dynamics of attention and listening changed when one participant gave her opinion on an issue and supported it with her experience in a professional context (see Chapter 4.3.3.). This could lead to the assumption that participants tended to listen to and trust their team members due to task-based authority. Therefore, students with relevant professional experience might have better chances to voice ideas and concerns and get their perspective taken into account, thereby advancing paradox management. Whether stakeholders value task-based or rather relationship-based trust is often subject to individual circumstances and cultural aspects (Sheerwood et al., 2005). Since paradoxical considerations and paradox management is particularly relevant in international contexts with cultural diversity, it is important for facilitators to recognize group dynamics related to trust and attention in order to enable optimum inclusion of perspectives among all participants.

Equal contribution to the solution finding process was emphasized in the case study since it was believed to promote inclusion of perspectives by offering the same opportunity to all group members to shape the solution. In comparison to other parameters, the statement on equal contribution in the groups to the solution finding received particularly mixed results in the feedback questionnaires. This is especially interesting when juxtaposed with the statement on reflection of own ideas in the process (see Chapter 4.3.3.). While participants seem to believe that their own contributions are reflected sufficiently, they were more hesitant to agree that all participants contributed equally to the solution finding. This might indicate that participants overexaggerate their own contributions or regard contributions of others as less valuable. This aligns with literature stating that team work often leads to a self-serving bias which overemphasizes own efforts (Forsyth & Schlenker, 1977). At the same time, perceived equal contribution in group work was found to be an important indicator as to whether groups were satisfied with their work in retrospect and thus, whether groups were willing to collaborate beyond a single project (Burdett & Hastie, 2009). Since workshops often lay the foundation by developing a solution which then needs to be implemented through further group effort, it is important to promote perceived equal contribution and consequently avoid future frictions. Therefore, facilitators should not only encourage equal contribution but also raise awareness

on relative contribution bias. This can have a positive impact on long-term paradox management beyond a single workshop.

5.2.3. Clustering as a means to achieve systemicity

Systemicity was identified as an important prerequisite to achieve a holistic perspective of an issue which considers interrelations as well as potential consequences and thus can offer a sense of comfort with a previously complex and confusing problem, such as a paradox (Harris & Metcalfe, 2015). Therefore, participants were asked to draw connecting lines between items placed on the board.

As mentioned in Chapter 4.3.2., participants were hesitant to connect different ideas on a broader scale than mere pros and cons of individual ideas. This could indicate, that participants did not fully understand the assignment or did not consider it relevant, or that they did not perceive the items as interrelated and therefore did not see a need to connect them. Due to the before mentioned positive impacts of systemicity on paradox management, facilitators should encourage the work group to create and recognize interrelatedness of issues.

A recommendation to facilitate systemicity and the identification of interrelations could be to encourage participants to use clustering techniques early into the process of creating the map. In the literature, clustering is defined as a method which supports problem structuring by grouping similar data and thus enabling actors to recognize patterns and perceive proximity or distance between elements (Madhulatha, 2012). This could then enable a group to achieve a shared understanding of the interconnectedness and systemicity of an issue and thus facilitate paradox management. For instance, they could be instructed to place similar ideas close to each other when sticking them to the board. This helps to create a sense of connectedness while still in the idea collection process and might be easier than identifying connections in retrospect, which could lead to a cluttered overview.

5.3. Questions for further research

Apart from recommendations, the conducted case study also revealed questions for further research, which will be discussed below.

5.3.1. Additional factors

This case study defined and examined various factors towards successful paradox management, such as inclusion of perspectives, comprehension, systemicity, innovative approaches and workable certainty. While these factors seem reasonable to address, they might not represent a complete list of all relevant factors to consider. This becomes clear when analysing the feedback questionnaires.

One participant responded with strong disagreement to the first statement on satisfaction with the solution found. However, all other aspects of this participant's questionnaire were rated rather positively. This could suggest that even if the defined prerequisites are met, satisfaction of all participants with the developed solution is not guaranteed. There might be additional factors which influence participant satisfaction, but were not considered in this case study. Future research could address this issue by further examining determining criteria for successful paradox management.

In this context, it might also be interesting to note that even though the case study aimed for a certain degree of consensus and satisfaction of participants with the solution, dissatisfaction can also be indicative of paradoxical thinking and could provide new impulses for change or important adjustments in the long term.

