Faculty of Design Sciences
Department of Product Development

Framing of Conflicts, Designing for Systems:

A Pragmatic Approach

Antwerp, 2024

Thesis submitted for the degree of doctor of Product Development at the University of Antwerp to be defended by Moein Nedaei

University of Antwerp

Supervisor:
prof. dr. Alexis Jacoby

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Preface

In recent decades, individualism has increasingly influenced dominant narratives in modern societies and systems, placing self-interest and personal fulfillment above collective well-being and shared interest. This growing emphasis on individual aspects of human progress has heightened the risks of separation and fragmentation within social systems, not only due to the rise in subjectivity but also because of a deeper structural failure: the inability to connect personal experiences to the broader, collective dimensions of human experiences. While scholars in other fields have explored the limits of subjectivity and the issue of human dissonance, these concerns remain largely under-examined within pragmatic culture, limiting the ability of modern systems and societies to affect meaningful changes on a larger ecological scale. Abdullah Öcalan, a founding member of the Kurdistan Workers' Party and long-time political prisoner, compared the difficulty of this situation—and the need for genuine change—to the harshness of a 'horse race,' where life can become increasingly unbearable. He argued that the only way to escape this madness and hatred is through significant change—or, as he metaphorically described it, by 'vomiting' the system out of one's memories, bodies, and minds. In his view, when the dominant paradigm of a system demands substantive change, true destabilization requires a

form of emancipation—liberating oneself from the rigid mindset that upholds these norms and values, and gradually transcending these conditions to create greater opportunities for continuity and progress. Before we can fully understand such an experience of change, we must first consider what actions are necessary and where to begin in order to activate our collective potential. Žižek, building on Öcalan's metaphorical concept of change, argues that the key to overcoming these challenges lies in harnessing our creative capacities—a form of intellectual 'transcendence' that doesn't necessarily stem from metaphysical objects but rather from collective agency and social power. From this perspective, capacities like creativity are transcendent, enabling the emergence of a new order and allowing us, as social agents, to design from within the systems we navigate. However, our intellectual power as an individual is inherently limited by the temporality of life, time, and resources, meaning that we can only grasp a portion of a larger complexity. In other words, no matter how intelligent we are, each of us can only address a specific part of the issue, which is why it is essential that 'we go through the mess together.' To illustrate this, drawing from an ancient Indian metaphor, Jalal al-Din Rumi (Molana) uses the parable of the 'dark room' and the search for wholeness to convey the challenge of grasping the entirety of a situation and the need for light—something that allows observers to see the full image of the system. Rumi's insight suggests that to fully understand the whole, one must experience the light—what he refers to as the usefulness of "reflection" as an instrument to perceive greater aspects of the system. This means that one must recognize their own limitations in understanding the underlying assumptions and place greater emphasis on reflection to fully comprehend the entire system. To navigate the darkness of one-dimensional aspects of modern systems, it is essential to engage with diverse viewpoints and overcome the limitations of current systems—such as one-dimensional forces, power structures, and dominant norms and cultures. This thesis explores the intersection of creative endeavors and commitment to collective change. At its core, it is a quest for a method—an effort to design a light, metaphorically speaking, to illuminate a situation

or collective space for meaningful reflections. The following chapters will guide you through a transformative journey, beginning with the identification of those who challenge the status quo—referred to as antagonistic actors—then examining the dynamics of the existing system, and finally demonstrating how to build networks and transcend deeply ingrained mindsets and paradigms within a simulated social context.

18.8.2024

Contents

Summary in English

To transform social systems, one must develop a transformative force that enables changes in the deeply rooted mindsets and the paradigm of a system. Such an agency exists within human relationships, capable of driving structural changes. By examining how different people or groups are mutually dependent on each other — an approach known as systems dynamics — facilitates changes in mindsets and paradigms. These changes offer the greatest leverage for interventions in social systems. Any attempt to alter these beliefs and mindsets will have a profound effect that extends beyond the established boundaries of social systems, enhancing the system's ability to transform itself.

In this PhD research, the premise is that relationships between actors with conflicting interests, known as antagonistic actors, possess a transformative capacity. They can create unique conditions for initiating change and disseminating power to transcend the mindset and paradigm of a social system. The central concept of this argument is the process of idealization, which depicts the interplay between two opposing forces: conflicts of interest that lead to destruction and design that creates conditions for constructing a new social order. In this research, design (construction) is viewed as a pragmatic attempt to harness the transformative power of antagonistic actors by establishing pre-conditions for the construction of a network of allies.

Through the formation of alliances, problematization has been used to turn underlying challenges into opportunities for effective engagement between actors with conflicting interests. Upon further examination, it became evident that the nature of disagreement gradually shifted from destructive rivalry to a more constructive coalition among opposing actors. One can argue that, to build a network of allies, it is essential to first implement a pragmatic approach and encourage meaningful collaboration

among a wider community of actors. This involves creating a situation of higher-order learning, which is embedded in the core of translation as a reflective and creative social process.

This PhD research, I will address the five research questions (phases) within four cycles to leverage design possibilities and establish the essential conditions for constructing a network of allies. The first phase is a theoretical exploration aimed at understanding the nature of a multi-agent system, with a focus on conflicts and the formation of a network of allies. A systematic review of the available literature on conflicts was conducted to shed light on the link between controversies and knowledge transmission. Following this, I present a model that explores a social change process, highlighting the role of controversies as a systemic trigger for structural change in adaptive systems .

In the second phase, the emphasis is on chronologically organizing information, outlining the essential steps needed to create the foundations for a network of allies. These steps are compared with key aspects of design practice, such as the value sensitivity of design or participatory design principles, to demonstrate the advantages of using design culture to form a situation akin to a network of allies. These theoretical insights are then translated from abstract models into practical steps, combining the design and systems competencies that are essential for developing an effective design method.

In Phase Three, a design-driven conflict (DDC) approach has been developed, outlining the necessary strategies and steps. This approach addresses the limitations of systemic design projects, particularly in building a network of allies by engaging marginalized actors in sensemaking processes. A key realization from the first iteration is that for a design method to be effective on a larger social scale, it must establish new ways of connecting people, fostering a communal and reflective environment capable of transforming existing structures to accommodate a broader range of interests.

Context Mapping: Designers collaborate with other actors to map shared resources and underlying relationships. This step aims to highlight the informal complexity of the context. (b) Analysis of Power Relations: This step involves defining power dynamics and identifying spillovers that cause disagreements among actors. The focus is on understanding the system dynamics within a problematic context. (c) Synthesis of Commonalities: The DDC method synthesizes the commonalities and core narratives of actors into boundary objects. This synthesis aims to increase the flexibility of the design process, while maintaining the key elements that foster new connections between actors. (d) Using existing narratives and shared commonalities as a foundation for translation, problematization enhances the applicability of the design method by creating preconditions for building a network of allies. In this PhD research, translation is used as a process to establish dialogue and improve the method's effectiveness in gradually transforming the core narrative of a social system. In the final phase, (e) the scaling-up step, the DDC method introduces new approaches to constructing a narrative structure. This phase focuses on expanding the results of translation from smaller-scale efforts to broader contexts such as the community level. While the previous phase concentrated on synthesizing and analyzing information, this phase evaluates the feasibility of the new method's structure and steps. It employs a content analysis approach and incorporates feedback from six experts.

In Phase Four, the research incorporated key elements of design culture to support a new cycle of iteration. These elements include the ability to make sense of complex situations, sensitivity to the values of design culture, and the creative use of reflective practices through interactive templates. This phase presents an actionable version of the DDC method featuring five interactive tools, maps, and templates designed to facilitate stakeholder participation in envisioning a desired future. The purpose of these interactive templates is to foster dialogue, encourage critical thinking, and promote reflective practice during collaborative sessions. The dialogical design process used here bridges the gap between the abstract concepts of

the DDC method and its practical steps, thereby making the method more actionable. This iteration further demonstrates how a participatory approach can be implemented, providing strategies for key stakeholders to engage in thought-provoking discussion. By the end of Phase Four, the need for further iteration becomes clear—not only to refine the method but also to use paradoxical elements that stimulate critical thinking and explore pragmatic approaches for engaging with conflicting stakeholders.

In Phase Five, the method's effectiveness was further evaluated, with a focus on its performative aspects: the ability to influence the deeper narratives within a community system. To support this evaluation, a system narrative approach was applied within a simulated social context. This began by documenting the initial conditions of various social movement archetypes (actors) and outlining the spatiotemporal characteristics of the problematic situation. Using the latest version of the DDC method, key components—such as primary drivers, spillovers, and the mindsets of actors—were analyzed to monitor the pace of changes within the context, particularly in terms of creating new opportunities for connection. These components were then transformed from static descriptions into relational elements, which were crucial for developing a new narrative structure. This designed narrative, along with insights from six organizational actors, informed five interactive workshop sessions aimed at testing the method's usability and performance. The results from this final stage showed that the DDC method can effectively facilitate collective action, foster social learning, and help build a network of allies. The outcomes of this PhD research present an effective approach for exploration and translation in problematic contexts, which is critical for fostering mindset and paradigm shifts.

Summary in Dutch

Om sociale systemen te transformeren, moet men een transformerende dynamiek ontwikkelen die veranderingen in de diepgewortelde denkwijzen en het paradigma van een systeem mogelijk maakt. In de kern van menselijke relaties schuilt een kracht die structurele veranderingen kan bewerkstelligen. Door een systeem-gedreven benadering te volgen en te kijken naar de afhankelijke relaties tussen actoren, kunnen veranderingen in denkwijzen en paradigma's de grootste hefboom vormen voor interventies in sociale systemen. Elke poging om deze denkwijzen en paradigma's te veranderen zal een diepgaand effect hebben dat verder reikt dan de bestaande grenzen van sociale systemen, waardoor het vermogen van het systeem om te transformeren wordt vergroot.

In dit PhD-onderzoek is het uitgangspunt dat relaties tussen actoren met tegenstrijdige belangen, ook wel antagonistische actoren genoemd, een transformerend vermogen hebben. Deze relaties kunnen unieke omstandigheden creëren voor het initiëren van veranderingen en het verdelen van macht, zodat de manier van denken en het paradigma van een sociaal systeem doorbroken kunnen worden. Het centrale concept in dit betoog is het proces van idealisering (idealization), waarbij er een wisselwerking ontstaat tussen twee tegengestelde krachten: ten eerste de destructieve belangenconflicten, en ten tweede het ontwerp dat de voorwaarden creëert voor het construeren van een nieuwe sociale orde. In dit onderzoek wordt ontwerp (constructie) gezien als een pragmatische poging om de transformerende kracht van antagonistische actoren te benutten door de voorwaarden te creëren voor het opbouwen van een netwerk van bondgenoten (a network of allies).

Door het vormen van allianties wordt het concept van problematisering (problematization) gebruikt om onderliggende uitdagingen om te zetten in kansen voor effectieve samenwerking tussen actoren met tegenstrijdige

belangen. Doorheen het onderzoek werd duidelijk dat de aard van de onenigheid geleidelijk verschoof van een destructieve rivaliteit naar een meer constructieve coalitie tussen de tegengestelde actoren. Voor het opbouwen van een netwerk van bondgenoten is het essentieel om eerst een pragmatische aanpak te hanteren en zinvolle samenwerking tussen een bredere gemeenschap van actoren aan te moedigen. Dit houdt in dat er een situatie van leren op een hoger niveau gecreëerd wordt, wat centraal staat in het proces van vertaling (translation), als een reflectief en creatief sociaal proces.

In dit PhD-onderzoek zal ik vijf onderzoeksvragen behandelen binnen vier cycli om de mogelijkheden van ontwerp (design) te benutten en de essentiële voorwaarden te creëren voor het construeren van een netwerk van bondgenoten.

De eerste fase is een theoretische verkenning, gericht op het begrijpen van de aard van een multi-agentsysteem, met de nadruk op conflicten en de vorming van allianties (a network of allies). Een systematische review van de beschikbare literatuur over conflicten werd uitgevoerd om licht te werpen op het verband tussen controverses en kennisoverdracht. Vervolgens presenteer ik een model dat een sociaal veranderingsproces onderzoekt, waarbij de rol van controverses als systemische trigger voor structurele verandering in complexe adaptieve systemen wordt benadrukt.

In de tweede fase ligt de nadruk op het beschrijven van de essentiële stappen die nodig zijn om de basis te leggen voor alliantie-netwerken, op basis van de beschikbare literatuur. Deze stappen worden vergeleken met relevante aspecten van de ontwerppraktijk, zoals de waardengevoeligheid van de ontwerppraktijk en participatieve ontwerpprincipes, om de voordelen van een ontwerpcultuur aan te tonen bij het creëren van een situatie, gericht op allianties.. Deze theoretische inzichten worden vervolgens van abstracte modellen omgezet naar praktische processtappen, waarbij ontwerp- en systeemcompetenties worden gecombineerd die essentieel zijn voor het ontwikkelen van een effectieve ontwerpmethode.

In Fase Drie wordt een methodiek ontwikkeld die we "design-driven conflict" (DDC) noemen, waarin de noodzakelijke strategieën en stappen worden beschreven. Deze aanpak is een antwoord op de beperkingen van de systemische ontwerppraktijk, met name de uitdagingen die zich voordoen bij het creëren van allianties (networks of allies). Een specifiek doel van deze aanpak is om gemarginaliseerde actoren actief te betrekken bij het proces van zingeving, zodat ook hun perspectieven worden meegenomen. Een belangrijke conclusie uit de eerste iteratie is dat een ontwerpmethode, om effectief te zijn op een grotere maatschappelijke schaal, nieuwe manieren moet vinden om mensen met elkaar te verbinden. Dit houdt in dat er een gemeenschappelijke en reflectieve omgeving moet worden gecreëerd, die in staat is om bestaande structuren te transformeren en ruimte te bieden aan een bredere diversiteit aan belangen.

Vervolgens wordt de DDC-aanpak geoperationaliseerd door middel van de volgende stappen: (a) Context in kaart brengen: de ontwerpers brengen gedeelde middelen en onderliggende relaties in kaart in samenwerking met andere actoren. Deze stap heeft als doel de temporele complexiteit van de context te verduidelijken. (b) Analyse van machtsverhoudingen: deze stap omvat het definiëren van machtsverhoudingen en het identificeren van spillovers die onenigheid tussen actoren veroorzaken. Deze analyse richt zich op het begrijpen van de dynamieken van systemen binnen een problematische context. (c) Synthese van de gemeenschappelijke kenmerken (commonalities): De DDC-methode synthetiseert de overeenkomsten en kernverhalen van actoren tot boundary objects. Deze synthese heeft als doel de flexibiliteit van het ontwerpproces te vergroten, terwijl de belangrijkste elementen die nieuwe relaties tussen actoren bevorderen, behouden blijven. (d) Problematisering: Door gebruik te maken van het bestaande narratief en gedeelde gemeenschappelijke kenmerken als basis voor een vertaalslag, vergroot problematisering de toepasbaarheid van de ontwerpmethode bij het creëren van de randvoorwaarden voor het opbouwen van allianties (network of allies). In dit PhD-onderzoek wordt 'translation' gebruikt als proces om een dialoog tot stand te brengen en om de effectiviteit van de methode te vergroten bij

het geleidelijk transformeren van het kernverhaal van een sociaal systeem. Daarom introduceert de DDC-methode in de laatste fase (e), de opschaling, nieuwe benaderingen voor het ontwikkelen van een narratieve structuur. Deze fase richt zich op het uitbreiden van de resultaten van de vertaling van kleinschalige inspanningen naar grotere contexten, zoals het gemeenschapsniveau. Terwijl de vorige fase zich richtte op het synthetiseren en analyseren van informatie, evalueert deze fase de haalbaarheid van de structuur en de verschillende stappen van de nieuwe methode. Bij de analyse wordt de feedback van zes experts verwerkt.

In fase vier integreert dit onderzoek de belangrijkste aspecten van de ontwerppraktijk in een nieuwe iteratiecyclus. Het gaat om het vermogen om complexe situaties te doorgronden, de waardengevoeligheid die eigen is aan de ontwerpcultuur en het creatief gebruik van reflectieve praktijken in een interactieve setting, met behulp van ondersteunende sjablonen. Deze fase introduceert een werkbare versie van de DDC-methode, gebaseerd op vijf interactieve tools, kaarten en sjablonen die zijn ontworpen om de participatie van belanghebbenden te faciliteren en om de capaciteit van de ontwerpmethode te verbeteren in functie van een gewenste toekomst. Het doel van de interactieve sjablonen is om de dialoog te bevorderen, kritisch denken aan te moedigen en reflectieve praktijken te stimuleren tijdens samenwerkingssessies. Daarnaast helpt het gebruik van een dialogisch ontwerpproces om de kloof te overbruggen tussen de abstracte concepten van de DDC-methode en de praktische stappen, waardoor een werkbare versie van de methode ontstaat. Deze nieuwe iteratie laat ook zien hoe een participatieve aanpak kan worden geïmplementeerd, waardoor er strategieën ontstaan voor de belangrijkste belanghebbenden om deel te nemen aan provocerende discussies. Tegen het einde van fase vier wordt de noodzaak voor verdere iteratie duidelijk, niet alleen om de methode te verfijnen, maar bijkomend ook om nieuwe elementen te introduceren die gebruik maken van paradoxen om kritisch denken te stimuleren en pragmatische manieren te verkennen om in gesprek te gaan met conflicterende actoren.

In Fase Vijf wordt de effectiviteit van de methode verder geëvalueerd, met de nadruk op de performantie en het vermogen om het diepgaande narratief van een gemeenschap te beïnvloeden. Om deze evaluatie te ondersteunen, werd een systeem benadering toegepast binnen een gesimuleerde sociale context. De aanpak begon met het documenteren van de initiële condities van verschillende archetypes (actoren) van sociale bewegingen en het schetsen van de ruimtelijke en temporele kenmerken van een problematische situatie. Met behulp van de nieuwste versie van de DDC-methode werden deze initiële elementen - zoals de belangrijkste drijfveren, spilllover effecten en de denkpatronen van actoren - geanalyseerd om de resulterende veranderingen in de context te begrijpen, met name in het creëren van nieuwe mogelijkheden voor verbinding. Deze elementen werden vervolgens omgezet van statische beschrijvingen naar relationele componenten, die nodig waren voor het ontwikkelen van een nieuw narratief. Het ontworpen narratief, samen met de inzichten van zes betrokken actoren, diende als basis voor vijf interactieve workshopsessies om de bruikbaarheid en de performantie van de methode te testen. De resultaten van deze laatste fase tonen aan dat de DDC-methode effectief kan bijdragen aan collectieve actie, sociaal leren en de opbouw van een alliantie (network of allies). De resultaten van dit PhD-onderzoek tonen aan dat DDC een effectieve methode is om problematische situaties te verkennen en te vertalen, wat cruciaal is voor het stimuleren van een verschuiving in de mentaliteit en het heersende paradigma.

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Ch. One

Chapter 1: **Introduction**

1.1 Analogy: the journey to the pole

This chapter may introduce a range of new terminologies, especially for design researchers. I commence this chapter with an introductory narrative that serves as an analogy. The objective of this approach is to facilitate a comparison of complex concepts and their underlying meanings and rationales. Prior research has shown that poetic representations of meaning have implications that extend beyond their immediate interpretation (Adib-Moghaddam, 2020). Notably, Dewey, in his concept of the "great community" (p. 144), illustrates that the practical usefulness of art—whether in drama, poetry, or novels—lies in its ability to break through the crust of conventionalized or routine consciousness. In his view, ordinary things, such as a flower, a gleam of moonlight, or the song of a bird, are not merely functionless items; rather, they can be seen as a means through which ones can experience deeper levels of life, inspiring desire, and thought (Dewey, 1946). Thus, through the poetic representation of a complex concept, one can not only explain difficult terminologies but also evoke sentiments, enhance understanding, and reveal additional layers of meaning (Carey, 2024). In the following sections, I have aimed to apply a similar approach by using such a language, and styles to foster engagement, dialogue, and communication. This approach focuses on explaining abstract concepts related to systems thinking and culture through the narrative expression of relevant ideas. The core narrative is inspired by "The Valley of the Quest," a long poem by Attar Neyshabur titled "The Conference of the Birds," translated into English by Sholeh Wolpé (2017). I chose Attar's work for this research because I encountered its narratives in various systems literature and was particularly inspired by how others have used its core concepts to explain the idea of wholeness, especially in Banathy's discussion of "who should be the designers in social systems" (p. 233).

The birds of the world gathered from near and far
They said: no nation is without a leader;
Why is that we don't have one?
They converged to seek a leader
A body without a head is without direction
Worthy of their nation of birds [P. 41]

Plot one: *During a winter holiday, a group of travelers decided to embark on a journey toward the North Pole in a small van. Before starting their adventure,* they checked the routes, reviewed the weather conditions, and gathered all essential items for the expedition, as is customary for any journey. *The journey to the North Pole was their first experience, they had no idea what awaited them. The only thing they knew about the North was based on other people's experiences, stories, and reading of some articles. Over the last few years, the travelers have heard many narratives, but one had a stronger message.* The narrative was, that people at the Pole are known to be less hospitable to outsiders than their counterparts at the South. *They were deeply influenced by this narrative, which significantly affected their planning. They tried to be packed and prepared, so they started booking hotels in advance and planned not to stop in other cities before reaching the destination.*

Relieve us, of our burdens Hoopoe
So that we can launch into this voyage. [...]
On such a journey, doubts will filter out the light.
When our anxious hearts are released,
Our bodies will give themselves to the road" [P.112]

Plot two: *The first day of their journey was pleasant, and they quickly crossed the border. As they entered the North Pole*, they received a few welcoming messages, one from a mobile operator and another from the government. As they continue, more welcoming messages arrive within the first few hours. *This was a strange but positive surprise, especially because they expected the system to be less hospitable. Therefore, 'their spirits were high and were lifted by this such an unexpected warmth.' However, on the second day, their journey took a difficult turn as heavy snowfall arrived unexpectedly. The* travelers *decided to make a brief stop at the nearest location.* They soon discovered a small village where they could take refuge and wait out the snowfall. As they moved through the village searching for a place to stay, they quickly realized that all the hostels were closed, and the shops had shut down. *After two hours, the town grew darker and the temperature dropped, making the search for shelter crucial for survival.* They knocked on doors, but no one responded. They assumed the townspeople, living so close to the Pole, were wary of strangers. *However, after an hour, a small cottage door finally opened, and they were relieved to be welcomed inside, where they had pleasant conversations with the residents.*

"The Simorgh does not reveal its home;
How then can one dare to seek? Where is the nest of wisdom?
There are no roads to its court, no doors to point the way!
If one could glimpse even a trace of, that would be something! … " [P. 45]

Plot three: In their first encounter with residents, communication was challenging because of language barriers. They relied on a mobile application to bridge this gap, which made their initial conversations possible, although not without difficulty. Despite the simplicity, the app proved invaluable in facilitating conversation. Thanks to the application, the travelers discovered that the family was willing to offer them a place to stay. Grateful of the offer, they accepted and were warmly welcomed into the household as temporary members. For travelers, this transition felt seamless—welcome relief after their initial struggles. However, for the family members, the decision to host strangers sparked numerous discussions, partly about trust and partly about their reasons for welcoming newcomers into their homes. Once settled, the travelers began to learn more about the family: a father, a mother, and their daughter, each with their own unique stories and perspectives. This deeper understanding enriched the travelers' perception of the family dynamics and fostered a strong sense of connection.