5.3.2. Identification of paradoxes as prerequisite for their management

In the literature, the identification of paradoxes is emphasized as a prerequisite for paradox management (Johansen, 2019). When dealing with paradoxes, it seems obvious to first focus on their identification and then on their management. However, the participants' feedback does not fully correspond to this theoretical suggestion. Some participants stated that they did not identify conflicting demands in the mapping process, even though they developed a satisfactory and sophisticated solution to the problem at hand. This raises the question, if paradoxes necessarily have to be identified in the first place to be successfully managed and for their full potential to be exploited. For instance, the solution of Group 1 encompassed both, re-opening of nuclear power plants and investments in renewable energy, even though the two solutions individually have very different, if not opposing environmental implications, considering, for example, the difficulties to safely dispose nuclear waste. The group still regarded both options as valuable and decided to draw from both their benefits, thereby developing a value creating solution which meets opposing needs (e.g. short- and long-term practicability), while it remains unclear whether the environmental paradox has been identified in the first place.

Further research on workshops with participants who are specifically trained on paradoxes could give interesting insights on this question in the future.

5.3.3. External perception and interpretation of paradox management

In Chapter 4.3.5., paradox management of the participants was observed and interpreted to examine how it is affected and supported by causal mapping in a workshop setting. However, one must acknowledge that it is difficult to perceive and categorize paradox management from an outside perspective, since individual perceptions are always subject to personal interpretations. For instance, behaviours that were perceived as reinforcement cycles (see Chapter 2.2.3.) by the facilitator, such as humoristic elements, might still relieve stress among

participants or even lead to creative and productive outcomes. This potential upside to a perceived reinforcement cycle could be considered a paradox in itself.

This finding raises the question as to which extent paradox management can be observed and interpreted from an outside perspective at all. Further research could examine this issue by training workshop participants on paradox management and comparing their subsequent self assessment with external observations.

6. CONCLUSIONS

While some issues require simple either/ or solutions, paradoxes are more challenging to manage and demand multifaceted considerations (Lüscher, 2009). In our globalized world, problems are often complex and affect a variety of international stakeholders with diverging interests and opposing demands.

This thesis examined how causal mapping as a problem structuring method can support paradox management of such unstructured issues in a workshop setting.

A shared understanding of the issue, inclusion of perspectives, a holistic big picture perspective and creative considerations beyond former recognition were defined as prerequisites for paradox management which could be promoted by causal mapping in a workshop setting. While participants on average reported a high level of satisfaction with the process and solution they developed during the workshop, a few outliers (namely one participant who reported low levels of satisfaction with the solution and two participants who were neither satisfied nor dissatisfied according to their responses in the feedback questionnaire) still indicate that there could be other important factors to consider. The participants displayed various paradox management strategies in their behaviour and solution finding, e.g. by prioritizing certain aspects temporally while still acknowledging the relevance to meet opposing needs in the long run or by equally stressing and integrating conflicting parts of their solution. Ultimately, they were able to reach workable certainty by agreeing on a versatile set of solutions which takes different variables, such as political, economic, social and ecological considerations into account.

Overall, it can be concluded that for this specific case, the workshop represented an adequate platform and causal mapping an appropriate tool for paradox management. The right set up, design and facilitation were considered relevant factors to create a fruitful setting to enhance the groups' task orientation and manage arising anxieties. The research also raised the question whether participants need to be aware of paradoxes in order to manage them and to what extent paradox management can be observed and interpreted from an outsider perspective. Further studies could address these questions by exposing participants to specific training on paradoxes and their identification before conducting a workshop on their management. Furthermore, recommendations on set up, inclusion of perspectives and systemicity were derived from observations made and feedback gathered.

While acknowledging that this case study is exploratory and limited in its generalizability due to the sampling strategy and size, it contributes to closing the research gap in the field of paradox management through causal mapping in a workshop setting by providing an in depth analysis on an individual case.

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ANNEXES

Annex A Workshop Assignment.