They soon realized that the family was genuinely kind. During their stay, the family treated them respectfully during meals and at night. They were given the same food and access to facilities, and treated with the same rights as the family members themselves. Despite adjusting to new rituals, such as dinner, the travelers could not shake the feeling that the family's offer of hospitality might have had hidden motives, rather than being purely out of kindness.

> *Don't be distracted by what is not the light*
> *The only closed doors are your own eyes*
> *Keep searching, one door is always open*
> *To those who wailing; when was the door even shut? [P 260]*

Plot four: On the next day, as the travelers prepared to leave, a breaking news bulletin interrupted their breakfast: "Severe weather will persist, and everyone should stay indoors for the next few weeks." This posed a serious challenge: continuing their journey would cut them off from essential resources like water, electricity, and food. With no option but to stay, tensions quickly grew as they discussed their options and preferences. The father and mother disagreed on how to protect their daughters and manage the household under these unexpected circumstances. The father, believing in kindness, was eager to support the travelers and ensure that they could stay. The mother, however, was worried about limited resources and the possibility of not having enough food for their child and others. After a long discussion without resolution, they decided to be honest with everyone in the cottage. They invited travelers and their daughters to participate in the conversation.

> *When the birds heard this story,*
> *They understood their connection to the Simorgh.*
> *They became eager to learn more.*
> *They gathered on the great Path as one voice, they asked:*
> *"Bird of experience (hoopoe) how are we to manage this flight? [P83]*

Plot five: As the travelers continued their discussions, they realized that exchanging resources was not as difficult as they had initially feared. Years of solo traveling had provided them with valuable insights and experiences, which they were eager to share with the family. On one hand, these insights helped the members not only optimize the use of resources but also share the surplus with others,

thereby increasing the possibility of collective survival. *Through the ups and downs, discussions, and occasional challenges, they found common ground—a place beyond right and wrong—where survival became the priority. In other words, despite the tensions and disagreements, they began to forge a new shared reality. They realized that survival, as a greater aim, could take precedence over individual needs; it was a collective effort. Although they did not always meet their original goals and the family had to adapt to some of their values, they discovered the strength of unity through reflection. The journey also challenged the travelers' old assumptions, giving them a fresh perspective; upon returning home with new experiences and a changed view of hospitality, they understood that hospitality goes beyond geographic boundaries. It is about creating a space in which everyone can come together.*

<div align="center">

They were thousands, but now, only thirty.
They saw the face of Simorgh. But in reflection!
When they looked closer, they saw the reflection was their own:
Simorgh ... Si-Morgh ... which means thirty birds, Si, thirty, Morgh, birds.
Thirty was them, and they were Simorgh; this You and Us, Us and You. [P 331]

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The narrative above illustrates how relationships can undergo change during periods of instability. Attar characterizes his work as a journey, depicting actors as wayfarers. According to Attar's poetry, if we as actors are not seekers, we are akin to inanimate objects—"hence, listless shadows on a wall, hence soulless puppets of their kind." From this perspective, humans should not be considered merely passive entities within a confined system; rather, their interactions with one another and their environments are important aspects. The central premise of this narrative is that situations and problems that emerge from these interactions can be understood as public or social matters. This framework posits that individuals, whether considered as social agents or as part of a collective whole, should ideally address their fears or challenges in a relational manner: transforming adverse events into opportunities for growth and progress.

These processes are transformative as they focus on achieving empowerment and identifying strategies to influence the broader social matters. While the entire book functions as a comprehensive manual for facilitating transformation, the current discussion emphasizes only a few nuances through a simplified narrative of the context. The primary emphasis is on how these changes influence people's ways of thought by

shifting their deep assumptions and deepening their perspectives to realize the concept of wholeness. This insight is grounded in the fundamental principle of systems thinking, which posits that understanding the dynamics of a context is more feasible through effective framing of relationships between agents (Laszlo, 1972). This principle applies across various contexts, including small-scale environments such as communities, families, and groups of friends, navigating the complexities and challenges of their shared experiences.

In reality, social systems are far more complicated than individual units, artifacts, or mechanistic systems (Gharajedaghi & Ackoff, 1984). Analyzing the dynamics of relationships and changes in narratives is a complex and multifaceted endeavor. While the current narratives aim to articulate complex situations, it is essential to acknowledge that various factors—such as power dynamics, and individual preferences—significantly shape the underlying dynamics within a given context (Flanagan, 2014; Trif et al., 2022). Thus, the outcomes of these dynamic processes, including the emergence of new values, opinions, and orders, are inherently contingent and may occasionally result in undesirable changes. The greater the complexity of a social system, whether normative or relational, the higher the likelihood of dissonance among actors (Elwert, 2001). Although the narrative presented here may be perceived as somewhat basic from an artistic perspective, it functions pragmatically as a guideline—rather than a principle—offering a concise overview of the challenges and uncertainties that may arise when introducing fundamental concepts. The first chapter examines these themes from an interdisciplinary perspective, concentrating on areas such as knowledge, relationships, and design as a transformative process—a journey toward change. Throughout this introduction, I will iterate, and translate various concepts to elucidate new terminologies.

1.2 The challenge of applicability: A Research Gap

In recent years, interdisciplinary aspects of design sciences have increasingly focused on integrating systems theory and design culture (Barbero, 2018; Bijl-brouwer, 2022). One recent iteration of this new design culture is systemic design, which offers new possibilities for articulation, change, and sensemaking in higher-order systems (Pennefather et al., 2018; Van der Merwe et al., 2019). From a systems perspective, systemic design has been aligned with the latest discourse in systems science known as critical system heuristics (Jackson, 2003; Ulrich & Reynolds, 2010). From a theoretical perspective, a systemic design approach focuses on more pragmatic questions, necessitating the use of creative competencies underlying various design cultures. This includes the systematization of designerly ways of doing and their guidelines in practice, known as design thinking (Jones, 2017). It also focuses on ways to leverage the analytical aspects of systems thinking to create process-oriented interventions (as opposed to solution-oriented interventions) in higher-order systems.

Despite certain advantages of systemic design, a strong inclination toward an analytical culture (rooted in systems thinking) limits design competencies, including the practical and creative aspects of designs (Barbrook-Johnson & Penn, 2022; Sevaldson, 2011). Zooming in to scholarly works related to systemic design reveals that the majority of the results still concentrate on principles (Bijl-Brouwer & Malcolm, 2020; P. H. Jones, 2014), roadmaps, guidelines, and frameworks often emphasize theoretical exploration (Costa et al., 2019; Nelson, 2022a). Although this has certain advantages, such as new possibilities for the exploration and interpretation of appropriate systems theories, reflection on the nature of problem situations, and insight into the level of stakeholder participation, there remains a need to understand the application of systems thinking and the relevant methods in the context of design projects.

In other words, further iteration is vital to make the use of systems theories more applicable in design-related projects (Costa et al., 2019). A rapid

review literature revealed that a strong theoretical inclination underlying systemic design projects leads to studies that are descriptive rather than creative, or critical and transformative (Nedaei & Jacoby, 2023). This implies that design studies employing a systemic approach rely solely on the generic structure or the advantages of integrating the two scholarly domains, design and systems inquiry. While the question of what a systemic design should look like is important, and the bridge between these two domains offers unique possibilities for research and practice, such as mapping large-scale systems or delving deep into the problem space, concerns persist regarding its epistemological aspects. How can we improve the applicability of a systemic design project, and what can be achieved through the integration of these two logics?

At first glance, it is evident that systemic design is a relatively new approach, and many aspects of it are yet to be fully explored. For instance, current projects surrounding systemic design reveal a lack of consensus regarding appropriate outcomes. In a study on systemic design principles, Jones (2014) stated that due to this uncertainty, many researchers and practitioners borrow models from other research domains in a piecemeal fashion without an in-depth understanding of the situation. This often results in a lack of strategies or policies that indicate the level of complexities at play. Using a pragmatic lens, Dorst (2015) argued that adopting a concept or practice from one specific domain requires assessing the appropriateness of the new concept based on the specific needs of the field (design). Drawing on Dorst's argument, Bijl-Brouwer (2022) mentioned that designers must be able to create critical connections within their designs and between their designs and the larger system level. In other words, systems thinking is a prerequisite for an effective design culture, especially when aiming to bring about a change in a higher order. Likewise, rationales and mindsets from systems thinking must be adapted to the specific needs of design science. Achieving this requires operationalization; developing a type of critical understanding that can reframe fixed principles in one domain, introduce appropriate processes, and adapt new strategies for use in the new field (Costa et al., 2019).

The latest research in systems science has revealed that an new iteration of systems thinking that can appropriately respond to the specific needs of design science is critical systems thinking (Ulrich & Reynolds, 2010). It is the latest iteration of the systems methodology that necessitates the usefulness of a pragmatic approach, leverages the roles of those who need to be involved (actors in situations of marginalization), and what needs to change (power relations) to increase the applicability of a systems approach while considering the humanitarian aspects of change and progress, i.e., justice, equity, empowerment, and moral progress (Jackson, 2003). Although delving into the latter—identifying the question of who these actors are and understanding the underlying ethical aspects—is beyond the scope of this research, it does not negate the necessity for an epistemological approach. This highlights the need for a process-oriented approach: designing new methods and processes, creating context-specific solutions, and adopting a design-based approach in complex social systems.

Gap: Based on a pragmatic standpoint, integrating a new concept from one discipline into an already established frame of reference is more attainable if it meets the specific needs of the existing theoretical canvas. Following this logic, the latest iteration of systems thinking—critical systems heuristics—becomes more effective if new adjustments enhance its applicability for an action-oriented discipline. This recognition reveals a knowledge gap at the process level, a form of uncertainty that requires further investigation. Research should focus on the core principles of critical systems heuristics and their relevance in driving innovation in higher-order systems. This calls for a research inquiry aimed at leveraging systems thinking to enhance the effectiveness of design processes. It involves understanding how to engage key stakeholders, navigate power dynamics, and amplify the voices of marginalized groups. By doing so, it fosters stronger alliances over divergence and creates a reflective environment that promotes deeper understanding and meaningful shifts in mindset.

1.3 How to intervene in social systems?

1.3.1 Mindset and paradigm change

To understand the underlying motivation for advancing a pragmatic approach and how means and processes can be adapted to bring about change, it is necessary to look back a decade before the popularization of critical systems thinking. In this earlier period, a similar argument emerged based on the two classic systems methodologies all grounded on a greater systems framework called open systems theory (Schneider & Somers, 2006). The first approach is system dynamics (identifying places to intervene) and the second is chaos and complexity. Both approaches focus on process-oriented interventions to leverage power to create change. The latter, complexity, views systems as real-world phenomena comprising a complex network of relationships between the actors and agents of a unified system, where problems are part of a greater system (Schneider & Somers, 2006; Turner & Baker, 2019). The former, system dynamics, is more epistemological, aiming to address a particular issue of interest, hoping to leverage the extent to which a system can operate under external challenges through internalization, sensemaking, and adaptations (Abson et al., 2017).

1.3.1.1 *Systems dynamic approach: the place to intervene*

In system dynamics, the formidable task of identifying the right places for intervening in systems was clearly discussed in the groundbreaking work of Meadows (Abson et al., 2017; D. Meadows, 1999; Meadows et al., 1972). This member of the Club of Rome introduced in her systems analysis the twelve leverages to intervene in systems. Based on this model, the core of the exploration was her emphasis on the ideal of transcending the deep mindset and paradigm as the most impactful leverage point for intervention.

In a conference paper published in 2006, Pourdehnad defined the word 'mindset' as a prerequisite or gatekeeper of the learning process in human

objects. From this perspective, for new learning to take place, one must transcend one's strongest viewpoint or mindset. Thus, a person can have a particular view that is so entrenched in a specific outlook that they do not see other perspectives, even though they might hear them and believe they have given consideration to those perspectives. Pourdehnad argues that the current mindset guides the collection and interpretation of certain types of information. This prevents individuals from openly considering new possibilities. In other words, no meaningful learning process will take place unless one changes their deepest mindset.

With regards to how one can change a mindset, Meadows particularly acknowledged the importance of change at the deep layers of systems. The deep layers of social systems are structured by social norms and values. She extended this concept to the level of 'power' to transcend the paradigm. According to this view, to change a paradigm and create a new order, one must create the power or legacy to transcend the mindset from which the system emerges. Pourdehnad framed this power of change in paradigm as the ability to unlearn, a cognitive process that must be instilled at both the personal and organizational levels. From this perspective, 'one's mindset represents a theory of what the world looks like to them', and like every theory, a mindset exists in the form of a knowledge structure. Pourdehnad then continued that before any change can occur, one must use a specific lens to see what needs to be let go of first (Pourdehnad et al., 2006). Thus, mindset changes requires a predisposition to challenge existing reality, norms, and values. A change in mindset begins with an inclination that involves first seeing and then resetting and challenging old assumptions, experiences, ideals, values, motives, and beliefs used consciously or subconsciously in decision-making and learning. These beliefs and values are shaped throughout one's life and deeply embedded in both individual and organizational aspects of ones culture.

A few examples of those assumptions, as well as the ability to see them, have been provided in the journey-to-the-pole analogy. Based on the narrative, before embarking on the journey, the travelers held the

presumption that people in the town wouldn't open their doors due to a lack of hospitality. This was the travelers' way of seeing, supporting his assumptions at a subconscious level. For the travelers, this assumption stemmed from an old narrative claiming that "living in a cold climate makes people less hospitable." This was a deep value for them, an assumption shaped throughout their lifetime and influenced by their friends and family.

It is crucial not only to understand how to challenge deep-seated assumptions but also to consider the ability, power, or resources required to question or, if possible, destabilize these entrenched attributes (Pourdehnad et al., 2006, 2014). Consequently, a process aimed at reframing the mindset should not only develop new ways of perceiving situations—essentially the ability to take a broader perspective—but also adopt both a relational and systems perspective. Figure 1 presents a conceptual visualization of the various leverage points for intervening in a system. Changes at each level can result in different outcomes, with shifts in mindset having the most significant effect.
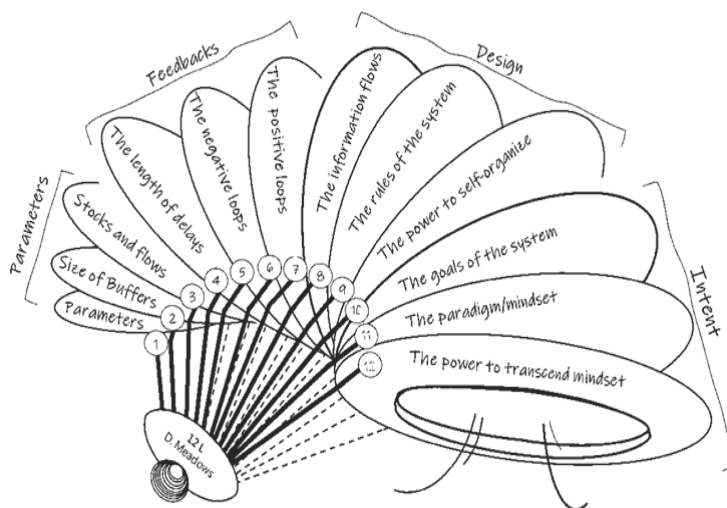
Figure 1 is a metaphorical representation of 12 leverage points to intervene in a complex system. At the heart of this model is a hierarchical structure that shows the deep leverage points of a system (No.12) have a bigger impact on the design of a system (Abson et al., 2017).

1.3.1.2 *Complexity and Chaos: Order in Disorder*

In chaos and complexity theories, Ackoff, and later Gharajedaghi, articulated similar reflections. Gharajedaghi, in his exploration of systems architecture, highlighted that systems inherently possess self-organizing capabilities. This concept, also known as autopoiesis, is an inherent characteristic of social systems and is based on principles of learning, change and continuity (Luhmann, 1995). Self-organization, as an informative process, signifies that change is continuous and can be experienced at higher levels of learning. Gharajedaghi (2004) argues that meaningful learning must occur through mechanisms that are revolutionary or capable of inducing significant change. In complex systems, the rate of self-organization and subsequent transitions is correlated with the energy, agents, and the extent to which learning occurs through interaction.

In complex systems, transitions often guide the structures and patterns of behaviors toward a predefined order (equilibrium) unless there is a change in shared images, deep values, and assumptions (Loorbach, 2022). From this perspective, the success of any action in a complex system depends on the extent to which one can penetrate or modify embedded ways of thinking. They are embedded ways of thinking because we most absorb them unconsciously, while growing as human (Pourdehnad et al., 2006). Individuals within a complex system can articulate their prevailing worldview to some extents, because most of us are not aware of how we arrived at our present mindset or for that matter the existence of a prevailing worldview within ourselves (Ackoff & Gharajedaghi, 1996). Individuals often find themselves unwittingly trapped within entrenched structures without fully grasping their adherence to initial order (Schneider & Somers, 2006).

Learning from experience, many institutions initially designed to foster structural change often perpetuate the systems they seek to challenge inadvertently. Actors, communities, and organizations aiming to change

the status quo frequently fail to bring about substantive changes at a greater system level (Schneider & Somers, 2006). The failure of these organizations to achieve substantial change can be traced to several factors, including interventions at superficial levels, an increasing tendency toward subjectivity, the imposition of order on naturally disorderly systems, and an overreliance on the size and structure of buffers (Dixon, 2020; Huybrechts et al., 2017). In contrast to these pseudo-attempts, the complexity theory serves as a valuable framework for understanding and addressing these methodological matters (Gharajedaghi, 2004). In the realm of complexity theory, feedback mechanisms and structured approaches are pivotal in elucidating system dynamics (Jones, 2014). Nevertheless, their efficacy in effectuating substantial changes can be contested (Meadows, 1999). It is imperative for individuals to delve into their relational aspects—such as dependencies and interactions—as well as the power to change self-organization. Systems dynamics illuminate the path to substantial change through interventions at the worldview and mindset levels. However, complexity theory emphasizes the importance of understanding the relational aspects, focusing on the dependencies among key actors and the patterns of new relationships. Understanding how different types of relationships evolve and operate and how they can gradually reshape worldviews and mindsets is central to complexity theory (García-Díaz & Camilo, 2018; Schneider & Somers, 2006).

In the story presented, the travelers encountered various counterintuitive situations; some were contrary to their initial assumptions and some were well-designed and eye-catching pieces of information. Although they initially recognized the hospitality of the people, their old view did not change. It was only when they entered a new field or context and engaged in various social encounters, including dialogue and discussion, that a new way of seeing gradually emerged, enabling them to see the other side of their right (or wrong) doing. For instance, they saw that the residents were hospitable, such as opening the door without asking for a particular reward. They framed receiving welcoming messages as positive signs (e.g., during the border crossing), but these were not adequate. In other words,

it was only through multiple encounters, serious conversations, and reflections that small changes occurred, allowing them to realize the underlying reason for the hospitality of family members. The lesson learned from this analogy is that achieving a change in mindset is more feasible when appropriate strategies are effectively identified and interventions are well-targeted.

This perspective emphasizes the importance of recognizing contextual factors and the need to frame complexity and uncertainty in a way that is sensitive to local contexts, dependencies, and relationships between agents. Thus, in complex systems, mindset and paradigm shifts typically arise in response to fluctuations, destabilization, and enduring challenges (Walker et al., 2004). To enhance the effectiveness of these shifts and drive higher-order innovation, it is crucial to adopt a relational perspective that considers the dependencies among actors as agents—an approach that enables both structural and action-oriented change. Once the correct modes of relationships or approaches are identified, it becomes not only more feasible to gain clarity on our own perspectives but also to initiate the processes of reflection, change, and unlearning (Olsson et al., 2014; Westley et al., 2013).

1.3.2 Interpersonal relationships: Unlocking the capacity to transcend mindsets

The capacity to transcend mindset lies in one essential property of social systems: relationships between members. These are challenging attributes of social systems; being hidden and invisible makes them difficult to research and study them with a ordinary and mechanistic lens (Tureta et al., 2021). In this section, I deliberately included the word 'power' to underscore the transformative capacities of actors' relationships in transcending their own mindsets. Ironically, this normative power plays a crucial role in reshaping diverse perspectives, which are closely intertwined with the notion of conflicts as a contradictory form of social relationships, a notion that has been extensively explored in both anecdotal evidence (the quest to pole) and scholarly literature (chaos theory).

In the analogy, it was evident that during the first encounter, the travelers were unsure about the underlying relationships of the family members. In their first attempt, they discerned some basic forms of relationships, but it was only during further interactions that they could realize other types of dependencies, e.g., the collaborative relationships between the father and mother of the family. Despite the visibility of the causes and effects of the interactions, many aspects of relationships remain hidden within the context.

In social systems, relationships, though often invisible, serve as generative spaces in which internal codes of conduct, connections, and interactions evolve (Ikegami, 2000). Unlike visible elements such as the actors themselves, these relationships exert significant influence and can enhance the system's capacity for self-organization i.e., through the creation of synergies or reflexive effects. These capacities are contingent upon openness to diverse perspectives, which is essential for fostering meaningful interactions and developing new forms of relationships. Relationships among individuals can be conceptualized as a social instrument with significant 'power' or agency for move and progress (Ciplet & Harrison, 2020; Della Porta et al., 2014). Theoretically, individuals can sustain relationships despite holding opposing viewpoints. Human relationships are not exclusively based on shared interests; they can also develop and persist through conflicts of values and interests. This implies that the foundation of human interactions is not limited to consensus but can also be rooted in the dissonance.

1.3.2.1 *Conflict: a form of social relations*

A perspective, derived from systems theory, posits that conflicts—as forms of social relations—can be transformative and possess the potential to significantly influence individuals' thoughts and opinions (Buchel et al., 2022; Jones, 2018). Ironically, this perspective (seeing conflicts as form of social relations) is also widely acknowledged within the tradition of pragmatism, especially among those who advocate for a more instrumental approach to systems (Dixon, 2020). From this view, the

capacity to transform deeply ingrained assumptions, institutions, and values is inherently embedded within the very interactions and relationships that constitute a community. This transformative potential persists even when these interactions are marked by conflicts of values, suggesting that the dynamic nature of social relations can serve as a catalyst for institutional change.