Case Study: The European energy crisis

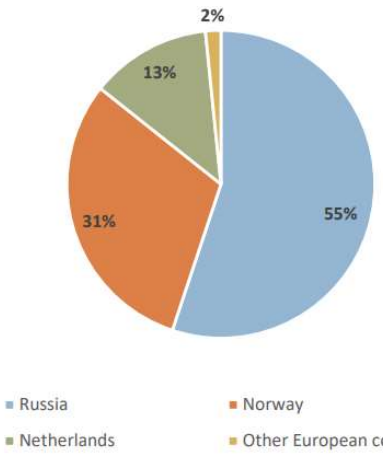
The European Union is sanctioning Russia due to the conflict in Ukraine. However, Germany continues to import Russian gas for €19bn per year, mainly from Russian state-owned enterprise *Gazprom*. Gas is mainly used for industrial production, heating in private households and electricity. Now, the German government is seeking alternatives to become less dependent on Russian gas.

Imagine you are consultants to the German government. Explore various solutions and their pros and cons. The goal is to find a set of solutions that causes minimal political, economic, social and environmental damage. Please also consider realistic and timely implementation of the measures suggested.

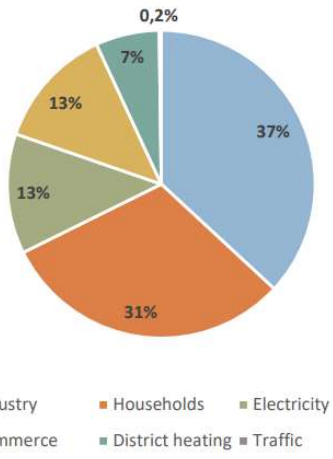
Background information:

- Norway claimed that it cannot increase gas exports to Germany.
- While some European countries use liquefied natural gas (LNG) imported from the US or African countries, Germany is currently lacking related infrastructure.
- The national gas reservoir can hold up to one quarter of Germany's yearly gas demand and is currently filled 28%.
- After the nuclear catastrophe in Fukushima, Japan, in 2011, the German government decided to gradually close down all national nuclear power plants until 2022.
- Germany wants to reduce its dependence on coal-fired power plants due to environmental concerns.
- Ex federal president Joachim Gauck suggested that the German population can "freeze for freedom" and "endure a general dip in our affluent lives" in order to save energy and become less dependent on Russian gas. A decrease in room temperature of 2°C in German households would lead to a 5% reduction of national gas demand.

German gas imports by country



What gas is used for in Germany



Annex B Template for finalization of ideas.

Final formalization of ideas

Solution part 1:

_____% of Russian gas imports will be compensated for by _____.

Specific measures:

Advantages:

Disadvantages:

Solution part 2:

_____% of Russian gas imports will be compensated for by _____.

Specific measures:

Advantages:

Disadvantages:

Solution part 3:

_____% of Russian gas imports will be compensated for by _____.

Specific measures:

Advantages:

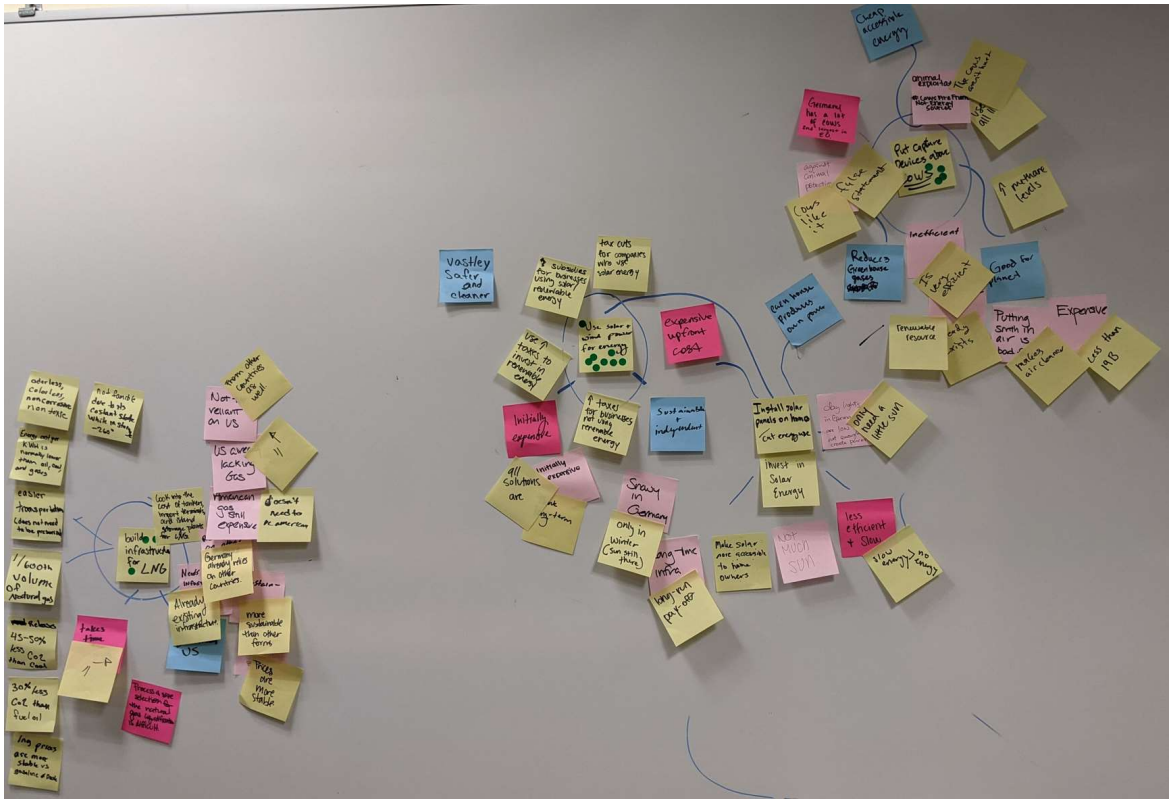
Disadvantages:

Annex C Causal Map Group 1 Step 1.

Annex D Causal Map Group 1 Step 2.

Annex E Causal Map Group 2 Step 1.

Annex F Causal Map Group 2 Step 2.



Annex G Example of rated response system used for question design.

Indicate your level of agreement by ticking the according box, using the depicted scale.	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
	1	2	3	4	5
Statement 1					
Statement 2					
Statement 3					

Annex H Workshop agenda – activities and rationale.

Activity	Rationale	Dedicated time	Materials
Introduction • Hand out participant list • Introduce facilitator • Split up group • Explain assignment	• Gather data on participants separately (anonymity for surveys) • Create "speak up" climate	10 mins	• Participant list • Assignment sheet
Collect phase • Hand out post its • Instruct participants to gather ideas working individually, stick them to the board and connect related items • Quantity over quality • Explain colour code: yellow for ideas, blue for pros, red for cons • Encourage using the board as means of communication instead of verbal communication	• Fuel idea generation • Stick to principle of working together individually	15 mins	• Sticky notes (yellow, blue, red) • Markers
Choose phase • Hand out voting dots	• Avoid lengthy discussions or undesirable group	5 mins	• Voting dots

• Instruct participants to take three voting dots each and to vote for their three favourite ideas individually by sticking them on the relevant post its • Facilitator then counts and determines the three winning solutions per team • Facilitator removes remaining ideas	dynamics like group think • Reach agreement of majority in limited time frame • Remove other ideas so participants focus on winning solutions		
Create phase • Instruct participants to further develop winning ideas by making them more tangible, adding specific measures as well as pros and cons • Instruct participants to criticize the other group's ideas by sticking pink post its with criticisms on their map • Use gamification: the group that adds the most pink post its to their opponents' map wins points • Use gamification: instruct groups to respond to the criticism using yellow post its and reward the group with a higher number of post its	• Convert ideas into solution • Deal with critical outsider perspective and find ways to justify and refine solution • Use of gamification to incentivize engagement	20 min	• Sticky notes (yellow, blue, red, pink) • Markers
Commit phase • Hand out solution sheet • Instruct participants to formalize ideas in template • Participants indicate how much of the percentage gas demand they want to compensate for with each solution • Participants also define specific measures as well as pros and cons for each solution • Groups present their solution set	• Create workable certainty by having one sheet per group which enforces group communication • Prioritize ideas by indicating percentages • Summarize and persuade by highlighting pros and cons • Commit by thinking about specific measures as next steps	20 mins	• 1 Solution sheet per group • Pens

Wrap Up • Thank participants • Hand out feedback questionnaire	• Ensure that feedback questionnaires are filled in • Gather feedback while workshop is still in recent memory	10 mins	• feedback questionnaire