Dewey, in his vision of democracy, asserted that conflict is an inherent product of human progress, including technological advancements. He critiqued the role of the state in attempting to reconcile these conflicts, arguing that conflict is a fundamental aspect of social relations and prerequisite for change and progress in societies (Dewey, 1946). Dewey posited that the primary concern is not the mere existence of conflict but rather the ways in which conflict is managed and instrumentalized. He emphasizes that the methods or forms through which individuals are brought together in collective activities play a crucial role in the formation of a new society (p. 9). Consequently, Dewey argued that "the genuine problem is that of adjusting groups and individuals to one another." This perspective later contributed to the development of a taxonomy that classifies conflicts into four distinct categories: (a) conflicts between groups, (b) conflicts between individuals, (c) intrapersonal conflicts, where an individual experiences internal division due to competing affiliations, and (d) personal conflicts, which arise independently of external affiliations and reflect internal discrepancies (e.g., a person may experience conflicting roles as both a church member and a business professional). He later distinguished the final category as internal or personal conflict, while the first two modes of conflict were conceptualized as forms of social dissonance. Dewey then posited that conflict should be understood as a quest for readjusting relationships, particularly from a distributive perspective. In this view, conflicts are not merely disruptions but should be regarded as methods or instruments for achieving a more equitable distribution of power among all members of a community. Thus, conflicts serve as mechanisms for reconfiguring and balancing social relations,

ultimately contributing to the creation of a more just and cohesive society (P 9).

Thus, it is evident that conflicts between social agents can be instrumentalized as tools for emancipation. Much like any instrument, conflicts can be strategically formulated to achieve specific outcomes, such as the liberation from oppressive structures or the transformation of rigid mindsets (Dewey, 1946). Through the deliberate use of conflict, individuals and groups can challenge and potentially dismantle entrenched systems of power, foster social change, and promote greater equity. Given the interdisciplinary nature of this study, which focuses on the use of conflict as an instrument for changing mindsets, this research explores the underlying structure of conflict by integrating perspectives from systems science and design science. The study begins by examining conflict through the lens of systems theories, highlighting its relational aspects. It then considers conflict from the viewpoint of design science, emphasizing its instrumental role. This dual approach underscores the necessity of developing a translational framework to effectively dissolve these two domains, allowing for a more comprehensive and practical application of conflict.

1.3.2.2 *A systems perspective of conflicts*

From a systems perspective, particularly within the framework of complexity and chaos, conflicts between actors are regarded as an inherent characteristic of social systems (Gharajedaghi, 2004). In organizations where members function as independent agents—each with the capacity to exercise choice—conflicts and disagreements are inevitable. From a systems thinking perspective, this implies that while multiple realities can coexist, they may also come into conflict and contradiction (Molnar & Palmås, 2022). In complex systems, such as societies, reconciling these differences presents significant challenges i.e., prioritizing one reality over another can increase the risk of confrontation.

During the journey a sudden change triggered a crisis situation, leading to a series of reflections, adaptations, and strategic shifts among travelers and family members. This crisis marked a pivotal situation, sparking intense debates over access to or mobilization of available resources, which eventually brought underlying tensions to the surface. While individuals initially made independent decisions (choice), it soon became clear that collective survival require cooperation. Travelers began to adjust their strategies and gain a deeper understanding of the challenges they faced. Family members recognized the value of incorporating travelers' experiences into their problem-solving approaches, rather than disregarding them. In turn, travelers reevaluated their assumptions and began to appreciate the concerns of their families.

Conflicts are foundational aspects of social life, shaping everything related to self-organizing systems, from major structural changes, such as revolutions, to minor reforms or instances of destabilization (Molnar & Palmås, 2022). These conflicts can constructively create critical moments when individuals move beyond their own perspectives to consider the well-being of others, which is a key step toward a more progressive and holistic approach to social relations. From a systems perspective, such shifts are common in real-life situations, where the increasing complexity of social systems amplifies the risk of polarization, which can lead to either constructive or destructive outcomes. From an open systems perspective, conflicts can be understood as part of a broader spectrum that includes tensions, disagreements, and spillovers (Ciplet & Harrison, 2020; Cuppen et al., 2020). Achieving significant transformation under adverse conditions, such as during a pandemic, requires a strategic approach to conflict management. While resolving controversies may be effective in certain contexts, an exclusive focus on resolution can sometimes legitimize undesirable outcomes (Snow et al., 2018). Gharajedaghi (2011) emphasized the importance of dissolving conflicts rather than relying solely on resolution strategies as a means of achieving more sustainable and holistic solutions.

From a network perspective, this approach necessitates the formation of new alliances, which involves the aggregation or strategic construction of conflicts and the deployment of methods such as mapping controversies to facilitate richer interactions between elements Tureta et al., 2021). To fully leverage the benefits of conflict as a catalytic agent, it is essential to create preconditions, spaces, or networks conducive to such interactions. This integration of network and systems approaches underscores the need for a strategic and instrumental approach to conflicts, where the focus is on framing (in) conflicts and designing (in) systems that foster environments conducive to cooperation and experimentation (Knight, 1992; Venturini et al., 2015).

1.3.2.3 *A design perspective of conflict*

In design science, conflicts have initially been examined through a positivist framework, particularly in studies focused on design and behavioral change. One vivid example is the framing of design outcomes as mediatory artifacts that can bypass the dilemmas associated with human and non-humans (Tromp & Hekkert, 2014). These approaches utilize products and services to remove conflicts emerging from the interaction of multiple agents, including technological and human interactions (DiSalvo, 2009). Some perspectives view conflicts as constraints arising from design processes, particularly in decision-making during the co-creation phase, where ends and means might be in contradiction (Molnar & Palmås, 2022). A prior study showed that these approaches often seek to simplify or reduce underlying complexities to mitigate the risk of confrontations, a process referred to as resolving dilemmas rather than moderating or triggering them (Ozkaramanli et al., 2016). Thus, a reductionist or methodological bias exists within the mechanistic aspects of design intervention, which tends to view conflicts merely as constraints, problems, or issues within a larger framework of design culture, something that must be resolved (Molnar & Palmås, 2022; Ozkaramanli et al., 2016).

In contrast, this PhD research, informed by its interdisciplinary foundations (design and systems science), adopts a mediatory perspective that views conflicts not merely as barriers but as catalysts for change, capable of creating opportunities for effective transformation. Rather than treating conflicts as static issues to be resolved or eliminated, this approach conceptualizes them as dynamic social instruments that can drive meaningful transformations (Dewey, 1946). Individuals with differing opinions serve as key interlocutors who not only challenge but also negotiate and engage in a communal space for both formal and informal interactions. From this view, conflicts between agents are seen as essential components of change processes. The intentional construction of conflicts becomes a prerequisite for leveraging the crucial role of conflicting actors in driving higher-order innovation (Buchanan, 2019).

This perspective aligns with those who adopt a pragmatic yet systemic approach to framing controversies. For example, Dixon reflects on Dewey's vision of democracy, where conflict and heterogeneity are seen as essential tools for fostering effective change within social institutions. In his exploration of the participatory dimensions of design, Dixon emphasizes the critical role of conflicting actors as an essential driver of higher-order innovation (Dixon, 2020). Hence, conflict should not be oversimplified or viewed merely as a constraint or a step toward resolution; rather, it should be recognized for its capacity to mobilize the influence of interlocutors in directing and shaping the trajectory of innovation (Tureta et al., 2021; Venturini et al., 2015). This approach emphasizes the critical roles of interlocutors, whose positions may evolve over time, resulting in various oscillations such as changes in responsibilities, roles, and regulations. Drawing on Dewey's vision of democracy, particularly his concept of the "public and its problems," Dixon stresses the importance of evaluating the positionality of diverse interlocutors, including shifts in power dynamics, to ensure that the public is not only involved in decision-making processes but also in shaping the institutions that influence the discourses underlying those decisions. In design science for higher order, it is essential to consider how to enhance the collective capacity of systems by empowering and

repositioning antagonistic stakeholders. From this perspective, conflicts can be viewed both as a mode of social relationships within a system framework and as a mechanism for structural change within a design science paradigm. Thus, designers and other stakeholders are expected to act as translators or knowledge brokers within this context (Tromp & Hekkert, 2014), leveraging conflicts between opposing agents as tools for generating new means and ends; creating inclusive spaces that facilitate higher-order discussions, dialogues, and articulations (Tureta et al., 2021).

Research suggests that, in sensitive situations, translational mechanisms, such as discussions and negotiations, should enable key actors to openly articulate their perspectives (Carey 2024). This, in turn, fosters mutual understanding and encourages deeper reflection across various scales and organizations (Manzini, 2016). Implementing reflective practices and exploring diverse perspectives are critical for achieving systemic change. By prioritizing dialogue, stakeholders can collaboratively shape their organizations, thereby guiding the direction of innovation. As such, the establishment of translational spaces is essential for effectively integrating design and systems thinking, particularly in the context of conflicts and disagreements. This integration calls for a paradigmatic shift, one that embraces new approaches to framing and understanding various paradoxes. Figure 2 illustrates different approaches to framing the concept of conflict, especially from a systems perspective. The next section delves deeper into critical systems discourse, highlighting the benefits of systems thinking that align with the needs of design culture. The premise is that this integration becomes more feasible through the use of translation as a bridging step. By fostering translational spaces, stakeholders can collaboratively shape their organizations, thereby driving systemic changes.
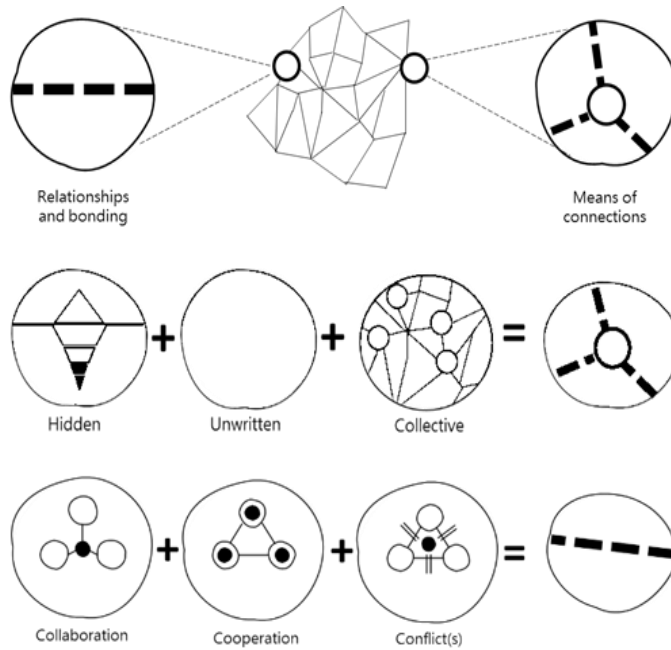
Figure 2 From a systems perspective, conflicts, as inherently contradictory modes of social relationships, possess the capacity to induce significant changes in deeply entrenched mindsets. This potential can be strategically leveraged to drive innovation, challenge established norms, and facilitate meaningful shifts in the underlying social systems, including power structures.

1.4 Context: The Critical Systems Discourse

Critical system heuristics is a philosophical framework that integrates systems thinking with normative aspects of complex systems, including justice, moral values, and power structures. The primary driver is to enhance our understanding of complex social phenomena and highlight the underlying dynamics at play (Ulrich & Reynolds, 2010). This system approach promotes critical thinking and encourages reflective practices to

outline the necessary steps and processes required to comprehend the multifactor and multiagent structures of social systems (Jackson, 2003). At its core, the critical systems approach examines human nature and its relationships with other components, actors, and entities, with the aim of transcending the dualistic limits inherent in Cartesian systems culture (Ackoff & Gharajedaghi, 1996). Jackson (2003), drawing from Ulrich's critical system heuristics, emphasized that a critical systems approach requires a practical orientation towards the emancipatory systems mindset. Such realization mandates that any planning or decision making affecting a broader community of people must consider the critical aspects of social systems, such as the involvement of key stakeholders and engagement with marginalized actors (Jackson, 2010). This recent iteration of systems inquiry deliberately aims to disseminate a paradigmatic shift from the traditional duality of hard and soft systems interpretations—such as the long-standing mechanistic view of systems—towards a creative mode of inquiry and articulation (Gharajedaghi & Ackoff, 1984). The essence of this third culture lies in knowing humans independent of their formal positions, institutions, or credentials, and recognizing 'US' as a pivotal component of social systems.

In his review of critical systems thinking, Jackson (2003) highlights that for designers to engage in reflective practice and critical heuristics, they must transparently frame boundaries and communicate the normative content of their design processes—such as opinions, ideologies, and values. Inclusivity in the design process is essential to ensure that the outcomes are openly shared and critically discussed, thereby mitigating the influence of designers' biases and subjective interpretations.

This concept is exemplified in Attar's The Conference of the Birds, where wayfarers—symbolizing the designers themselves (Si-Murgh)—are encouraged to engage in reflective practices. Achieving this level of understanding, or wisdom, requires designers to adopt a broader perspective, distancing themselves from their individual objectives, and thus enabling others to grasp the larger picture that Attar advocates. This

notion is further reinforced in systems discourse, as articulated in Banathy (1996) vision of social systems (see P233 Who Should Be the Designers?), where he emphasizes the necessity of creating spaces where reflective practices are integral. The intention is to enable a more balanced and inclusive approach to design, addressing the complexities of human interactions and the challenges associated with the inclusion of marginalized actors. This approach highlights the importance of critical thinking and the need to foster environments that support cooperative actions.

The primary objective of a critical systems approach is to challenge and transcend the ideological and rigid mindsets entrenched within the first (hard) and second (soft) generations of systems approach. This recent culture offers an alternative perspective, diverging from the mechanistic mode of inquiry, which traditionally emphasizes singular models of human operation and success (Braidotti, 2019). In particular, one iteration of this framework, the interdisciplinary aspects of systems approach, has been advanced through the work of contemporary systems scholars such as Latour (Latour, 2000) and his Actor-Network theory and Callon on the 'sociology of translation' (Callon, 1984). These scholars challenged the duality of human universality and culture, but also, questioned the concept of individualism and challenged the pre-assumptions about the superiority of humans at the core of a posthumanism scholarly attempt. Latour, in his reflection on the concept of the global system-Gaia (Clarke, 2017; Latour, 2017) stated, that to address today's problems, one must position oneself beyond such a duality, viewing the problematic as a system that can bring all aspects of the ecosystem together into a single integrated organism (Clarke, 2017). In support of his critique, he focused on the quest for a pragmatic approach, an attempt to create a network of allies, and the inclination to unify diverse social agents. Callon refers to this pragmatic endeavor as a necessity for the continuity of (social) processes, something that has been interpreted as the act of 'translation' between diverse social agents (Callon, 1984; Seravalli & Witmer, 2021).

In critical systems discourse, intermediary steps such as translation are essential. Ulrich underscores the importance of achieving a 'dialectical solution' to connect the rationality of planners directly with the social realities most affected by the individuals themselves (Ulrich & Reynolds, 2010). A prior study demonstrated that to operationalize these dialectical possibilities, the epistemological aspects of translation as a linguistic process can be adapted to the processes of network construction (Tureta et al., 2021). This adaptation addresses the normative predispositions that participants bring into systems design, emphasizing the mechanisms underlying translation as a crucial step in network construction.

1.4.1 Translation: A prerequisite for interdisciplinarity

In essence, translation is a multifaceted process influenced by the perspectives of interlocutors, translators, and others involved in conveying or receiving the core message (Simeone, 2016). This process inherently involves a degree of adaptation and ambiguity, leading to outcomes that are both emergent and sensitive to the context in which translation occurs. Scholarly research highlights that translation takes place within specific fields or contexts where deep aspects of social systems, such as worldviews, mindsets, and power structures, shape how translators convey and interpret messages (Tureta et al., 2021). A previous study demonstrated that the translational process encompasses various subprocesses, including comprehension, sense-making, and the interlinking of different ideas, concepts, and realities, thereby facilitating effective communication between diverse social agents (Seravalli & Witmer, 2021). This iterative and reflective process allows observers to trace the evolution of meaning and emergence of new perspectives, thus promoting higher levels of understanding, learning, and interpretation.

From this perspective (higher levels), translation is a prerequisite for connecting different components, systems, and realities, making it a crucial aspect of the relational culture of inquiry, particularly in design and systems thinking. Hypothetically, one can distinguish between two distinct systems of knowledge based on their unique meanings and

principles. In this context, translation plays a vital role in bridging the gap between these scholarly domains, and potentially fostering the emergence of a new order. Simeone (2016), in his doctoral research, termed this concept 'modes of translation.' He argued that the role of translation extends beyond its traditional function as a semiotic process focused solely on categorizing spoken language. It also involves analyzing and reconnecting various metaphorical and systemic processes. For example, methods such as visualizations, representations of complex systems, and prototyping can effectively help to translate and integrate different realities, such as those encountered in laboratory research and industry.

Accordingly, the relevance of translation for this research lies in its capability to effectively bridge the core narratives of critical systems discourse—elements that are purely theoretical such as discussions on marginality, power relations, and resource allocation—with the specific need of a design culture (Bijl-brouwer, 2022; Jones, 2014). Normative elements, such as the distribution of power or resource allocation, are often seen as vague or abstract, making it difficult to fully grasp their usefulness in complex systems. In such situations, applying a translational process in a social space can facilitate movement between different levels of abstraction, resulting in steps that can foster engagement and encourage actors to share deeper experiences, including those related to power imbalance. In other words, a creative yet mediating approach, like translation, is essential for navigating complexities at different levels of abstraction, including those related to design and the complexities of a system's culture.

A prior study showed that using a translational process guided by protocols and guidelines enhances a design's ability to address complex problems. This approach not only equips individuals with essential skills, methods, and knowledge but also helps key actors understand contextual dynamics and manage the complexities of multi-actor systems (DiSalvo, 2009). The concept is that viewing translation as a mediating step—one that facilitates the emergence of shared values in communal spaces—can

enhance the effectiveness of a new design culture that integrates practices and research for interventions in higher-order systems. The literature supports this view, arguing that translation is a crucial component of complex design processes aimed at fostering interdisciplinary language (Seravalli & Witmer, 2021). In this context, designers can act as translators, akin to Latour's concept of facilitators, mediators who create boundary objects and skillfully organize standardized forms, objects, and structures.

In essence, this argument is similar to the design of tangible artifacts. If we view the design of processes themselves as an outcome, this perspective supports using transactional items to enhance the effectiveness of design processes (Simeone, 2016; Tromp & Hekkert, 2014). In other words, just as the meaning of an artifact emerges from various divergences and convergences within a social system, the meaning of a process aimed at shaping an artifact can evolve through multiple iterations. Drawing on Schön's (1987) concept of design as a process, Simeone introduces the idea of 'design moves.' Design as a translational process involves the iterative exploration of various possibilities, reflecting on each move and sharing these moves with others to gather feedback and inform subsequent iterations.

Thus, viewing the process itself as an artifact and design as a translational process opens up new possibilities: the quest for methods, languages, or mechanisms to equip design processes (by use of translation) to better address the specific needs of key stakeholders. This third possibility, viewing translation as a tool, suggests that its usefulness extends beyond conventional methods by recognizing its potential to introduce new forms of rationality into complex systems. This approach can enhance the integration of design with critical systems heuristics, a key aspect of systems inquiry. When applied effectively, a translational process can create new opportunities for meaningful communication and idea exchange among various participants (Tureta et al., 2021). By understanding power dynamics and diverse relationships within the

translation context, designers can attain the level of rationality necessary for effective dialogue, discussion, and articulation.

Overall, it is crucial to emphasize that critical systems thinking represents an epistemological shift in the discourse of systems sciences, moving away from the dualistic paradigm of hard and soft approaches. Effective measures, methods, and strategies must be implemented to facilitate meaningful and enduring connectivity and alliance (Callon, 1984; Nedaei & Jacoby, 2023; Ulrich & Reynolds, 2010). Central to this integration is the formation of new alliances among those who are separated, suppressed, and excluded from the dominant narrative of social systems. This embodies an emancipatory systems approach that involves contestation over principles, resources, and values among challengers, resistors, and key stakeholders (Dixon, 2020). A pragmatic yet translational approach to fostering discussion and utilizing dialogue is essential for developing a new rationality that supports the emergence of a cohesive and justice-oriented societal order (Carey, 2024).

1.4.2 Focus: the call for a mediatory step

In recent years, in alignment with the popularization of this critical system heuristic, especially the extent to which it is related to the relational and creative mode of thinking (Cross, 2006; Nelson, 2022), the design discipline has expanded its logic and relevance to a higher level of complexities e.g., the studies related to the problems in societies, systems, and communities (Forlano, 2017). An epistemological and even ontological repositioning of the design culture (Aguirre et al., 2017; Aguirre-Ulloa & Paulsen, 2017) has adapted design science from its ordinary focus on material objects, e.g., products and human-centered fashion, into scholarly endeavors aimed at understanding what a designerly intervention ought to be in the realm of social systems (Bijl-brouwer, 2022; Bijl-Brouwe, 2016). This approach extends beyond merely addressing solutions at the product level to represent a new culture of design innovation. This necessitates a comprehensive analysis of the system, and focuses on creating strategies and policies for effective changes in higher-order systems. Recent

examples of this new direction in design science include investigating power dynamics within organizations and addressing the imbalances between key stakeholders. Additionally, it emphasizes fostering civic engagement at the societal level, particularly during destabilizing events, such as crises or pandemics (Dixon, 2020). This endeavor necessitates the development of new strategies and measures to effectively engage actors who are most affected yet traditionally less involved in design, planning, and decision-making processes. This endeavor aims to foster an interdisciplinary approach that enhances the potential for effective interventions in complex systems (Banathy, 1996; Aguirre et al., 2017). Given this adaptation, one premise is that if design becomes detached from the main discourse of the critical systems paradigm, it will lack the essential means and agency required for in-depth interventions in the multiagent and multistakeholder systems.

It is imperative to explore the characteristics and define specific principles prior to advancing methods and strategies. Such principles must provide a foundation for developing processes and steps aimed at deep structural changes. Schneider (2006) argues that, for research in complex systems to achieve effective change, it is imperative to frame principles that are both context-specific and flexible enough to respond to emergent outcomes arising from interactions between actors and actants. Establishing these principles is a prerequisite for scholarly research at the process level, aiming to make novel contributions to the interdisciplinary aspects of design, complexity, and systems science.

The Aim: The primary aim of this research is to advance design methods, tools, and processes that strengthen or establish new means of connection among individuals with conflicts of interest. Earlier, I posited that creating conditions for meaningful change—such as shifts in mindset and opinion—requires establishing a reflective environment resembling a network of allies. From this perspective, a designer is seen as a facilitator who ensures that even less prominent voices are included to foster meaningful reflections. The design method functions as a mediatory

process that optimizes the interactions between designers and key stakeholders. Drawing on literature, I hypothesized that active engagement, bonding, and network construction are prerequisites for effective intervention in complex systems. This prompts a fundamental question that necessitates further scholarly investigation: How can design methods and processes assist key stakeholders during periods of destabilization to construct networks of allies and facilitate effective changes in the underlying worldviews and mindsets? This query is aligned with the core principles of a 'sociology of translation, and the final outcomes should leverage the practical competencies inherent in a design culture, focusing on 'dialogical design solutions. Figure 3 is an attempt to depict the complexity and interdependence of different parts (letters) of the research, in the concluding chapter, another iteration of this will be provided, i.e., following a discussion on the continuation of the research. Figure 4 conceptualize the main focuses of this research, emphasizing the integration of design and systems sciences through the vital task of translation as a linking mechanism.

Orders	Components	Orders	Components
A	DDC Method (Nedaei 2023)	E	Complexity theory (Gharajedaghi 2006)
B	Third generation (Pourdehnad 2011)	F	Antagonistic actors' engagement (Nedaei 2023)
C	Critical-Sys thinking (Ulrich 2009)	G	Systemic design application (Jones 2018)
D	SyDynamic theory (Meadows 2009)	H	Dialogical solutions (Manzini 2016)
M	Mindset Change (Pourdehnad 2011)	Q	Device of network-problematization (Callon 1984)
N	Device of narratives (Paulesn 2021)	R	Higher order systems (Jonas 2014)
O	Device of critical thinking (Jackson 2003)	S	DDC Theory (Nedaei 2022)
P	Method, and process level innovation (Jonas 2014)	T	Community engagement (Dewey 1946)
I	Device of empowerment (Latour 1984)	Y	Conflicts (Relationships Dewey, 1946)

Orders	Components	Orders	Components
J	Translation- prerequisite (Simeone 2016)	Z	Critical Systems approach (Ulrich 2010)
K	Network construction (Venturini 2015)		
L	Community engagement (process)(Dixon 2021)		
U	Dialogical processes (Manzini 2016)		
V	Value co-creation (Jones 2014)		
W	Structural change (Huybrechts 2017)		
X	Public innovation (Disalvo 2009)		

Level of Abstractions

- Theory, concept, and idea
- Method, means, and process
- Tools, product, artifact and simulation
- Application, outcomes, outputs, ends, and impacts

Figure 3   This image illustrates the key elements of this research, organized into three levels of abstraction: theory, method, and application. These components are revisited in the conclusion, where the contribution of the research is presented in a conceptual map.
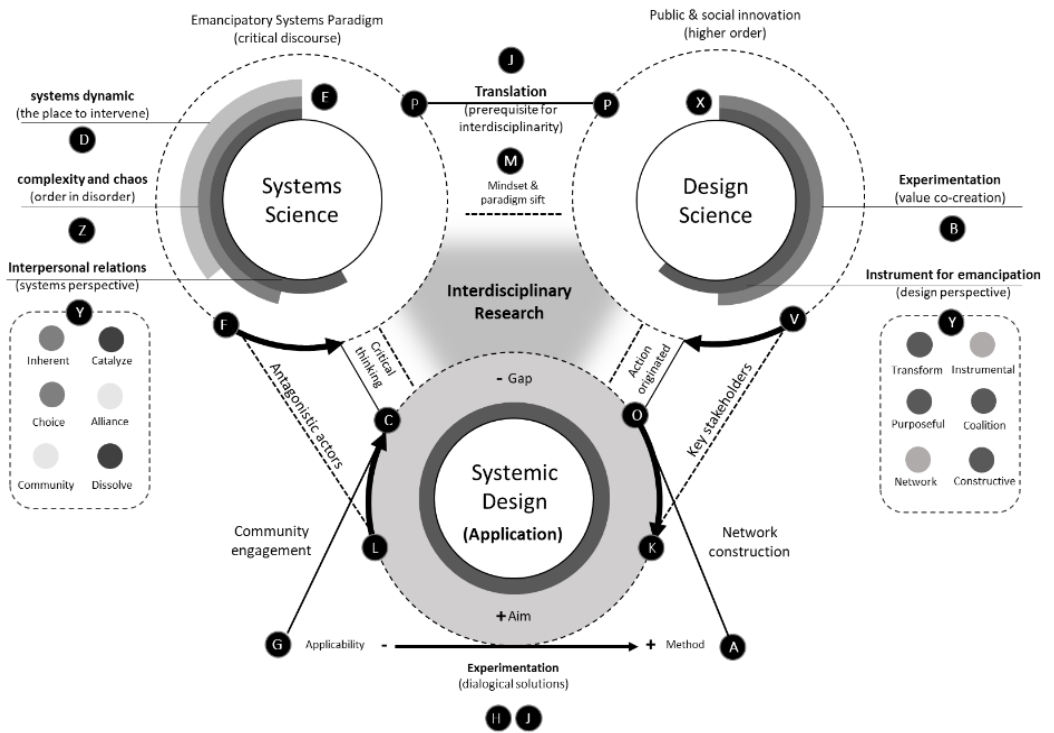
Figure 4- This image presents a metaphorical representation of the research context, highlighting the latest paradigm in systems sciences—critical systems thinking—and its contribution to the specific needs of design science, particularly in fostering innovation within higher-order systems. Translation is depicted as a crucial mediatory step in bridging the interdisciplinary aspects of this research, achieved by creating communal spaces that facilitate dialogical processes. The premise is that the practical utility of design and systems thinking, referred to as systemic design culture, becomes more effective by establishing the necessary preconditions for network construction—an approach that enhances the fidelity of community building. This process fosters a reflective environment, including situational experimentation, which is conducive to mindset changes. Network construction is rooted in the collaboration of a broader community of actors, with particular emphasis on the transformative role of conflicting agents.

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1.5 Shared Characteristics of Systems: four principles for action

According to open system theory, a system is defined as an entity comprising interconnected components and parts that each exhibit distinct behaviors and functions (Schneider & Somers, 2006). Understanding the dynamics of complex systems necessitates viewing them as integrated wholes, rather than merely sum of individual parts. Laszlo, in his pioneering work in systems science, argued that pursuing wholeness, dependency, and continuity represents a healthy response to the increasing needs for a deeper understanding of human faculties and needs. This realization necessitates a comprehensive understanding of human relationships and underscores the diversity of values, goals, and purposes as fundamental attributes of complex adaptive systems (Laszlo, 1972). Drawing on critical systems approaches, interventions in the multi-agent structure of social systems requires a meticulous framing of boundaries, and the careful selection of appropriate principles and strategies.

The selection of appropriate principles is highly dependent on the type of organization and the specific situation of a context. A prior research shown that this selection process can be facilitated through insights from systems dynamics theory and complexity science (Stern, 1991; Friedman et al., 2013; Jantsch, 1980b). One advantage of this adaptation is its ability to effectively navigate contextual uncertainties, optimize the design process, and identify areas where an action-oriented approach can result in effective changes. In a previous review, I demonstrated how the complexity theory and system dynamics can guide the formulation of a design approach. Drawing from a pragmatic view of complex systems, including Dewey's vision of democracy—which is recognized as a prerequisite for the development of processes that foster both change and continuity—I will explore four criteria through a thematic review of the literature (Dixon, 2020). The underlying motivation for this review is to establish appropriate principles that can facilitate social experimentation. These principles are

intended to generate valuable insights for advancing design methods, which are essential for network construction. The criteria to be examined include: (1) sensitivity: understanding the dynamics of individuals' interactions within specific boundaries. (2) diversity: appreciating the richness of human experiences and their capabilities to navigate uncertainties. (3) creativity: exploring collective alliances and how they can catalyze imagination and the idealization of future possibilities. (4) iteration: supporting continuous improvement through social learning, reflection, and the principle of continuity. By focusing on these criteria, the review aims to advance systemic design methods to ensure that the cumulative impact of these attributes effectively addresses the complexities inherent in social systems. This approach seeks to enable a more purposeful and action-oriented intervention, ensuring that design processes not only navigate the intricacies of social systems, but also contribute to meaningful, sustained outcomes.

Relevance: In Section 1.3, the discussion delves into the advantages of adopting a value-sensitive approach that aims to create a precondition for a change in mindset. This continues with a focus on the transformative power of antagonistic actors as essential drivers for inducing structural changes. Despite this recognition, it becomes evident that such a theoretical alignment is insufficient to address the pragmatic and epistemic limitations inherent in the current systemic design literature. Section 1.2 underscored that the primary focus of research on systemic design (SD) exclusively revolves around theoretical contributions. There is a growing need to advance design processes and methods with a particular focus on methodological exploration. This involves developing strategies to establish new networks of allies and to create environments conducive to key stakeholder engagement. In Section 1.4, the emphasis was placed around reflective practices and how to facilitate the exchange of values and opinions through translational mechanisms: processes akin to reflection, knowledge exchange and higher order learning.

As discussed earlier, before organizing information and making meaningful adjustments to procedural steps, it is essential to focus on the motivations that promote collective action, engagement, and alliances. From the perspective of critical systems thinking (1.4), fostering an environment for the engagement of contradictory voices—specifically diverse viewpoints—is in-line with the principle requisite of variety. Thus, leveraging the richness of human experience to facilitate system adaptation becomes a prerequisite for framing boundaries. In other words, a future framework aimed at driving action must be grounded in both normative and context-specific criteria to foster synergies among key stakeholders. This entails leveraging the relational, developmental, creative, and progressive capacities inherent in any human system to establish fundamental pillars of change agents. These realization not only need to align with normative imperatives for profound change, similar to self-organized systems, but also facilitate adaptations—qualities in which internal mechanisms respond to external tension.

1.5.1 Sensitivity

"A method must inherently embody normative quality and measures"

In the context of this research, the main emphasis is on social systems, which involve actors, actants (non-human actors), and relationships. In such systems, one distinctive quality of human agents is the actors' dependence on signs, meanings, and values to interpret, connect, and justify their relationships with others.

In the earlier story (The Journey to the Pole), the three members of the family formed a social system to support and protected each family member. The collaborative relationship between the father and mother of the family was dedicated to supporting the child within the family. Values in such systems become an essential property, a prerequisite that fosters bonding as well as diverse forms of relationships between actors (Luhmann, 1995). Unlike mechanistic systems, in a social system, zooming out from the system reveals a new set of relations, each constructed based

on different value systems. In such a situation, the layered structure (father, mother, and daughter) indicates a dependence between diverse agents.

Hence, despite the role of values in fostering bonding among actors, agencies at the individual levels can exert a destructive or constructive effect, thereby affecting the dynamics of relationships within the context. By taking into account the role of agencies—the capacity to make choices— individuals, e.g., a member of the family, can also influence others. In other words, while values become necessary for interactions between agents (from a holistic view), they also function as the trigger that can influence others.

In social systems, such a complicated and dynamic situation can create the normative power to bring about change. During the journey toward the pole, when a crisis arose, the mother of the family was reluctant to offer assistance to the strangers due to the scarcity of resources and the implications of such scarcity for the welfare of the child. Despite that, as an individual agent, the father of the family was driven by the strong value of benevolence. He followed a different course of action. This was an individual choice contrary to the core values of the family (system), which caused a certain degree of disagreement within the family (as a system).

In light of this, Banathy (1994) stated that contrary to the mechanistic systems, the organization of social systems is tightly related to the specific kind of values: 'the meanings people happen to have' (Banathy, 1996). The way social systems emerge, evolve, and disappear is tightly related to the processes that the value systems undergo throughout one's lifetime experience. Hence, while in mechanistic systems, the tendency toward linearity requires the elimination of values, in social systems, one must deploy values to ensure that self-organization creates a new order (D. H. Meadows et al., 1972). Indeed, the tendency to remove values from an individual level might hinder essential means of action and obstruct a system as a whole from creating a new order. In the narrative presented above, if the family failed to effectively address the concerns of one member (the father) or disregarded the importance of benevolence, the

disagreement between actors could escalate into a destructive event. When actors exercise choice (agency), the sensitivity toward value both on individual and collective levels becomes vital. It is imperative to ensure that disagreements between actors do not escalate into a destructive course of events.

- In a system where components have the capacity for choice, contradictions are inevitable due to dissonances in norms and values. While these contradictions can serve as a catalyst for action, it is crucial to dissolve the underlying disagreements rather than simply solving or removing them, in order to avoid the risk of unintended or destructive change.

1.5.2 Diversity

"A method should capture the relational aspects and the richness of human experience."

The second characteristic discussed here is the importance of diversity (P. H. Jones, 2014). In social systems, accounting for diversity means recognizing the subjective differences among actors and the sensitivity individuals have toward various realities (Schwartz, 1994; van de Kaa et al., 2020). Diversity and interdependence among agents are also inherent properties of self-organizing systems. The underlying idea is that diversity can increase the potential for structural change, and efforts to enhance diversity can facilitate the creation of a new order (Banathy, 1996; Heylighen, 2002).

For instance, in the example provided above, when family members agreed to host the strangers (the travelers), it gave rise to a new situation. This situation introduced the possibility of forging new relationships between existing family members and newcomers. As the crisis unfolded and the newcomer requested more support, it sparked serious discussions among permanent members and newcomers. These discussions added new dimensions but also challenged the equilibrium of the system,

particularly in terms of who must get support first, the guest or the child of the family.

Based on the second law of thermodynamics, components of mechanistic systems normally tend to lose their values (energy) through interaction with others, while humans, the components of social systems, not only do not lose their values but instead reshape their values through the connection and interaction with others (Claessens et al., 2023; B. Friedman et al., 2013; Laszlo, 1972). This means, in social systems, the elements that construct orders are not just the components but also the relations between diverse agents, i,e., one by one, one with the whole, and the whole with the one. Central to this realization is a process called 'in-formation' which simply means that in a diverse system, actors do not lose their values, nor are the values something to disappear. Instead, actors organize a new order that allows them to use their relationship to learn from one another.

Taking insights from the story above, when members of a system decide—whether by consensus or disagreement—to introduce a new component (traveler), individual agency and subjective dependencies can contribute to the system's diversity. Such subjective diversity enhances the potential for change at individual, interpersonal, and social levels. Jantsch (1980) supports this view by stating that social systems are self-organizing, noting that "order occurs only after a change in the internal code of conduct." Therefore, the quality of a new order, or the ingredients of a desired future, is closely tied to the system's diversity, particularly the richness of experience and its informational aspects.

- Prior to the emergence of a new order, it is crucial to invest in processes that cultivate genuine diversity within the system. Involving marginalized actors is often necessary to surface potential conflicts, which can then drive change at the level of intent. This principle recognizes that by incorporating diverse voices—particularly those of historically excluded actors—the system is better equipped to undergo meaningful transformation.

1.5.3 Creativity

" A method should integrate developmental aspects, a future-oriented perspective"

The third proposed aspect of social systems basically means that change occurs through the creation of a new order. It has been outlined in systems literature that, to develop or design a new order i.e., the image of a desired future, one must deploy a creative agent (Iba, 2010). That is very similar to what we experience in the design culture: the design of something that can ease a developmental and progressive process.

For instance, in the above story, the mobile app played a certain, albeit very basic, role in facilitating the translation process during the initial encounter between family members and the travelers. This device serves as a basic form of a boundary object, fostering a new alignment at least at the level of awareness. However, as discussions progressed among the actors, it became evident that it was necessary to implement additional devices and comprehensive elements to facilitate the reflective practices and guide dialogue between actors.

In systems theory, such as chaos and complexity and its practical applications like system dynamics, creativity has been acknowledged as a means to dissolve disagreements. It serves both as a method for establishing new connections between agents and as a prerequisite for fostering reflective practice, essential for purposeful intervention (Dixon, 2020). Banathy's explanation of the idea of 'creative design' shows that such transcendental quality must be at the core of attempts to design processes ideal for interventions at the societal level. Ackoff, in his reflection on the notion of 'messes' or problem systems, acknowledged that a creative culture must reside at the core of what we call design for systems and societies (Ackoff, 1981). This concept was later adopted by Gharajedaghi a decade afterward: deploying a vehicle in which choices, especially the developmental aspects of humans, become manifested at its higher order (Gharajedaghi, 2004).

Thus, contrary to the mainstream of design research and practice, the systems perspective advocates for a more relational and dialogical design process to stimulate action. This entails leveraging design abilities to craft instruments for iterations in higher-order systems,—viewing design as a means to connect diverse realities (the vehicle of choice). Therefore, the design of such dialogic processes would ideally facilitate in-formative situations, foster learning, and contribute to the translation toward the design of a desired future.

- Design (product, service systems) has the potential to serve as a catalyst for change in social systems by facilitating interaction between diverse agents, such as by creating opportunities for learning and reflection. This pursuit of creativity requires the strategic use and application of the competencies inherent in design cultures, specifically the deployment of creative processes. Through this approach, design can play a crucial role in enabling systems (self-organized) to adapt, evolve, and respond to emerging challenges.

1.5.4 Iteration

" The emergence of a new order occurs from the cultivation of a higher-order culture"

The final principle is the iterative nature of social systems, where changes occur progressively over time. According to Dewey pragmatism, processes such as interpreting images, defining codes of conduct, and shifting frames of reference are time-consuming procedures (Heylighen, 2002). This iterative nature of social systems highlights that while the creation of new orders is inevitable, it happens gradually as part of a transitional process (DiSalvo, 2009; Dixon, 2020).

For instance, during the journey toward the pole, it became apparent that conflict among members compelled individuals to reconsider the enduring value of the system (support for smaller members) and adjust their expectations to the new situation. Although, in the story, a few examples

were provided about how individuals reacted to the new situation, in a real-life scenario, it is difficult (if not impossible) to predict how members of a self-organizing system will react to internal challenges.

It becomes clear that without a strategic approach, the process of 'information' happens slowly, making it difficult for actors to anticipate or predict the outcomes of processes like higher order dialogue and discussion (Garrity, 2018; Geels, 2011; Loorbach, 2022). As a result, internal changes might only affect surface-level aspects such as parameters, activities, and practices, rather than deeper values (Huybrechts et al., 2017). This uncertainty also makes it challenging to determine how these changes can speed up the creation of new orders. To address this, it is important to establish new processes and create simpler structures that make it easier to accelerate the flow of information. This approach involves using the idealization and envisioning aspects of design to facilitate higher-order processes (Meadows, 1999). Through the design and implementation of such processes, a self-organizing entity can ideally facilitate learning and reflection, thereby idealizing a desired future.

As such, the design process must enable systems to display diverse assumptions (in a narrative way) but also facilitate interventions, and illuminate the consequences of a desired change. In the story above, one missing aspect of dialogue between actors was the image of a desired future, both at the individual and collective levels. Although the technology (app) helped actors share and exchange insights (translation), it never created a future image of their ideal expectations or what they envisioned for the situation after the crisis. In a diverse environment such as a social system, the ability to create iterations and progressively zoom out from the level of intent becomes a pragmatic quest. Making efforts to iterate in the deep layer, such as reflections and exchanges of thoughts, can enrich self-organization processes. (Heylighen, 2002; Jantsch, 1980).

- In social systems, the quality of shared visions can be improved by clearly rendering a desired future and fostering a creative culture. For example, utilizing a creative process—such as

designing narratives of the future similar to prototyping—can help refine and clarify these visions, bringing the core elements of these stories to light before a new order takes shape.

In summary, sensitivity, diversity, iteration, and creativity are fundamental elements of a design culture that serve as prerequisites for action-oriented change. A design approach aimed at initiating systemic change from underlying social structures must meticulously integrate these elements, emphasizing their application during the developmental stage (see Figure 5). In the following sections, I will elaborate further on the four phases of this PhD research, systematically integrating these elements across the five research questions.
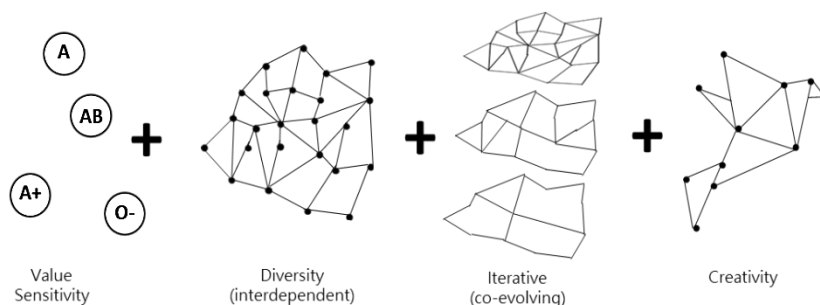
Figure 5 presents four characteristics of social systems that serve as principles or prerequisites for the development of a design method essential for action-oriented change. While the foundational aspects of these principles are drawn from Deweyan pragmatism—specifically, continuity, process, and change—the requisite creativity and sensitivity have been adapted as systemic requirements aimed at facilitating desired changes within underlying social systems.

1.6 Aims and Objectives

Based on an analysis of the literature, I delineate the foundational aspects of a new culture of design, focusing on prerequisites that can facilitate structural change. As mentioned earlier, one premise is that a designerly way of doing, as a creative and pragmatic approach, should integrate these

principles to facilitate the creation of a new order. Given this realization, I argue that it is imperative to conduct rigorous research on the developmental aspects of a design culture, focusing on design methods that can foster change at the level of intent. A designerly way of knowing should be viewed as a vehicle of thought, and design methods as a process through which diverse opinions (or voices) can be translated, integrated, and leveraged in order to facilitate structural changes.

Accordingly, the focus of this research is not on the outcomes or end results of the design process; rather, the *'aim' is to conduct scholarly research to explore, design, and examine the intermediary steps, processes, and methods that facilitate structural change*. Drawing from critical systems thinking, particularly Ulrich's notion of dialogical solutions, these contributions can be viewed as designs of boundary objects, maps, or interactive templates that can be applied in a social context to create the preconditions for new alignment and facilitate network construction.

One premise is that social systems evolve continuously, independent of any singular entity or token (self-organized systems are inherently transitional). Developing a design methodology exerts a constructive influence by harnessing the creative and imaginative capacities of a design culture. This realization aligns with the principles of an iterative design culture that emphasizes leveraging translational mechanisms to facilitate the emergence of a new order, such as narratives that facilitate envisioning a desired future. In other words, it becomes evident that while the intersection of design and (critical) systems thinking has been explored in previous research, particularly in studies focusing on translation (Simeone, 2016; Tureta et al., 2021), systematic research in the realm of design science must carefully consider the effective use of dialogical solutions to foster community engagement and facilitate network construction.

1. The first objective is to explore the unknown aspects of social relationships, with a particular focus on the notion of conflicts. Theoretically, this objective seeks to conceptualize informal institutions, such as norms and social practices, that are necessary

for achieving deep and structural changes at the level of intent. Epistemologically, it aims to synthesize various dialogical possibilities to leverage the transformative aspects of conflict in order to achieve desired outcomes, such as facilitating mindset changes.

2. The second objective involves a thorough examination of the ontological aspects of conflicts in order to uncover their inherent nature and fundamental elements. Building on this rationale, the focus shifts to the social learning, reflective practices and collective agencies that arise from conflict of interests, such as higher-order learning. The intention is to analyze how these processes evolve over time and adopts a designerly way of knowing focusing on participatory processes such as alignment of actors with conflicting values; examining how translational elements within the existing design processes can effectively contribute to network construction.

3. The next objective is to outline steps and processes to facilitate structural interventions at the level of intent. This involves harnessing the creative potential of design and synthesizing various creative methods. Establishing the foundation for a systemic design approach, called the Design-Driven Conflicts method, aims to facilitate a shift from a purely mechanistic mindset to a relational way of thinking. A critical aspect of this latter is harnessing the appropriateness of a design culture to leverage the exact criteria for creating a networks of allies. The framework particularly focuses on translational process; it directs attention to the pivotal advantages of systems inquiry. Furthermore, its practical relevance aligns with the objectives of the dialogic design process. By introducing innovative processes, methods, and tools, this approach aims to make substantial contributions to researchers and practitioners across the diverse realms of design and social innovation: What processes should systemic design employ to

construct networks of allies e.g., in a context similar to the situation of crises?

4. In Phase four, the focus shifts towards a pragmatic approach. The objective is to utilize the outcomes of the previous steps and refine the dialogical aspects of the systemic design method. This also involves obtaining a higher-fidelity version of the DDC method that is capable of demonstrating actionable results to facilitate community-level engagement. In doing so, it focuses on creating a participatory action platform that encompasses both creative and iterative aspects of design. This becomes a co-creative quest aiming not only to harness design competencies but also to lever the dialogical aspects of a design inquiry to establish the 'preconditions' for paradigm shifts. This raises the following question: What does a systemic designer need to disseminate the results of a network of allies and scale up the emergence of new alliances?

5. The last objective focuses on social simulation to rigorously test and validate the applicability of the design-driven conflict method. The aim is to assess the effectiveness of the method in altering the core narrative of a problematic context. To achieve this high-level intervention, I will design a simulation in a similar but smaller social environment. The intention here is to create an environment that not only achieves participatory outcomes, but also examines how effectively a design method can foster alliances through community engagement. This final phase involves iterative cycles, where I reflect on the theory, refine methods, create artifacts, and apply them in a simulated social field. Through this iterative process, I aim to derive conclusions and reflect on nuanced discussions regarding the method's contributions, relevance of its principles, and originality of this research across different levels of abstraction.

1.7 The research methods

(Ch 1) A thematic literature (1.5) review was conducted in period of March until September 2020. The objective was to synthesize notable studies in systems domains focusing on critical systems discourse, complexity studies, and systems dynamics. This process of selection, and screening of relevant literature was previously undertaken by a researcher at the Strategic design division, and was guided by the following hypothesis: 'A design approach for innovation in higher-order systems, including value co-creation and system engagement, becomes more effective when process-level advancements are aligned with the core narrative of critical system heuristics' (1.2). In doing so, the principal researcher of the DDC project aimed to analyze specific principles that could address the particular needs of a new design culture. The rationale for selecting thematic review as a research method was to gain insights by thoroughly exploring the themes and patterns of complex information within the third culture of systems inquiry. This approach enabled the integration of key concepts, theories, and insights, while also incorporating creative methodologies such as complexity visualization or rich pictures. Through this exploration, the researcher identified four core principles that can effectively unify various disciplinary perspectives. These system principles were later revisited and adapted for use in a pragmatic approach (as a guideline), focusing on the quest for process, change, and continuity, which ultimately formed the foundation of an interdisciplinary design method. Figure 6 shows the location of Ch1 within its broader framework; with the first layer depicting the objectives, the second showing the questions, and the third outlining the methods.

(Ch 2) Following the identification of these four guiding principles, a rigorous systematic analysis was conducted from October 2020 to July 2021. This analysis employed a diverse range of academic resources and insights from four interdisciplinary fields: conflict studies, complexity studies, network construction, and design science (in total 146 peer-

reviewed articles were included). This methodological quest facilitated a comprehensive exploration of how evidence-based reviews can deepen our understanding of both the rigorous and structural dimensions of complex adaptive systems. Subsequently, a qualitative meta-analysis was performed using a methodological framework adapted from Levitt (2018). The analysis was structured around four thematic areas. The first phase concentrated on research addressing the construction of conflict, its association with deep-seated changes, and paradigmatic shifts. The analysis then evolved to facilitate the exploration of social systems through a design practice lens, specifically by examining how design competencies, including participatory elements, can help create networks among actors with conflicting interests. Figure 6 shows the location of Ch2 within its broader framework; with the first layer depicting the objectives, the second showing the questions, and the third outlining the methods.

(Ch 3) Three main research activities were conducted from September 2021 to April 2022. (1) a panel discussion with experts was conducted to focus on the developmental aspects of the design method. (2) an internal workshop at the University of Antwerp focused on providing feedback and reflecting on the outcomes of the panel discussion. (3) semi-structured interviews with six experts were conducted to provide an initial evaluation on the design method itself. The panel discussions were conducted with twelve PhD candidates from diverse academic backgrounds. The sessions integrated lectures and theoretical discussions. The lectures served to introduce key concepts and stimulate dialogue, while the theoretical discussions facilitated deeper reflection and feedback on the underlying rationale of the DDC method. All sessions were recorded and subsequently summarized by the organizer. The materials generated from these discussions were utilized in an internal workshop where researchers at the University of Antwerp examined the core aspects of the method and explored the integration of various sub-systems. Additionally, six semi-structured interviews were conducted in three sequential phases with a primary emphasis on detailed discussions regarding the feasibility of each methodological steps. Throughout the interview process, various aspects

of the methodology were subjected to in-depth analysis, specifically its goals and underline rationale. This latter was pivotal for assessing both the efficacy and effectiveness of the design method prior to its application in simulated social context. The interview questions were developed based on the first version of the design method validation. During the review, we realized that incorporating the Daalhuizen approach was crucial for a more accurate validation of the design method. Figure 6 shows the location of Ch3 within its broader framework; with the first layer depicting the objectives, the second showing the questions, and the third outlining the methods.

(Ch 4) In the next iteration (May to Sep 2022), the focus shifted to the interactive aspects of the method. The objective was to refine the method by employing design elements—specifically creativity, translation, and envisioning aspects—as discursive tools to enhance design method efficiency. During this phase, iteration was employed as a qualitative research method, with the design process functioning as a mediatory step necessary for the prototyping interactive items (Srivastava et al., 2009). Previous research suggests that in the design of higher-order systems, prototyping serves as a critical bridge between abstract knowledge (at the laboratory level) and real-world applications (at the agora level). Each interactive template (prototype) serves as a learning cycle, providing insights into the strengths and weaknesses of the method. This investigation focused on three dimensions: (1) the participatory aspects of the method, (2) the appropriateness of the higher fidelity version, and (3) the challenges and obstacles in the design processes. The use of iteration as a qualitative research method provided a contextual framework for addressing the issues identified in the initial phases, including semi-structured interviews. In this research, the iterative processes were built based on the results of the interviews detailed in Chapter 3, which included refining the focus and direction of the method. A key objective was to develop tools, maps, and creative items that could facilitate continuous meaning-making, translation, and generation of new ideas. Figure 6 shows the location of Ch4 within its broader framework; with the first layer

depicting the objectives, the second showing the questions, and the third outlining the methods.

(Ch 5) To evaluate the applicability of the method, five workshop sessions were conducted focusing on a system simulation method (Dec 2022-Sep 2023). Unlike traditional empirical methods that rely on data analysis or field studies, a system simulation involves crafting research scenarios including the narratives of the events that replicate elements and relationships found in real-life situations. Therefore, during the sessions, each workshop represented a different phase of the method, in which participants were asked to adjust the central narrative of the system—namely, the emergence of the internet as a disruptor in the music industry—to explore the various dynamics at play. To support this process, OpenAI's ChatGPT was employed as a non-human agent to generate and synthesize context-related narratives. Common content was rephrased and checked for plagiarism to ensure the originality of the narratives. Additionally, a brief survey was conducted to assess the participants' perceptions of their ideal roles and situations within organizational archetypes. At the conclusion of each session, a structured discussion was conducted that allowed participants to elaborate on their experiences using the structure, steps, and processes of the method. To gather feedback, five qualitative open-ended questions were developed, incorporating elements of the System Usability Scale (SUS) (Brooke, 1996) and End-User Satisfaction Index (EUS) (Doll et al., 1994). The aim of this latter was to illustrate the interaction between multiple internal and external stakeholders and evaluate the efficacy of the method in shaping organizational narratives. Following the simulation sessions, the participants completed feedback templates and engaged in an open discussion to reflect on their experiences. Figure 6 shows the location of Ch5 within its broader framework.
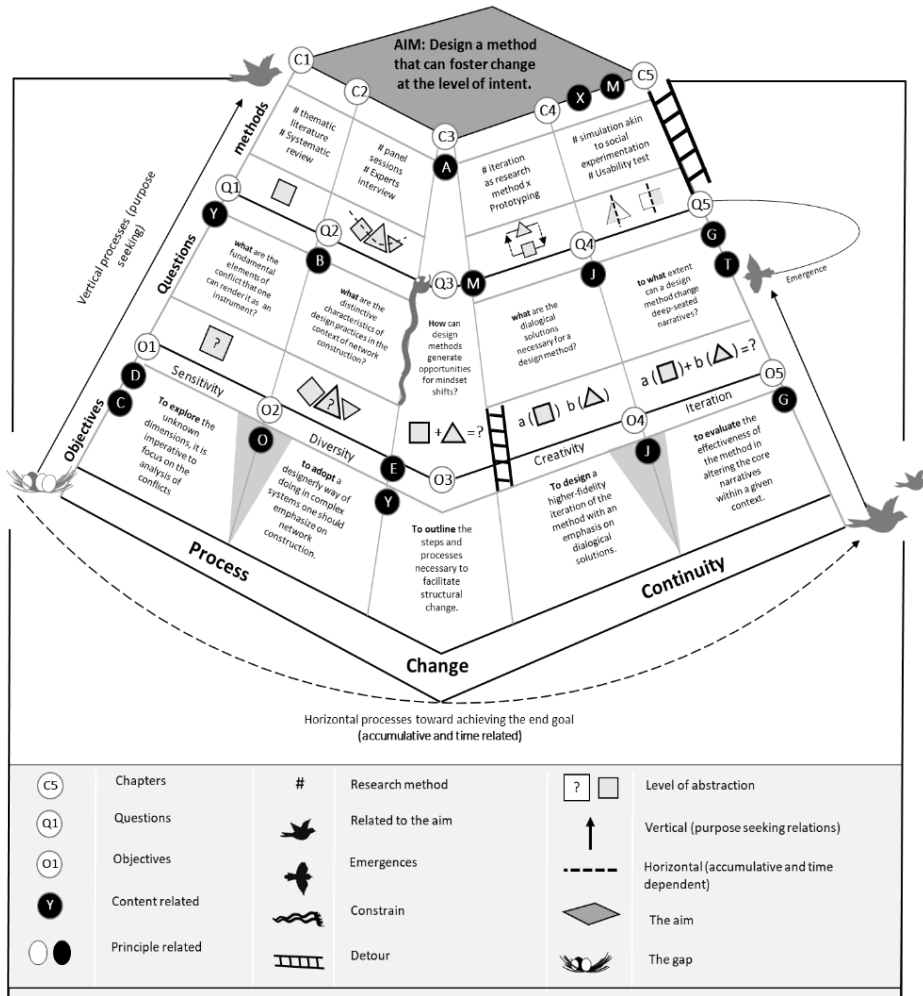
Figure 6 In this research, five questions have been formulated, each aligning with one of the following objectives: "to explore," "to adapt," "to outline," "to design," and "to evaluate." The research employs dialogical processes to facilitate experimentation at various levels, particularly those focused on narrative and network construction. Five research methods are presented across different phases: (1) a thematic review that advanced the principles, (2) a systematic review that conceptualized the structure of the method, (3) expert interviews and panels that informed the second iteration of the design method, (4) an iterative process that serves as both a research and design method, and (5) a simulation that acted as a new cycle of iteration, which is a necessity for experimentation in a simulated context.

1.8 The design method

In this PhD research, the design method known as design-driven conflicts (DDC) is one of the main contributions. The research elements, including the aims, objectives, and questions, have been discussed in the preceding section. Figure 6 shows an attempt to integrate the epistemic processes and steps underlying this research. Given the broad scope of this study, I also briefly introduce a visual analogy to serve as a guiding principle for the inclusion of additional informative elements that were not presented in the previous model. This approach has three objectives: First, to make the research more inclusive and accessible to a broader community of practice by distinguishing research methods from the rationale behind design methods; second, to minimize misunderstandings between design research and design methods, a recurring issue discussed throughout this dissertation; and third, to introduce a specific mode of translation (analogy) as a substitute for conventional models such as a table (or sequential model). Therefore, much like the 'journey to the pole,' I will use a visual analogy to illustrate the key elements of the method, focusing on the processes and techniques involved in rug-making. Through this analogy, using translation as a bridging step, my goal is to highlight the key aspects of the method, including the following items and procedures:

First, just as a rug or carpet that serves a purpose beyond merely covering a surface—acting as a medium that intertwines everyday narratives—a design method for higher order intervention can function in the same fashion. (a) in this research, the context or main narrative in which the method originates and through which its application must be interpreted is related to critical systems heuristics (1.4). Therefore, its outcomes and applications should be interpreted in alignment with the core principles of a critical systems approach. Second, designing a rug usually requires a clear rationale, image, or plan to guide its development in various stages. (b) similarly, in this research, the method constructed based on specific rationales or working hypotheses, each offering a plan of action that, when

followed, leads to specific outcomes (1.5) Just as a craftsman follows guiding principles to create a rug or carpet, this approach can be applied across different phases of a design method's to refine and enhance its utility. Third, the structure of a rug typically consists of various components and elements, either locally sourced or imported from other environments. (c) similarly, a design method is composed of specific elements that shape its structure, content, and interconnected aspects. These informative materials can be adapted from core principles of design science or borrowed from other disciplines to meet the specific needs of design science (1.2). Fourth, the rug is composed of interconnected components that, when held together, ensure that the entire piece is cohesive. (d) similarly, when developing a design method, it is essential to incorporate elements that connect the inputs and outputs across the different phases of the process. Here, translation serves as a bridging mechanism, creating boundary objects and relational tools that ensure seamless connections between various artifacts and systems (1.4.1). Fifth, when making a rug, it is crucial to establish a solid foundation using warps that run through the length of the rug and wefts that weave over and under the structure. (e) in this study, the four guiding principles align with those in the design method, establishing a sequential process in line with the internal objectives of each process and step. The goal of connecting these elements is to integrate creativity, diversity, and sensitivity and thus ensure the effective implementation of the design method in a simulated context (15). Sixth, to build a rug, one must deploy relevant tools that are specific to the task and sensitive to the context. These elements are crucial for the construction of versatile artifacts. (f) in design research aimed at achieving dialogical solutions, it is important not only to use a variety of mediatory tools, but also to develop new design elements, such as visual techniques, modular objects, and standardized forms, to seamlessly connect different parts and components. Finally, weaving typically begins at the bottom of the loom by passing several wefts through warps to create a foundation. (g) similarly, a design method aiming for higher-order change must begin by addressing specific context-related elements, known

as boundaries, by establishing criteria related to the dynamics of the system. This step is crucial to ensure that these dynamic aspects are fully integrated into relevant processes. Just as a craftsman finishes a rug by securing the warp with certain ends (which may form fringes or be tied in other ways) this final step is essential for setting the stage for the future refinement. In the final chapter, I delve into this concept in detail, and discuss the significant contributions of this approach, including its impact on public innovation, community building, and network development (see Figure 7 for the visual representation of the analogy).

(c) the structure of a rug typically comprises components that are either locally available or imported from other environments.

(d) a rug is often composed of linked components connected through certain nodes.

(e) to build a rug, one must device instrument that are often specific and context-sensitive, serving as prerequisites for constructing the artifact.

(b) the design of a rug often includes a certain rationale or working hypothesis, incorporating an image or plan of action.

(a) a carpet or rug, with its flat, relational, and narrative design, makes it possible to reveal insights into the "context."

(f) It is based on a loom or set of principles that typically remain consistent, regardless of specific artifacts. However, size and format are influenced by underlying rationale and hypotheses.

Change

Continuity

Process

(g) while iteration and circulation are necessary, the process has to start from the bottom
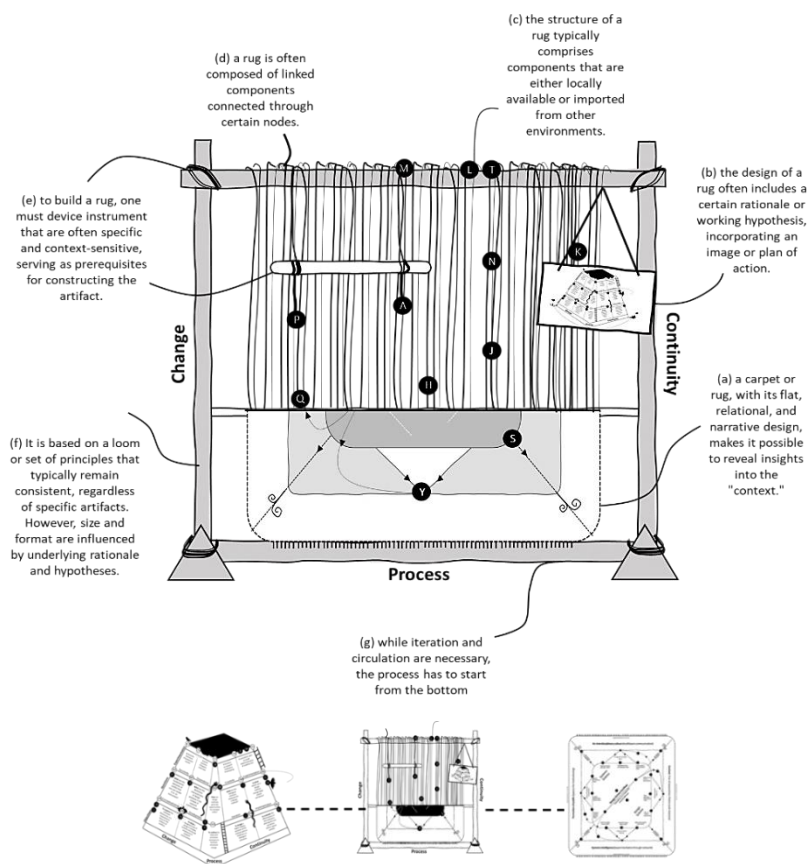
Figure 7 offers a metaphorical representation of the design method, drawing parallels with the carpet crafting process to highlight its key elements. In the conclusion, I will present the complete version of this model, discuss how this research contributes to the broader framework of science.

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1.9 Thesis Overview

This PhD research introduces a designerly approach at the intersection of design, systems, and the sociology of translation. It begins with an introductory chapter (the current part), aiming to identify the relevance of design within a broader discourse of systems science. It continues with an overview of the research, including the questions and the processes underlying each chapter.

- Chapter Two: The Quest for Understanding

In Chapter Two, the roots and nature of conflicts as a contradictory form of social relations were investigated. This exploration aligned with the requisites for the instrumentation of conflict, which is essential for meaningful changes in the deep narratives of a system. I identified how conflict, by creating a situation for social learning, can provide the necessary means for deeper thought, and how one can play with this as a powerful instrument of change. The focus was on a situation of conflict and steps for constructing a network of allies, essential for meaningful interventions at the level of intent. One objective of this part is to shape a new theoretical framework called 'design-driven conflict' (DDC), which aims to demonstrate links and relations between design, conflicts, and social change with a focus on 'change' in complex adaptive systems. The following research question guides the first part of the inquiry in chapter two:

Q1. What lies at the core of conflict that makes it a potential instrument of change on the mindset and paradigm level?

To address this question, a comprehensive systematic review was conducted. This method has allowed me to narrow down the results from diverse scholarly disciplines. In the first part of the review, I elaborate on the process of conflict, including the inputs (values) and outputs (the transmission of knowledge) that individuals share during a contradictory situation. In the second part, I discuss the reflexive process (translation) as

a prerequisite for conflict construction. The discussion extends to outline a few steps essential for a desired change in the dominant mindset and the paradigm of a social system.

Q2. What are the unique features of design inquiry that make it an optimal approach for establishing a network of allies?

The design mindset is participatory, value-sensitive, and purpose-oriented, enabling designers to effectively intervene in social contexts. Arguably, systemic designers, through their active engagement with communities, possess the ability to facilitate sensemaking alongside other actors, and they utilize their creative abilities to envision a desired future. To delve further into this concept, I developed a design-driven conflict model that illustrates the advantages of design for a sociology of translation (as a process) and network construction within a social system.

- Chapter Three: The Quest for Change

In Chapter Three, the results of the previous phase, along with insights from a panel of experts, are used to draft the first version of the design method. The primary objective was to explore translation as a social process and its potential to facilitate the sharing of more profound insights. In the subsequent phase, a secondary review was undertaken to introduce an action-oriented framework—a design-driven conflict methodology tailored for systemic design contexts. The primary objective was to foster an environment conducive to social learning by integrating a diverse spectrum of perspectives with a particular emphasis on understanding conflicts. This chapter argues that this framework has the potential to facilitate the formation of alliances among stakeholders, thereby establishing foundational processes for catalyzing a paradigmatic shift such as transforming underlying narratives. I gradually build an argument that, with the use of this method, a designer can create empowerment—partly as a facilitator to bridge different social worlds and partly as an independent actor who can leverage individual creative capabilities. The

central question that I tried to answer in this chapter is about 'how' to instrument conflicts:

Q3. How can design as a creative process of thought and planning 'facilitate' the pre-conditions for a mindset and paradigm shift, i.e., aggregating a network of allies?

To answer this question, I draw my arguments on the key aspects of critical system thinking (Jackson, 2003; Ulrich & Reynolds, 2010b): the necessity for the deployment of a pragmatic approach in the design of social systems. For interventions at the intent level, a design method should ideally assist a systemic designer in creating new ways of alignment. On the one hand, there is a need to facilitate meaningful discussions and dialogue in higher-order learning situations. On the other hand, there is the quest for defining the concrete steps necessary for a dialogical processes. Thus, to answer the third question, the requisite is to advance a design method at the level of 'social' processes, that can drive insights from the hidden layers, and create new means of alignment. After developing the first draft of the design method, a group of experts participated in the interview sessions, and the results were analyzed to elaborate on the efficacy and effectiveness of the method (Daalhuizen & Cash, 2021a). In addition to examining the content, I realized that it is equally important to assess the efficiency of the method, including its usability and the degree of change that one can attain through its implementation. Therefore, these critical aspects were thoroughly investigated in the subsequent chapters of the thesis.

- Chapter Four: The Quest for Creativity

Chapter Four begins with a short iteration on the epistemological aspects of the method, comparing a design-oriented conflict approach with the mainstream in systemic design: system-oriented design. I highlighted the issue of path dependence, the challenge of transformability, and the limitations of current methods in engaging a diversity of actors. This was further advanced by demonstrating how the instrumentation of (or playing with) conflicts can provide essential means and triggers to foster change

and transition. During the research, my focus was on the strategic aspects of the methodology, its advantages and relevance for choosing actors with higher agencies, and the challenging task of identifying the power relations. I highlighted how the use of the design-driven conflict methodology can facilitate design interventions in a social context. I utilized a creative approach to demonstrate the efficiency of the method: advancing design tools and techniques essential for creating a network of allies.

Q 4. What does one need to disseminate the results of a dialogical processes so that the community can gradually build the preconditions for a mindset shift, e.g., new alliances?

To answer this question a set of boundary objects including the tools and templates were designed including three main components. Part one is a sidebar content where I introduced action-oriented questions, each equipped with a prompt asking the participants to follow certain steps. The informative parts of the tools were supported with several templates where the results of reflections and discussion were meant to be exchanged during the collaborative sessions. That was the quest for a reflective practice, e.g., creating a situation for social learning, focusing on the applicability of the elements of translation. Five sets of card decks, each consisting of 40 interactive cards, were designed to facilitate communication on abstract topics. Each card demonstrates a particular concept related to one part of the templates e.g., differences in the power relations. At the end of Chapter Four, I argued that designing tools facilitated a collaborative format that can establish a precondition for changes in the dynamics of relationships and, ideally, the narrative of a context.

- Chapter Five: The Quest for Simulation

Chapter Five is an extension of the previous chapter, where I attempt to examine a higher fidelity version of the method, including tools and

techniques to ease the implementation of the method. The high-fidelity version of the tool was tested in a simulated social system environment. In this chapter, a simulation was employed as a research method that leverages the usability of the design method in small-scale interventions. This involves a more comprehensive analysis of the elements corresponding to the dynamics of the context, as well as creating an informative bridge between the participants e.g., identifying the elements of the new narrative system. The main objective is not only to create a situation for low-threshold dialogue, easing the study of complex issues, but also to examine the efficiency of the design method before its application in a social system. The underlying premise is that if a design method effectively creates a narrative situation encompassing the key elements, processes, behaviors, and relationships within a problematic context, simulating a phenomenon in this way becomes akin to generating it in the real world. In other words, the use of a social simulation can yield a simpler and more familiar image of the context; therefore it can be helpful before any intervention in a real context. This supports the advancement of the inquiry considering the following research questions:

Q 5. To what extent can the use of a design method change the deep narrative of a problematic context?

To examine the efficiency of the method, a simulated social environment consisting of artificial relations, roles, and responsibilities has been implemented in five co-creative sessions. Using artificial elements, I tried to create a problematic situation similar to a real-life scenario where a number of actors could engage in more in-depth discussions. During these processes, my main focus was on the narrative of the context, in particular the extent to which, after five sessions, dialogue and discussion between actors could collectively design a new narrative for the context. Regarding the usability of the DDC method, a series of discussions i.e., dialogue-based sessions, have been conducted. These sessions were an attempt to establish a type of in-formation structure and to create a mode of reflection and exchange between the diverse actors who participated in the sessions, with

the purpose of aggregating a new network of allies. As a facilitator and design researcher, I measured the user satisfaction and the usability of these tools and templates, in a separate setting. The content for these

sessions was based on two research indexes derived from usability studies (Dianat et al., 2017b, 2019a). The insights, opinions, and expectations actors shared during the interview sessions underwent additional reflections. The multiple analysis and synthesis processes helped to uncover the appropriateness of the design-driven conflict method for a structural change in the deep narrative of a simulated social system.

- Chapter Six: Conclusion

In Chapter Six, concluding remarks are provided to summarize the results of the preceding chapters. Given that each research cycle has been built gradually, providing additional synthesis for the five research questions, including proper answers to each, is vital. This final reflection sheds light on the possible shortcomings of this research, including limitations, and offers some suggestions for future studies. The chapter concludes with a final reflection on the contribution of this research to the field of design sciences, along with a personal view of the PhD journey throughout the four years of research.

Ch. Two

Chapter 2: **Understanding**

Chapter 2 presents the current literature on the topics of design, conflicts, and social transformation with a focus on, (a) the roots and the nature of conflicts, (b) the duality of conflict and social change, and (c) design advantages for a network of allies construction as a creative and pragmatic process. The result of this review was published in a special issue in the Journal of Societies: "Language, Identity, and Conflict"

Abstract: Controversies are an inseparable part of social systems which, if constructed properly, can create a unique condition for higher-order learning. In addition, design inquiry, as a process of thought and planning, is also a constructive process. This provokes the question of how to construct controversies from a designerly perspective in order to steer higher-order learning. This paper presents a theoretical contribution to the field of social system design by providing the first insights into design intervention to facilitate a network of allied construction. Through a systematic review of the concept of conflict and disagreement, the link between controversies and knowledge transmission is examined in order to highlight the benefit of controversies in a constructive way. Next to that, the essential steps for constructing a network of allies are proposed. These steps are compared with specific aspects of design in order to unfold the advantages of design for network construction. Finally, the paper wraps up with concluding remarks about the necessity of having a bridging step from theory to action in order to facilitate the construction of controversies in a real-life context.

2.1 Introduction

One thing is certain about the future: human social systems will be more complex, dynamic, and uncertain than they are today (Radermacher, 2016). In particular, the growing complexity of the modern world has signaled a paradigm shift in terms of how we manage our values and thoughts (Marion, 2006). Such complexity is an 'issue' entangled with 'relationships and interactions' between people (Jackson, 2003b; Marion, 2006). Various studies on complexity theory have shown that the complexity of social systems is a product of communication and interactions between people (Jackson, 2003b; Kappeler, 2019; Luhmann, 1995; Marion, 2006). This means that it looks beyond a summation of how the thoughts, decisions, and actions associated with relationships between people make social systems complex, ill-defined, and uncertain (Bausch, 2014; Bulleit, 2017; Dépelteau, 2015a; Luhmann, 1995; Metcalf Editor, 2014). Accordingly, exploring and then reframing different forms of relationships are crucial steps towards making intervention and change in social complex adaptive systems (Godsiff et al., 2019; Kappeler, 2019).

In general, communication and interactions in social systems take different forms (Gharajedaghi, 201; Kappeler, 2019). Some types of relations are cooperative and some are competitive, but in the context of complexity, interactions between actors are more contradictory (Gharajedaghi, 2012a; Godsiff et al., 2019; Kappeler, 2019; Slavin, 1969; Wieviorka, 2013). Such complexity is partly associated with the subject dependence of social systems and partly with the plurality of world views (P. Jones, 2018a; Metcalf Editor, 2014). For example, when there are differences in values, people strive to use their own visions, and this increases the risk of conflict and disagreement between people (Bausch, 2014; P. Jones, 2018; Schaffernicht, 2017). Therefore, the focus of the reported research is on the concept of 'conflict and disagreement' as a contradictory form of social relationships.

Conflicts and disagreement can be found on different levels, from conflict at the organizational scale to tension between different nations, and it is often defined as a challenging form of social relationship. In contrast with destructive forms of controversy (e.g., tension or violence)(Barbero, 2018a; Bijl-brouwer, 2022) 'constructing' them can create a unique condition through which a new order can emerge (e.g., change in the distribution of power) (Staerklé et al., 2011). Regarding the construction process, its literal meaning refers to the act of building something or putting together different parts to create something as a whole (*CONSTRUCT | Meaning in the Cambridge English Dictionary*, n.d.). In social systems, however, construction refers to 'the capability of a social system in aggregating a network of adaptive agents' when they are at the edge of chaos (Berger & Luckmann, n.d.; Marion, 2006). This type of capability has certain applications; in particular, it can create a unique condition for 'synergistic relationships' or it can lead to desirable changes in 'emergent properties of social systems' (Andersson et al., 2014; Godsiff et al., 2019; Harris et al., 2010; Hocking et al., 2016; Ruttonsha, 2018; Wieviorka, 2013). Therefore, instead of merely seeing controversies as a destructive course of events (often leading to a removal action), it is essential to know what we actually need in order to rebuild controversies after their occurrence and what steps, or competencies are required to implement them properly in a real-life context i.e., from a pragmatic view.

Learning from the limitations of system theories (e.g., dynamic theory and complexity theory), the prerequisite for answering these questions is to exploit theories and methodologies in the third phase of science (also known as the third culture of inquiry) (Godsiff et al., 2019; Hodges et al., 2017; Jackson, 2010). The key feature of the 'third culture of inquiry is to create actionable strategies and promote creative solutions that meet everyone's need' (Bausch, 2014). Likewise, studies in the domain of design sciences have shown that such a 'pragmatic and creative quality' is embedded in the core concept of 'designing' (Buchanan, 2016; Dalsgaard, 2014; Ejsing-Duun & Skovbjerg, 2019). In particular, design professions, as part of an 'action-oriented discipline', bridge the gap between abstract

knowledge (e.g., theories) and concrete solutions, ideation, and the use of knowledge in a real-life context (Banathy, 1996; Bausch, 2014; K. Friedman, 2003; Jonas, 2018). Therefore, the aim of this research is to introduce a new theoretical framework called "design-driven conflict(s)" that can lead to the necessary steps required to facilitate network construction in social complex adaptive systems.

2.1.1 Objectives

Based upon the above research question and the aim of the study, this paper has four objectives (Table 1): (i) First, we aim to identify the underlying factors that are associated with conflict and disorders in respect to the complexities in social systems;. (ii) Upon defining the origins, incidence, and different perspectives regarding the concept of 'conflict', we aim to clarify the reciprocal relationship between the conflict of agents and social change from a normative perspective. The intention is to investigate the mechanism by which controversies facilitate the emergence of a new reality through destabilizing underlying social structures. Next to that, (iii) we explore the steps required to construct conflict and disagreement by creating a network of interactive agents;. (iv) Upon identifying the limitations and challenges associated with conflict construction, we propose specific aspects of design intervention (from a theoretical point of view) that ought to be beneficial in the context of social controversy.

Domains	The review structure			
	Conflict(s)			
	(i) Conflict of agent(s): A common phenomenon in social systems			
Conflict (1)	(a) the stereotypes	(b) the definitions	(c) the root causes	(d) the consequences
Complexity (2)	(ii) Duality of conflict(s) and social change			
	(e) conflict & ritualism	(f) emerging new knowledge		
	Construction - Creating a network of allies			
	(iii) Network construction, requisites, and challenges			
Construction (3)	(g) awareness	(h) objective variables	(i) boundary object(s)	(j) change in the ends and means
*The absence of a discipline	(k) willingness	(L) complexity of relations	(m) uncertainty of context	(n) synthesizing ideas	(o) creating trust & transparency
	Design & Network Construction			
	(v) Design(er) potentials to intervene in social context			
Design sciences (4)	(p)heterogeneous people	(q) making experiences tangible	(r) frame fundamental values	(s) empirical values	(t) to work in iterations

Table 1 is an overview of the research and the rationale underlying the structure

2.2 Materials and Methods

A systematic review of the literature was conducted to address the following hypotheses. First, 'conflict(s)', in a constructed way, facilitates desirable changes in underlying social structures. Then, 'design', as an agent of change through the creation of a network of interactive agents, can construct controversies in social systems.

To ensure the scientific quality of this paper, we conducted a systematic analysis using different academic resources and 'four interdisciplinary' fields of sciences, including conflict studies, complexity studies, network construction, and design sciences (from [1] to [4]) (Table 1). Furthermore, we conducted a 'qualitative' meta-analysis based on four successive stages that were originally developed by H. Levitt (Levitt, 2018) as a tailored method to enhance the methodological integrity. As such, (1) the analysis began with a primary study within the scope of our research questions (i.e., what is conflict construction in a social system and which aspects of design facilitate the construction of a network of allies) and then continued with

some essential modifications to the research questions based on the exclusion and inclusion criteria. Certain research elements, such as the type of study (whether it is included in at least one of the five research domains), date of publication (the majority were published after 1980), the intervention strategy (whether it refers to a socio-political or socio-cultural study), and the type of the publication (peer-reviewed articles or scholarly books and book chapters) were required. In addition to that, we excluded specific elements, such as studies at individual levels (in particular about conflict studies)), as well as hard and soft aspects of system thinking. Next to that (2), we transformed the results of the primary research into the number of units and subunits that clearly supported the four research objectives (from [a] to [t]). This process helped us to generate a number of keywords, but it also supported categorization based on commonalities (or distinctions) with the abovementioned study disciplines (from [1] to [4]) (i.e., the selected keywords for the second review process were *constructive conflict*, *conflict management*, *social transformation*, *institution(al) emergence*, *higher order learning*, *network construction*, *sociology of translation(s)*, *boundary objects ecology*, *participatory design*, *value-oriented design*, *value co-creation, and system oriented design*). (3) To identify the essential keywords, we conducted a new search process in which we included scholarly works from research engines such as ScienceDirect, SpringerLink, Google Scholar, and Scopus (Inin total, 621 scholarly documents were found). The documents were imported into a reference manager software (Mendeley) for further analysis based on their titles, abstracts, and keywords. Next to that, we transferred the results into a new set of categories that had previously been created in five different excel sheets based on integration of the research objectives, keywords, and domain of studies. (4) Finally, this process reduced the literature list to 121 essential research items that had been examined carefully. Further, based on reading the bibliographies and references, we added 25 additional research items related to the scope of our review study.

2.3 Results

2.3.1 Conflict of Agent(s), a Common Phenomenon in Social Contexts

- Root Causes of Conflict(s)

With regard to the consequences of conflict in social systems, organizations often define conflict as a problematic form of social relations that many agents, intentionally or unintentionally, seek to avoid (Bartley, 2007; Schweiger et al., 1986; Stasser & Stewart, 1992; Stasser & Titus, 1985). This opinion is mainly manifested in positivistic approaches within organizational contexts (Luthans et al., 2004). The objective is to increase the efficiency of actors and their relationships with one another, support decision-making processes, and resolve conflict within the organization (Daft, 2008). As such, they often have a linear problem–solution approach toward internal and external challenges. For instance, Shiflett (1979) proposed a linear approach for analyzing the productivity in the organization by highlighting the negative impacts of diversity and conflict on group performance. Based on the Shiflett model, removing conflict within the organization can increase the probability of the resources being used (Shiflett, 1979; Stasser & Titus, 1985). Moreover, a number of studies have underlined the concept of social conflict as a destructive form of social relationships that could negatively influence growth and progress at organizational levels (Schweiger et al., 1986; Stasser & Stewart, 1992; Stasser & Titus, 1985; Walton, 2014b; Wieviorka, 2013). Similarly, Cuppen (2018) mentioned the concept of the 'diversity paradox' to illuminate how actors of a social system who avoid the consequences (e.g., lack of progress in decision-making) of a conflict and disagreement often tend to have consensus-confirming discussions (Cuppen, 2018b; Mouffe, 1999). As a result of this stereotype, they often fail to reveal other aspects of the problem and lose the benefit of diversity (Bulleit, 2017; Cuppen, 2012; Walton, 2014). Despite the consequences of controversies on group efficiency, the truth is that neither all personal aspects of perceived

conflicts nor all social consequences of ruptures are problematic (Bratton, 1997; Slavin, 1969). In other words, the impact of conflict (i.e., the resulting changes after conflicts) as a dynamic form of social relationships can also be "**constructive**" (Cuppen et al., 2020). For instance, one of the advantages of controversies is that they can facilitate 'exploiting the total intelligence of groups' or reduce the risk of 'group thinking in an organizational context (Cuppen, 2012). From a broader social perspective, controversies can also contribute to 'learning and capacity building', which is essential for 'change in the deep cultures and values' (the concept will be explained in the next section) (Cuppen, 2018; Della Porta et al., 2014).

Moreover, the review of the literature showed that, in social systems, conflict(s) between human agents is an essential property of human relationships that 'stimulates' the dynamic nature (self-organization property) of the social system (Bratton, 1997; Bulleit, 2017; Gomez & Taylor, 2018; Wildman et al., 2016). It is a common consequence of human life and a necessity for continuous growth in every society (Bratton, 1997a; Crespo & Appel, 2020; Slavin, 1969; Wieviorka, 2013). In the short-term, controversies shape the individual's decisions, behaviors, or actions. In the long-term, by challenging the dominant culture and opinion (also known as a social reality), they can increase the speed of growth in a social system (Berger & Luckmann, n.d.). As stated by J. Gharajedaghi (p. 104), ignoring the role of conflicts in a real context reduces the independence of people and their agency to a robotic level. Therefore, removing controversies or "the ideal of a conflict-free society not only is not feasible, but it is not even desirable"(Gharajedaghi, 2012a).

Regarding the origin of conflicts, in an early study, Coser (p. 201) divided the sources and incidences of conflict into four categories, including the distribution of power, wealth, resources, and achieved identity (Coser, 1957). Collins (Patricia Hill Collins, 1989), in a study on 'black feminist thoughts,' highlighted the linear relationships among different parameters that lead to oppression and tension in marginalized groups, including the relationship between the power and distribution of resources and then the

impacts of different value systems, i.e., just ahead of human natural drivers on knowledge validation. Based on Collins' study controversies, in the present form, are a product of past events, in particular, the way that power is distributed. Similarly, Bratton divided the origin of conflict into three main categories, including power differentials, scarce resources, and value divergence (Bratton, 1997). In contrast with such linear (systematic) approaches, Callon and Latour (1989) tried to go beyond systematic approaches. Their concept of "translation" by decentralization of "power" (or capital) gives more agency to the role of actors and their network of relationships. As outlined by Latour translation is a prerequisite for transformation' in social systems. Through the translation process, social realities, including the interests of actors, can be modified differently (Latour, 1990). This means the divergence of interests is more about the process of translation, rather than transformation (Tureta et al., 2021). Moreover, Ackoff and Gharajedaghi based on a review of early social thinkers, such as Marx, Weber, and Bagdanov, defined the root cause of controversies from a systemic point of view based on a 'network' of five elements, including wealth, beauty, power, value, and knowledge (Ackoff & Gharajedaghi, 1996). From this viewpoint, any changes in the 'dissemination and distribution' of these resources can destabilize the power relation (F. Avelino & Wittmayer, 2016). Despite the importance of having a multifaced approach, a number of studies have shown the differences in individuals' values, expectations, and thoughts as a prime source of conflict and disagreement (Cuppen et al., 2020, 2021). From this perspective, value divergence between people leads to more contradictions, and this increases the risk of conflict and tension (Bratton, 1997; Cuppen, 2012; Gomez & Taylor, 201a; Karakiewicz, 2020; Wright et al., 1997). Accordingly, controversies can be reproduced from the interactions between certain elements (actors and actants), including people and their object of interest, the spillover of past events (e.g., divergences in hidden variables and opinions), and power relations in a social system. In the next part, in response to the second objective of the paper, we discuss the 'mechanism of controversies' and the way that

conflict accelerates the speed of (desirable) reforms in social adaptive systems.

2.3.2 The Duality of Conflict(s) and Social Change

- Conflict(s), and the Issue of Fixation

In general, the mechanism of change in social systems is a gradual process. The process is often entangled with an internal feature of social systems known as self-organization. Self-organization refers to the continuous emergence of patterns and orders and ensures the continuing adaptation of the system when dealing with external challenges (Heylighen, 2002). Based on this feature, 'social changes' are normally a gradual and continuous state of reform in which normative factors 'gradually' change the dominant discourse and social equilibriums (Elzen et al., 2011; Frank W. Geels, 2011b; Joore & Brezet, 2015). For instance, reframing social structures, changing the status quo, and even shifting the values or norms by reframing patterns of relationships all lead to such changes in the long term (Joore & Brezet, 2015; Slavin, 1969).

Despite this, shortening this process requires 'effective' changes in the default 'values and mindset'. These stable variables (e.g., ethical aspects of life) act like a barrier that forces people to stay in their normative zone while strongly relying on their deep values and mindset. Such core values are socially constructed through the interactions between actors. Any changes in these values require a social mechanism (Berger & Luckmann, n.d.; Knox-Hayes et al., 2021) that is potentially embedded in the core concept of conflict as a form of social relation. The same argument about the controversies was clearly outlined by Mattingly et al: "The moment of confrontation, which may evoke in us disquiet (p. 483) and bewilderment, uncertainty, and confusion is the moment of […] change in the moral and ethical aspect of life (Mattingly & Throop, 2018)". In such a situation, our premise is (re)constructing an internal tension by the declining risk of 'fixation or ritualism', which can not only ensure the continuity of systems but can also increase the speed of reform (Coser, 1957; Heylighen, 2002; Olsson et al., 2017).

Further, in contrast to the self-organization nature of social systems, controversy, as a form of social relation, can act as a fuel that triggers the speed of reforms (Berger & Luckmann, n.d.) (p. 123.). In other words, the success of reform, i.e., the extent to which changes reframe the dominant discourse and the rate of the changes (i.e., how long it takes to reframe the existing system and boundaries) are entangled with controversies as a process of change (Heylighen, 2002a; Slavin, 1969). Figure 8 shows how the divergent values [V1 and V2] decrease the distance between two momenta and how upgrading the level of tension can increase the speed of reform.

In the next part, to further unfold the process and the consequences of such changes, we examine the relationship between the outcome of conflicts (higher-order learning) and the emergence of a new reality.
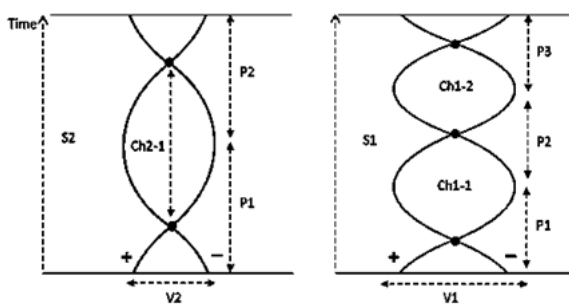
Figure 8 Conceptual visualization of controversies in social systems: the speed and rate of transformation are subjected to time and context and are entangled with the outcomes of conflict as a process of change.

- Food for deeper thoughts

Regarding the process of change, the 'initial' or fundamental outcome of conflicts could be certain phenomena, in particular, the creation and transmission of 'new knowledge and wisdom' (Coser, 1957; Cuppen, 2012, 2018; Ligtvoet et al., 2016). Figure 9 show the process of diffusion, continues transmission of new knowledge from conflict and disagreement. In social systems, knowledge is not necessarily information. It is "the fact or condition of knowing something through experience or association" with others (Cowan & Jonard, 2001; *Knowledge | Definition of Knowledge by*

Merriam-Webster, n.d.). In other words, knowledge is 'socially distributed' and tightly entangled in the way that a new reality (i.e., roles, responsibilities, or any form of activity that shapes an institutional order) is constructed in social systems. Regarding the relation between reality and knowledge, Berger and Luckmann defined the concept of reality as the quality of phenomena that we recognize independently of our own volition and knowledge as the manifestation of that reality in every aspect of our social lives. Learning from the organizational theories, the bridge between that reality and the transmission of new knowledge is a change in 'deep culture and values'. These values, known as vertical culture, refer to the types of values that we are brought up with from an early stage of our life. One key feature of these values is their implicit nature, in particular, for keeping people socially together (Baron et al., 2018). In this case, new activities in a social context (e.g., practices, behaviors, and relations), before emerging physically, need to be manifested in the culture of people (Bartley, 2007; Czarniawska & Joerges, 1996; Schultz, 2012). For example, the concept of democracy as an emergent property of a social system must emerge culturally before emerging physically in real life. (Flanagan, 2014; Wieviorka, 2013). The relation between deep culture and social change has been mentioned clearly in the system dynamics theories as well, mainly as a powerful leverage factor (or critical point) that can create a mindset or paradigm shift in a social system (Kováts-Németh, 2016; D. Meadows, 1999).
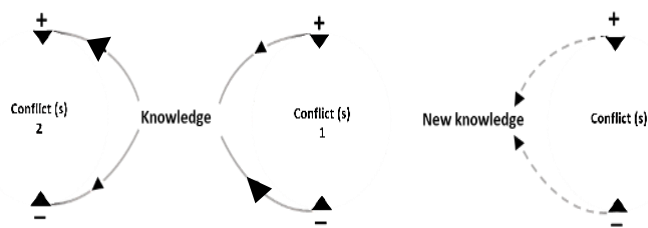

Figure 9 Knowledge that originates from the process of conflict is like a fuel that increases the speed of reform. By challenging the dominant realities, such knowledge in social systems can create the possibility for the emergence of a new order

Despite that, in theory -knowing cultures, decoding and encoding the values is a highly difficult process (Della Porta et al., 2014). Cultural values, particularly those associated with vertical culture, are harder to change than any other variable in social systems. They are the prime source and equilibrium of social structures and make systems stable and resistant (Coser, 1957; Elzen et al., 2011; Flanagan, 2014; Frank W. Geels, 2011; Westley et al., 2011). Speeding up the transmission of culture, in particular, with regard to values and assumptions, requires a 'stronger trigger' or 'internal stimulus' (Baron et al., 2018; Czarniawska & Joerges, 1996). Our premise is that the "conflict(s) of agents" can be identified as an internal stimulus that triggers such changes. As stated earlier, the revolutionary mechanism of controversies facilitates the essential changes in deep culture(s) and values. For example, a historical review of early societies revealed how different forms of human–human relationships, in particular, conflict or contradictions, can shape a new space of action (Callon, 1984b; Latour, 1984), such as developing a new writing style, bookkeeping, or even accounting after a clash of early nations (i.e., by overcoming their computing capabilities), which can accelerate the transmission of a new culture (Adib-Moghaddam, 2008; Crespo & Appel, 2020; Inayatullah, 1998b; Scott, 2017; Wieviorka, 2013). As a result of this transmission, there is not only the emergence of new behaviors, actions, and relationships, it can also shape constitutions, roles, and regulations between social actors (i.e., they are the manifestation of social reality) (Czarniawska & Joerges, 1996; Flanagan, 2014; Ligtvoet et al., 2016).

Accordingly, while increasing the system's diversity is a necessary step toward adaptation, controversies between actors can also open more room for knowledge transmission at a higher order (also known as third-order learning) (Allard et al., 2007; Coser, 1957; Cuppen, 2012; Kunseler et al., 2015; Popa et al., 2015; Wildman et al., 2016). On one hand, knowledge results from conflict (as the common and initial outcome), and on the other hand, the probability of having more conflicts within a system with intersecting values makes conflict an effective instrument of change for deep culture (Bartley, 2007; Della Porta et al., 2014). Notably, as stated by

Quist (p. 1035), a 'critical' discussion between actors often leads to the creation of new knowledge, not only on the cognitive level but also with respect to values, attitudes, and underlying convictions (Quist & Vergragt, 2006). As such, conflict is potentially the 'agent of change' (or an actant) that has the ability to alter the situation, particularly through the transmission of higher-order knowledge (Figure 10) (Knight, 1992).

Despite this, the success of conflict (as a process of change), i.e., whether it has created new synergies or not, is partly about the rigidity and resistance of culture but also about the effective utilization of conflict and disagreement (Bartley, 2007). In other words, the process is not always straightforward; a conflict and the associated changes (from values to the new relationships) may fail to achieve their desired outcomes if the transition into the new institution does not occur within a specific time and context. The problem is relatively political (Tureta et al., 2021). It is related to the distribution of knowledge (as a process) and the consequences of that transmission in a new context.

For example, human knowledge is often defined as an instrument for survival and power. Two societies confronting each other with different realities both distribute knowledge in a way that supports their own definition of reality (Berger & Luckmann, 1984). The one with more power has a better chance of imposing its own definition or manipulating the outcome of the process in a different way. Regarding the issue of power, Collins clearly unfolded the difficulties of black feminist scholars in the face of Eurocentric masculinist epistemologies, wherein the hegemonic nature of white male epistemologies decreased the influence of black feminist thought through Afrocentric feminist epistemology (Patricia Hill Collins, 1989). In other words, although oppression created the possibility for the emerging new order, it never scaled up as expected. Thus, there is no doubt that controversy, as a dynamic process (Tureta et al., 2021), contains a series of actions and decisions that happened in the past (in relation to what was important for people), continue in the present (in regard to power relations), and alter the future. But what we can learn,

from a futuristic discipline (e.g., design sciences) is that the future can be socially constructed by the creative use of the assets of today (Inayatullah, 1998) in a way to create (new) synergies between opposing realities.

For this, what is required is a '**constructive form of conflict'** or, as stated by Knight (p. 296), a 'strategic form of conflict' (Della Porta et al., 2014; Knight, 1992). The construction could result from certain steps: preventing the destructive impacts of conflicts (e.g., as physical or verbal tension) (Cuppen et al., 2020), redesigning a new network of conflicts (Tureta et al., 2021), or even rebuilding the future after conflicts (F. W. Geels & Verhees, 2011; Ligtvoet et al., 2016). In particular, the focus of the next part is network construction under the condition of conflict and disagreement. Our premise is that construction processes, along with utilizing the creative and productive function of controversies, are necessary for meaningful changes in the dominant discourses (Maesschalck, 2017). As such, in response to the third objective of the paper, we further investigate what steps are necessary and how these steps could be implemented properly for the effective utilization of conflict in a social context.
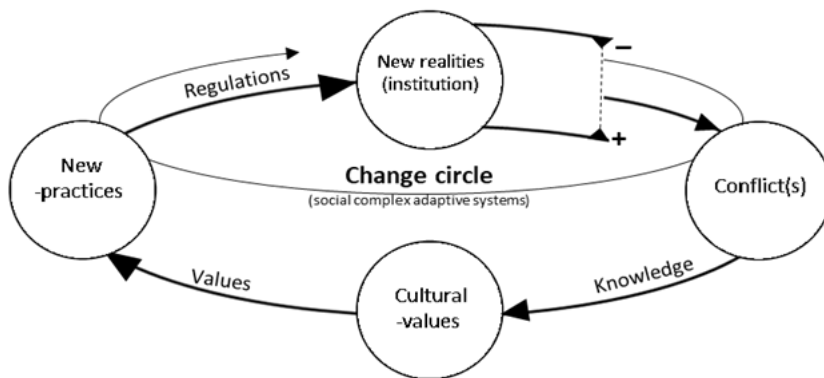
Figure 10 Circulation of change and adaptation in social systems. Conflict, by diffusion of new knowledge, becomes an agent for the change of deep culture and culture. By reframing values, it becomes an agent of the change to new realities (e.g., emerging new institutions) in social systems

2.3.3 Network Construction, Requisites, and Challenges

As concluded in the last section, despite the relationships between conflict(s) and social transformation(s), there is no guarantee that the diffusion of new knowledge from conflicts will lead to 'desirable' changes in the dominating mindset and paradigm of a system (Bartley, 2007; Berger & Luckmann, n.d.; Della Porta et al., 2014; Elzen et al., 2011; Knight, 1992). In particular, the problem with a diffusion model is the 'initial force of those who have power' (Latour, 1984). Rather than what has been transmitted or where the transmission occurs, the displacement of a token (which in our case is social knowledge) refers to the power of a particular actor who has power that is either greater or different (F. Avelino & Wittmayer, 2016). In contrast to the diffusion model, Latour (Latour, 1984) mentioned the role and agency of individual actors in shaping a token. Based on the translation model, a shift from the transmission to the continuous transformation of a token is happening (which, in our case, represents higher order learning) only by the decentralization of power. In other words, the prerequisite for obtaining higher-order learning (from the process of controversies) is taking into account the 'power of association' (Latour, 1984) or a collective action that has been rooted in the notion of a network of interactive agents. Therefore, to conceptualize the effective inclusion of conflicts in a context of controversy, two steps must be reviewed: first, what the construction of a network of controversies is, and, second, how to utilize (instrumentalize) the conflict between actors in a meaningful way. The former requires a review of the literature based on social science theories (i.e., both structural and systemic viewpoints), and the latter requires a study on decision-oriented discipline(s) in particular design sciences (Banathy, 1996; Gharajedaghi, 2012; Ligtvoet et al., 2016).

To start with, network construction refers to a process in which a set of human and non-human agents becomes related and is converted into a set of collective agents (Callon, 1984; Tureta et al., 2021). In line with the process, we highlight four essential steps associated with the construction of a network of controversies. The steps should not be seen as a linear

process (a framework or method); instead, the focus has to be on the research dimensions, in particular, the complexity that each step encompasses.

- Obtaining Knowledge from Context

The first step is obtaining knowledge about the context (i.e., context refers to a controversial situation). As long as the context is not overly complicated, knowledge about the context can be conducted through analytical studies and by defining the emergence and incidence of conflicts (Cuppen et al., 2020). Among the key questions that need to be answered are the following (Cuppen et al., 2020): What is the incidence of conflicts? Who are the actors and actants of the system? How are they connected in a dynamic context? What are the impacts of controversies? Addressing these questions requires a consciousness or awareness of different world realities (e.g., cultures) (Becker, 2014; Boeijen, 2015; Ekere et al., 2009; Knickmeyer, 2020; Ligtvoet et al., 2016; Manzini, 2015), but also a transparent (critical) discussion between actors that can further facilitate the unfolding of the unknown side of the context (Boeijen, 2015; Clemmensen et al., 2018). Prior research has shown that knowledge about the context in earlier phases of construction can prevent 'unfair judgment', 'misinterpretation', or 'oversimplification' of the problem (Frank W. Geels, 2011; Gharajedaghi, 2012). In particular, when people have value conflicts, a misinterpretation (which is often associated with bias or unfair judgment) can escalate the negative impacts of the tension (e.g., physical or verbal violence) (Clemmensen et al., 2018; Della Porta et al., 2014). In addition to this, having prior knowledge about the context is essential for knowing power relations, tracing influential positions, and hearing marginalized voices (Tureta et al., 2021). A study by S. Hussein et al. revealed that while understanding different 'social hierarchies' is a prerequisite for better engagement, a lack of such knowledge about the context(s) prevents actors from participating effectively (Hussain et al., 2012). Therefore, by knowing each actor's position and analyzing them within the network (Tureta et al., 2021), we can increase our awareness or

build background information about the context, which is an essential step for network construction.

- Beyond Objective Variables

The second step is to define a context beyond objective variables (Ligtvoet et al., 2016). Despite the necessity of awareness for framing a context, attributes of a context are not always sequential and simple (Cuppen et al., 2020; Galarza, 2008). Some attributes are dynamic and ever-changing (e.g., subjective differences of actors) (Cuppen et al., 2020; Star & Griesemer, 1989) Moreover, the context is not an isolated entity (Tureta et al., 2021); there might be some external variables (e.g., rules and regulations in neighboring systems or conventional and new forms of media) that influence the temporal dynamics of a conflict (Callon, 1984; Cuppen et al., 2020; Latour, 1984). Notably, E. Cuppen et al. conceptualized the concept of 'controversy spillover' to illuminate the impacts of external variables in shaping the attributes of a context (Cuppen et al., 2020). Based on their study, controversies in one social system can influence the dynamics of the context in another social world. Accordingly, once the context has been defined as a complex entity, rather than merely seeing the controversies in a linear way, the requisite is to see the 'relations' between controversies as an 'object of interest' (Cuppen et al., 2020). One benefit of seeing the relations is that the authorized agents (e.g., policymakers, organizers, or entrepreneurs) can create a situation of 'problematization', in which issues can be (re)framed by actors in a dynamic manner (Callon, 1984; Cuppen et al., 2020).

To conceptualize the 'problematization' process and its relation with network construction, M. Callon proposed a 'sociology of translation' wherein he explained four 'successive' moments of translation (starting with problematization) toward framing a network (Callon, 1984). For Callon and Latour, framing a context requires the flow of objects to be seen from different viewpoints. While this process gives more agency to actors, in the end, this is an 'obligatory passage point' (i.e., often defined by one viewpoint) that facilitates the creation of a network of 'alliance'. This

means, through a problematization process, that allies (either external or internal actors) become part of the network if, and only if, they follow the obligatory passage points (Callon, 1984b; Kunseler et al., 2015; Ligtvoet et al., 2016). Despite the benefits of problematization for creating a network of actors (i.e., in relation to the dynamics of context and employing a broader community of actors), the limitation is the issue of power. Problematization will narrow down the construction process based on one specific viewpoint (Star & Griesemer, 1989). In this case, beyond creating a network of 'alliance' through such a problematization process (i.e., starting with involving actors and ending with obligatory passage point(s) that are assigned with one actor), an ecological or holistic approach is required to create a network of 'allies' in which actors have more agency to make their own decisions (Galarza, 2008; Hocking et al., 2016).

- Boundary Object(S) Ecology

Subsequently, the third request is about creating 'boundary objects' from which the knowledge and opinions of actors can be 'translated' in a meaningful way (Cuppen et al., 2021a; Star & Griesemer, 1989). In particular, boundary objects can be effectively used to create a network when contradiction and differences among actors are at a high level (Cuppen et al., 2021). Considering that translation is a co-evolving and progressive process (e.g., transmission of thoughts), creating a boundary object can facilitate the transcendence of the (potential) social world among actors. Finding commonalities and crossing boundaries between different social worlds are essential features of boundary objects (Star & Griesemer, 1989). The concept was originally developed by S. Star (which was originally a response to M. Callon's four moments of translation model) to illuminate how entrepreneurs (e.g., a science authority) can create a common ground between contradictory voices by encountering different social worlds (Cummings et al., 2019). Based on Star's studies of 'creating a network of allies' rather than mediating the concerns of actors from a specific point of the passage (alliance), it is the role of individuals (allies) to maintain the integrity of the interests of the others (Star & Griesemer, 1989). Moreover, giving more agency to actors will empower them to

articulate a greater range of discourses (Ligtvoet et al., 2016; Simonsen & Robertson, 2012).

In such a situation, besides involving a diverse range of actors (Cuppen, 2012; Cuppen et al., 2021), a further requisite is to have a balance between them to facilitate a transparent discussion (Cuppen, 2012). Such diversity, along with an open, unbiased discussion between actors (e.g., the inclusion of marginalized voices), leads to the unfolding of more hidden assumptions, a higher proportion of unshared knowledge, and a better translation situation (Brodbeck et al., 2002). Thus, utilizing boundary objects, crossing the contradictory voices by using their commonalities, and creating a condition for making controversies (as a form of relationships) more participatory are the advantages of having a holistic viewpoint.

Our premise is that this should ideally lead to construction since, on one hand, it can provide a situation of social learning that gradually changes the predominant mindset and paradigm within the system (through a different moment of translation) and on the other hand, it can lead to the strength of the network being maintained with a long-term perspective.

- The Interchangeable Notion of "Ends and Means"

Next to creating a participatory context through boundary objects, the fourth request is about utilizing the interchangeable notion of "ends and means". Ends are "possible states of affairs, which someone values for their own sakes" and means are the things that make pursuing that ideal end a desirable experience (Frankfurt, 1992). As we gain distance from a fundamental view (in which analysis is one essential step), for people such as H,. Frankfurt rather than knowing what drives people to act in a certain way, it is more about seeing the duality of a relation between ends and means among people (Frankfurt, 1992). One benefit of this approach is turning a context of controversy into a more competitive form of engagement (Gharajedaghi, 2012).

To serve such an active and competitive relation (which is essential to obtain the benefit of problematization), it is also essential to create an 'interactive' context (Ikegami, 2000). An interactive context increases the transparency of communication among actors. For instance, people who engage without any preplanned intentions often have to deal with the temporal dynamics of conflict (Cuppen, 2018; Cuppen et al., 2020), and this requires transparency in the first place. In this situation, the creation of an interactive context by facilitating the exchange of values can increase the transparency of the context. The creation of an interactive context can also support actors to share their opinions, challenge the dominant discourses, and reframe (by negotiation) the boundaries among each other (Van der Velden & Mörtberg, 2015). Moreover, one benefit of such an interactive approach is having a problem-structuring dialogue (Cuppen, 2012, 2018; Kaushik & Walsh, 2019) which is essential to increase the effectiveness of deliberation in handling the temporal nature of conflicts (Van der Velden & Mörtberg, 2015). Therefore, through these processes (making a controversial context interactive, and creating a problem-structuring approach) the contradiction between people can turn into a competitive form of engagement wherein people can not only learn from each other, but they can also utilize their thoughts and opinions through the exchange of their interests.

- The Absence of a Discipline (Analytical, Synthetic, Complex, and Relational)

In sum, the abovementioned steps are necessary but not enough to construct conflict in a real-life context. Prior research (with more practical implications) has shown that these steps have brought some challenges since they do not clarify the kinds of interventions needed, and how we can design for them (Cuppen, 2018; P. H. Jones, 2014; Kummitha, 2019).

For example, when there are diverse actors, the facilitator is often confronted with a sea of meanings, aspirations, and convictions which makes synthesizing and sorting ideas a highly complicated process (Kunseler et al., 2015). Another concern is about the willingness of actors

and their right to participate in the first place (Maesschalck, 2017), which refers to the issue of power. In particular, such a problem is more common when one actor takes a position that belongs to the other authorities (e.g., in the problematization process, defining the obligatory passage points is a researcher's responsibility). Therefore, the issue requires a creative approach to change the power relation and include marginal (Van der Velden & Mörtberg, 2015). In addition, creating an interactive context in order to deal with (lack of) trust and transparency requires an 'iterative' mindset that gradually increases trust and transparency between actors (Gharajedaghi, 2012; Ligtvoet et al., 2016).

All of these problems, along with the necessity of having an action-oriented participatory bias, require an additional approach for conflict construction (Simonsen & Robertson, 2012). Such a participatory mindset has to create actionable strategies to facilitate emerging new values between contradictory voices (P. Jones, 2014; Van der Velden & Mörtberg, 2015). Thus, in the following sections, in line with the fourth objective of the paper, we examine specific aspects of **design inquiry** in order to illuminate how a 'designerly intervention' can facilitate conflict construction in a complex adaptive system.

2.3.4 Design(er) Potential to Intervene in a Socio-Political Context

In general, the implications of designed objects and environments are partly functional (explicit) and partly socio-political (implicit)(B. Friedman et al., 2013). Prior to publicizing an artifact in a real-life context, designers often attempt to unfold the unwritten social aspects of their designed objects (Van Boeijen & Zijlstra, 2020). Their intention is to see the consequences of the designed object from a broader social perspective. Such a dimension of design has been discussed in a few studies, mainly at a methodological level (Sims, 2016; Tromp & Hekkert, 2014). In particular, Sims in a study about the politics of design, mentioned three main capacities of design for political implication: the 'prescriptive', 'publicizing', and 'proposing' notions of design (Sims, 2016). The prescriptive feature is relatively similar to the translation processes. Based

on this aspect of design, a designed object can be translated from a socio-political concern (e.g., the issue of poverty) into a technical problem (e.g., internet connection) (Sims, 2016; Van Boeijen & Zijlstra, 2020). In contrast to the prescriptive features, the 'publicizing' aspects of design have more social implications, aiming to make a complex political problem graspable or publicizing it for a broader community of actors. The third aspect refers to the futuristic implication of design. The intention is to 'propose' an alternative future through the involvement of multiple actors (each actor proposes a different reality), and the objective is to decrease the risk involved in making a decision in the political context (Van Boeijen & Zijlstra, 2020). Despite having certain methodological advantages, the problem with such approaches is the lack of theoretical bases to support the underlying argument for the benefit of the design contribution. In other words, it is hard to find an analysis based on the first insight of design interventions. For example, regarding the translation process (prescriptive aspects of design), unfolding the relevance of design requires a normative investigation. The same concern is applicable to envisioning a collective future, which requires an investigation based on the participatory roots of design. Accordingly, similar to the last section, the steps presented here do not aim to present a methodological contribution; rather, the objective is to explore the theoretical contribution of design for construction in social systems.

- Design Potential to Participate with Heterogeneous People

Starting from the idea of community building within the decision-oriented disciplines (e.g., applied engineering, business, and marketing), designers are traditionally more inclined to involve actors in their intervention processes (e.g., customer surveys, focus groups, or field tests). They have a great tendency to engage closely and to empower actors from micro to macro levels to share their knowledge and experiences in a meaningful way (Manzini, 2015; Van der Velden & Mörtberg, 2015). Such a tendency is partly related to their desire to (co)create a better future, i.e., improve the quality of human life (Karakiewicz, 2020), but it also shows their

propensity for human-driven solutions (B. Friedman et al., 2013; Simonsen & Robertson, 2012).

In particular, participatory approaches in the domain of design are aimed at creating a more explorative and reflective mode of inquiry by involving a broader community of actors (Schön, 1992; Van der Velden & Mörtberg, 2015). Through participatory sessions, designers utilize a variety of (participatory) tools and techniques in order to facilitate a critical discussion that ideally leads to the exchange of more meaning and values among actors (Hocking et al., 2016; Stirling, 2008; Van der Velden & Mörtberg, 2015). The participatory notion of design, along with the creative use of tools and techniques, can create a unique condition for knowledge transformation that is similar to the core concept of 'boundary objects' (Boeijen, 2015; Star & Griesemer, 1989). A study by A. Van Boeijen showed that designing a set of cards (i.e., culture-sensitive cards) assists the designer to examine the culture of the intended user, and it can serve as a condition for creating boundary objects from which the designer's work will receive more credibility among actors (Boeijen, 2015). A similar study by F. Smulders showed that prototyping with or for stakeholders by bridging the gap between research and the production context facilitates a better understanding of the design process (Smulders, 2006). Thus, prototyping processes, along with the creative use of tools and techniques (e.g., cards, probes, or dairies), are great examples of bridging different social worlds (Sanders & Stappers, 2014; Smulders, 2006; Visser et al., 2005). The creation of the essential condition for the formation of the boundary objects and then utilizing the participatory tools and techniques enlarges the potential network construction.

- Design Potential to Make Experiences Tangible

The second advantage is the value sensitivity or sensemaking power of design. A design intervention, as a value-oriented approach, facilitates the definition and (re)framing of values in order to obtain meanings for their desired outcomes (B. Friedman et al., 2013b; Manzini, 2015). Design facilitates, by challenging people's deep values and assumptions, the

creation of tangible knowledge and experiences. Studies have shown that the way designers intervene in a complex context is not limited to their intellectual abilities, nor is it simply related to linear relations of (predefined) variables within the context, but it extends to the competent use of values for the benefit of people and society (Dalsgaard, 2014; Dangerfield, 2014; Van der Velden & Mörtberg, 2015). In particular, different approaches in design practice embrace the role of values in shaping human social systems (e.g., design for sustainability or design for the base of pyramids (Knox-Hayes et al., 2021; Tromp & Hekkert, 2014). Similar to the design context within the domains of social sciences, the act of constructing a network is tightly entangled with making sense of the context. Whether a controversy context is simple or complex, knowledge about the context, how values influence people's relations, and determining the kinds of values that are stable or unstable are among the key questions that need to be addressed for the construction of a network (Cuppen et al., 2020, 2021). Our premise is that the value sensitivity of design, along with the use of designerly tools and techniques, facilitates network construction. In the following text, to explain the concept in detail, we further explore four aspects of design, i.e., the design capacity for framing fundamental values, empirical values, values that result from iteration, and situational values that are meant to be instrumental for the act of framing a network of actors.

- Design potential to frame fundamental values

First principles, or widely accepted principles, are fundamental values that cannot be reduced to other assumptions (i.e., they refer to ethical values such as security, respect, love, or kindness) (B. Friedman et al., 2013; Mattingly & Throop, 2018b; Sterling, 2010). These values influence actors' attitudes, define fairness, and legitimize what is right or wrong about an action (*Intrinsic vs. Extrinsic Value (Stanford Encyclopedia of Philosophy)*, n.d.; O'Sullivan, 1999) Likewise, in the design process, knowing these values (i.e., design of being or intrinsic values) is one of the essential steps that designers need to implement them in a real context (Van der Velden & Mörtberg, 2015). From the early stages to the final stages of design,

designers often struggle with the ethical question of what is the right things to do, or even more deeply, what is fundamentally important for humans? (Bengston, 1994; Stirling, 2008). Without certain knowledge and abilities about these values, designers cannot understand why (and how) people act and interact with one another in different ways (Boeijen, 2015; Hodges et al., 2017). In this case, they often deploy a thorough and in-depth assessment of the context in order to reveal these values (Kunseler et al., 2015; van der Bijl-Brouwer, 2017). They use a variety of tools and techniques and utilize their design ability to distinguish values from other related concepts (Price et al., 2018; Vigliano Relva & Jung, 2021; Visser et al., 2005). In particular, by consciously using the culture of the intended user, they can assure that their artifact(s) have been accepted in a specific social system (Boeijen, 2015; Sterling, 2010). A study by R. Price et al. showed that designers can surface deeply held assumptions and synchronize different thoughts among actors by using narrative tools and techniques (Price et al., 2018). These tools, along with design abilities (i.e., using creative techniques to frame socially accepted values), bring more clarity for intervention and change in a social context (K. Friedman, 2003; van de Kaa et al., 2020). Considering that one essential step toward network construction is knowing fundamental values (which require obtaining knowledge from context), the use of such design abilities to unfold fundamental values has a certain benefit by increasing the feasibility of deliberation in a complex context (Hocking et al., 2016; Vigliano Relva & Jung, 2021).

- Design potential for empirical values

In contrast to the fundamental values, studies have shown that a design process is not just about applying pre-defined values, it is also about utilizing empirical values and related knowledge. Empirical values refer to values that have more potential to be tested in a real context, such as concepts of usability or the affordability of a designed object.

In particular, certain values associated with the design process get their meaning through real-life experiences (Hodges et al., 2017; van de Poel,

2021). Similar to instrumental values, they are grounded in daily life and it is hard to separate them from human practices (Dalsgaard, 2014; Dangerfield, 2014; Morgan, 2014; Redström, 2008; Ziff, 2000). Unfolding these values requires an empirical investigation, along with a pragmatic mindset, similar to the core concept of design (B. Friedman et al., 2013b; Hodges et al., 2017; Redström, 2008; Ziff, 2000). Based on the pragmatic notion of design, a designer does not define an object merely based on its inherited values (what it is being used for) but also based on 'how it ought to be' in order to help the user achieve a practical, yet meaningful, end (Dangerfield, 2014; Hothersall, 2019; Kaushik & Walsh, 2019; Redström, 2008). A study by I. Dianat et al. in the context of masonry work showed that the way designers shape (handle) tools has a significant impact on how a product is being used in a real-life context (e.g., user performance, usability, and discomfort) (Dianat et al., 2015). In order to obtain a functionally better end, besides subjective attributes, a designer often investigates the practical implications of their values (Dianat et al., 2015; Velden & Mörtberg, 2021). Through this process, they often use different tools and techniques to better investigate the application of their values. For example, the purpose of 'a system usability matrix' or 'affordance structure matrix' is to evaluate the usability or affordability (as an instrumental value) of artifacts in a systematic way (Hocking et al., 2016; Redström, 2008; Sanders & Stappers, 2008; Simonsen & Robertson, 2012; Visser et al., 2005). Such investigations can be conducted individually or in a collective way. For example, by employing different playful techniques, one can aim to provoke a reflective form of deliberation wherein actors can share and experience the practical outcomes of their artifact in a real context (e.g., by prototyping with stakeholders) (Van der Velden & Mörtberg, 2015; Visser et al., 2005). Such a pragmatic mindset along with a systematic approach for processing thoughts creates a unique condition to test and validate the results of an intervention (Hodges et al., 2017; Kaushik & Walsh, 2019; van de Poel, 2021; Van der Velden & Mörtberg, 2015). Considering that one of the main challenges toward (co)creating a network of actors is having actionable strategies, such a pragmatic mindset not only

can create a unique condition for connecting people in practice but can also lead to more trust and transparency toward the process and results.

- Design potential to work in iterations

A design intervention is neither entirely synthetic nor is it entirely analytic. The third advantage of the design is its iterative circle. From understanding to action and from the production to the use of knowledge, the design process is a learning circle (Harris et al., 2010; Hothersall, 2019). Designers utilize both analysis and synthesis techniques in an iterative way to increase their own understanding of the situation as well as to ensure the effectiveness of knowledge and experience (Cross, 2011a; Dalsgaard, 2014; Norman & Verganti, 2014; van der Bijl-Brouwer, 2017). An iterative process requires a dynamic culture (i.e., moving back and forth between problem and solution space) from which designers obtain meanings of their values through iteration and by reflection on others' thoughts and opinions (Cross, 2011; Dorst, 2015a; van der Bijl-Brouwer, 2017). In addition to that, an iterative circle makes design interventions suitable in the treatment of **emerging phenomena**, such as destructive conflict (Dalsgaard, 2014; Kummitha, 2019). From a social systems perspective, one advantage of continuous iterative insights is to yield a greater understanding of the problem and a better sense of the whole. Moreover, a design intervention is like a reverse zoom lens through which designers see the system as a working part of a successively bigger and bigger picture (Gharajedaghi, 2012). Thus, having an iterative culture leads to more trust and transparency both about the process and results in a broader sense (Flanagan, 2014a; Popa et al., 2015). As stated by J Ghardajgi, subsequent iterations (which are embedded in the design process) help to assure trust in the consistency of the process as well as to generate knowledge related to the complexity of the context (Gharajedaghi, 2012). In this case, the third advantage of a designerly intervention for network construction is to obtain a bigger picture of the context, learning from failures, and generating new knowledge through an iterative circle of inquiry. Such a co-evolving and progressive process can create more transparency as well

as a sense of conformity among actors and facilitators through the construction process.

- Design potentials for holistic approach

The fourth advantage of design is embracing the complexity of a system as a whole and obtaining a futuristic (opportunistic) approach toward intervention and change. A design process is neither entirely about framing a set of elements, nor is it fully about arranging them in order. It is more about how to 'organize' the properties of a system as a whole (Dalsgaard, 2014; Dangerfield, 2014). Studies have shown design thinking is a complex process that has a great capacity to handle complex situations (Dalsgaard, 2014). Regarding the complexity of design thinking, based on Rittel's wicked problems principles, R. Buchanan, claimed that most 'design problems' are implicitly 'indeterminate,' ill-defined, and complex' (Buchanan, 2016). From this perspective, the complexity of design thinking is not a prerequisite for better design. It is at the core of what it means to act as a designer in a rational, designerly way (Simonsen & Robertson, 2012). In a complex context (e.g., social systems), the designer employs a holistic and complex mode of inquiry in order to frame the problems in a wider context and support the dynamic notion of design (i.e., moving from whole to parts in an iterative circle). As stated by K. Dorst, design experts, rather than solving a problem in the given format, often (re)frame a problem in a wider context (Dorst, 2015). In such a situation, the role of the designer is similar to the concept of 'translator' in Latour's 'power of association' (social science), wherein a designer, as an organizer, can increase the credibility of the proper values through the power of association (people) (Latour, 1984) and the connections between actors (Redström, 2008). In this case, the essential approach is to 'connect' the components of a system in a meaningful way in order to make sense of a complex context (P. Jones, 2017; Simonsen & Robertson, 2012). In contrast to other aspects of design, in dealing with complex problems, tools and techniques are also relatively complex, relational, and 'kaleidoscopic'. For instance, designers use the idea of Synthesis maps or Giga maps in order to connect the components of system but also to embrace the complexity of

actors and relations in a meaningful way (Brewster & Juan, 2007; P. Jones & Bowes, 2017; Sevaldson, 2018). Through these mapping processes, designers have different choices when intervening in a system, and with each choice, a new paradigm gradually emerges (D. Meadows, 1999; Mootee, 2013). Therefore, the complexity of design thinking, along with having a holistic-opportunistic approach toward complex problems, makes a designerly approach highly appropriate for intervention and change in a complex system, wherein actors and the context operate under conditions of uncertainty and vagueness (Harris et al., 2010).

- Concluding remarks

In sum, from a theoretical standpoint, four elements of design, along with the participatory notion of design, have certain advantages for constructing a network of actors. In particular, through value co-creation (i.e., from highly fundamental to pragmatic and relational methods), design can create a unique condition for transcending a current situation into a desirable future from which knowledge and experiences can be created through the relations between actors (Costa Junior et al., 2018; Ruttonsha, 2018). In this case, the integration of the aforementioned aspects of design (fundamental, pragmatic, reflective, and kaleidoscopic notions of design), along with the design tendency to empower actors to co-create value in a complex context, has a great capacity to construct controversies in a social system (B. Friedman et al., 2013b; Redström, 2008; Visser et al., 2005). In the next part, after a short synthesis of the aforementioned insights, we discuss the essential steps that should be taken for the implementation of a designerly intervention in the network construction process.

2.4 Discussion

Undoubtedly, controversies are a common and ever-changing phenomenon among actors in social systems. Our review shows that, regardless of stereotypes about controversies, which often come from a consensus-building mindset in organizational contexts, the construction of

conflicts between contradictory voices has a certain impact on the speed of reform in a social system. In particular, conflict itself could be identified as a strong trigger or agent for change in underlying social structures. The outcome of conflicts, i.e., the diffusion of new knowledge from conflicts, is a true representation of 'higher order learning' as it facilitates transformation in the dominant discourse and social equilibrium. However, the process is not straightforward, nor is there any guarantee that such transmission will lead to desirable changes. In particular, the concern is power relations, wherein one authority might impose his/her own definitions. Learning from B. Latour, the requisite is to reframe the model from a diffusion approach into a translation model (Latour, 1984). In doing this, we highlight one possible way to construct controversies, conflicts, and disagreements: the creation of a situation of social learning between contradictory voices. One way to create such a condition is to construct a new network of allies wherein actors are willing to share and exchange their meanings and values in a meaningful way. Based on the results of the review, depending on how complicated a controversial context is, certain steps are required to create a network of allies, including (1) obtaining knowledge about the context through analyzing the actors, variables, and incidences of controversies (i.e., appropriate for simple context); (2) defining the attributes of a context in a dynamic way by transferring the attention from the controversies themselves to the relationships between controversies as objects of interest (i.e., appropriate for complicated contexts); (3) creating a boundary-object ecology from which knowledge and opinions between actors can be translated in a meaningful way (i.e., appropriate for simple to complex contexts); and finally, (4) creating an interactive context wherein actors are willing to exchange their meanings and values with each other without threatening the object of their interests (i.e., appropriate for a complex context). Our premise is that involving actors in all these steps, along with maintaining the continuity of translation between opposing opinions, can create a unique condition for mindset and paradigm shift in a social system. As we stated earlier, inherent in all these steps is the high complexity of actors

and the complexity of relations (e.g., power relations) between the contradictory voices (Metcalf Editor, 2014). To ensure that such complexities are understood and treated properly, the requisite is to have a multidisciplinary, action-oriented approach (Gavrilidis & Nita, 2020). This approach has to be tailored in a certain way not only to maintain trust and transparency between actors but also to unfold hidden values and assumptions between opposing opinions. Additionally, employing creative skills is an essential step in order to encourage actors' active engagement in the sensemaking process. In this case, 'design interventions' are due to certain advantages, including (1) the designer's tendency to be involved in the community (i.e., this refers to the participatory roots of design); (2) design abilities in sensemaking in a complex context (i.e., making experiences tangible); (3) (4) the design(er)'s potential to frame fundamental and empirical values (i.e., value sensitivity of design intervention); (5) the design's tendency to work with a progressively bigger and bigger picture (the holistic and iterative notion of design); and finally, (6) the designer's ability to frame problems in a complex situation, which makes a design intervention highly appropriate for creating a network of actors in a controversial context.

To leverage the theoretical insights and to facilitate design interventions in actual contexts (i.e., it has to be applicable in relation to controversies at the technical, organizational, institutional, and social levels), the suggestion for future studies is to use an actionable methodology (or design framework). One essential aspect of this methodology is to address multifactor and multidimensional aspects of complex problems. The reason for having such a feature is the necessity of capturing the relevant dimension of a controversial context as well as to integrate a broader set of design principles (i.e., refers to six design dimensions). In particular, besides introducing feasible steps for analyzing and synthesizing insights (i.e., exploring the context from stakeholder's perspectives), the methodology has to provide an actionable framework to facilitate the translation moments, multilateral negotiations, and a discursive dialogue between contradictory voices (Cuppen et al., 2021). Furthermore, measuring the

interconnectivity of actors as well as the strength of the new network is highly essential for future studies. Learning from network theories, there are certain correlations between the strength of a network and the efficiency of problematization. Such a correlation can address some of the remaining questions, for example, to what extent the identity of the actor(s) has been changed through the translation processes and to what extent the ideal of paradigm shift is about to emerge in the near future. From a theoretical perspective, some of these concerns (about the strength of the network) can be addressed by creating an aspirational 'narration' or a strong 'core story' between actors (Paulsen, 2021). However, a further suggestion (after developing the design methodology) is to conduct an empirical study in a real controversy context.

Ch. Three

Chapter 3: **Change**

Chapter Three presents a first iteration on a design-oriented methodology. This includes the outcomes of the previous phase, the review study, and the aggregation of five design methods which have been adapted based on three main cycles (a) translation, (b) network construction, and (c) the possibilities for mindset change. The result of this chapter was published in a special issue of the Journal of Systems: Futures Thinking in Design Systems and Social Transformation.

Abstract: Transformability is one of the essential attributes of social systems. To improve transformability, one should create the preconditions for strategic intervention on the underlying social structures. This paper proposes a design-driven conflict (DDC) methodology in response to the limitation of the systemic design approach by aggregating a network of allies essential for the paradigmatic shifts. The proposed methodology has more strategic implications. It starts with unfolding the actors and shared resources (phase one context mapping). It continues with defining the power relations between them, drivers, and spillovers that cause conflicts and disagreements (phase two analysis). After this, it shows how one can synthesize the commonalities and the core narratives of actors in the form of boundary objects (phase three synthesis). By using the existing narratives and the commonalities between actors as inputs for the translation phase, DDC creates the preconditions for a network of allies construction. Next, the methodology uses translation as a method, in relation to the four moments of a 'sociology of translation',

problematization, interessement, enrolment, and mobilization, in order to gradually change the learning paradigm of the system. In the scaling-up phase (phase five), DDC proposes ways of creating a narrative platform, shedding light on how to mobilize the results of translation from the community level onto a broader social scale. The framework for the design methodology has been evaluated based on a method content analysis and by a group of experts from diverse backgrounds and disciplines. The results show, except for the efficiency of the method, which requires additional investigation in a real-life context, the efficacy and effectiveness of the method have been elaborated in a sufficient way.

3.1 Introduction

For a long time, it has been assumed that resilience and adaptability are two essential qualities of human systems to achieve survival and success in a problematic situation (Olsson et al., 2014; Walker & Westley, 2011). Recent studies, however, have shown that in a problematic situation (e.g., social crisis), the success or the failure of social systems is tightly entangled with the capacity to create a new paradigm from which a fundamentally new way of living can emerge (Hensmans, 2000; Walker et al., 2004; Westley et al., 2011). In particular, living in a condition of social crisis can greatly erode the resilience of human systems (Adib-Moghaddam, 2008b) if the dominant paradigm of a social system does not support meaningful changes from the underlying social structures (Walker & Westley, 2011). This means that, in addition to resilience and adaptability, transformability is needed when the ecological, economic, or structural aspects of a social system cannot continue functioning in the face of social crises (Walker et al., 2004; Walker & Westley, 2011).

In general, transformability refers to the socio-ecological capacities of a social system that lead to fundamental or paradigmatic change in the regime's structure (Olsson et al., 2014; Walker et al., 2004). One can improve the transformability of a social system by creating the precondition for the paradigm shift in the normative attributes of human

relations, such as a change in worldview, mindset, or deep narrative of a social system (Sangiorgi, 2011). In spite of such transformative impacts, the rigidness of mindsets and the multilayer structure of social systems (Frank W. Geels, 2011b) often result in a gradual change in the normative layers (Frank W. Geels, 2011; Joore & Brezet, 2015). In other words, even if the intention is to transform a system, in practice, the speed and rate of reform are showing a transitional movement in social systems (Elzen et al., 2011; Frank W. Geels, 2011). The issue of transformation, as opposed to transition, basically discloses one essential feature of designing for social systems: the higher the leverage points (D. Meadows, 1997; Taheem et al., 2022), i.e., mindset and paradigm level, the stronger the trigger needs to be (Della Porta et al., 2014b; Marcuse, 1991).

To transform a system, it is recommended to have a purposeful intervention, a strategic approach that highlights what are the right places in a system to intervene and from where such an intervention should be initiated (Hensmans, 2000; D. Meadows, 1997). The requisite for such a pragmatic and strategic intervention has been discussed clearly in critical system discourse, often in response to the increasing need for purposeful interventions in a problematic situation (Jackson, 2003; Walker et al., 2004). Based on critical system discourse, to close the pragmatic gap between the intention (which is transformation) and the capacities to change (e.g., the paradigmatic capabilities), a heuristic approach is needed, aiming to gradually involve a broader community of people in sensemaking processes (Jackson, 2003). The objective is to amplify the voices of marginalized actors, empower the oppressed or contradictory voices (Jackson, 2003; Ulrich & Reynolds, 2010), and ideally make the normative attributes of a system explicit and transparent for all members (Jackson, 2003). According to this viewpoint, only then one can reflect critically on the deep narrative or worldview of a social system and create the preconditions for a mindset and paradigm shift in a particular system (Jackson, 2003).

Learning from social construction theories (Berger & Luckmann, n.d.; Patricia Hill Collins, 1989), one possible strategy for such an intervention is to play with controversies in social systems, particularly conflicts, tensions, or any form of disagreement (Della Porta et al., 2014b; Nedaei et al., 2022; Tureta et al., 2021). Controversies are an inseparable part of social systems; they can improve and stimulate the self-organizing capacity of social systems (Bratton, 1997; Heylighen, 2002a). Controversies between actors can act as a silver bullet or social catalyst that can facilitate destabilization, change, and growth from underlying social structures (Bratton, 1997). In other words, controversies have a transformative mechanism that, if constructed, can create the precondition for change on the mindset and paradigm level (Nedaei et al., 2022; Sangiorgi, 2011). To construct controversies, the requisite is to aggregate a network of adaptive agents, and it is recommended to make this process purposeful using an action-oriented discipline (Nedaei et al., 2022b; Seravalli et al., 2022). One benefit of an action-oriented approach is to improve and facilitate aggregating a network of actors and creating the precondition for continued adaptation. In doing this, a call for the involvement of a pragmatic and creative approach is needed; thus, a systemic concept is embedded in the core concept of designing (Nedaei et al., 2022).

The focus of this paper is on the contribution of design (science and practice) to the ideal of a mindset and paradigm shift in a social system. Our main concern is that despite the prominent role designing in the condition of disagreements plays (Elzen et al., 2011; Milojević & Inayatullah, 2015), it is not yet clear what the role of design in a contradictory context is and how they, designers can contribute strategically on the mindset and paradigm level in social systems (Boeijen, 2015; Karakiewicz, 2020; Westley et al., 2011). Learning from past experience, such a limitation can result from a lack of complimentary steps, in particular, a design methodology to bridge the gap between theory and action (Herlo et al., 2017; Nedaei et al., 2022; Ulrich & Reynolds, 2010). In other words, an actionable framework is required to make the relation between these two steps (thinking and action) more reasonable and more

time dependent (Daalhuizen & Cash, 2021). The aim of this paper is to present and validate a design methodology to assist future social system designers toward the ideal of a mindset and paradigm shift in social systems. Considering the methodology is still in progress, the focus will be on the content knowledge quality rather than the user performance (or the outcomes), which requires additional investigation in a real-life context.

3.1.1 Objectives

The first objective is to briefly explore the current philosophical paradigm embedded in existing design methodologies (i.e., focus on critical discourse). Next, our attempt is to highlight the limitations and challenges toward the ideal of mindset and paradigm shift in social systems (i.e., focus on the systemic design approach). Then, we will continue by introducing specific aspects of the proposed methodology, including the essential steps that one has to go through, the links and connections between these steps, and, more importantly, the underlying motivation for taking these steps. Finally, upon explaining the different parts of the methodology, the content will be evaluated based on semi-structured interviews with a group of six experts. The results will be deliberated in a way to support future researchers for further iterations both on the content and the structure.

3.1.2 Background

In the design of social systems, once we made the decision to redesign the system (not to create a new one), we have to leave the system behind and prepare for change by introducing a new mindset and paradigm (Banathy, 1996; D. Meadows, 1997). The process of transcending the paradigm is the most problematic part of the design process, which is often dismissed by designers, particularly in social sectors (Banathy, 1996). Nevertheless, a few studies within the last decade tried to navigate the relationships between design and paradigm shifts, mostly with a focus on designed objects (Kummitha, 2019; Seravalli & Witmer, 2021) or design responsibility for challenging the existing reality (Heidingsfelder et al.,

2019; Mazé, 2021). Among these studies, reflective design concentrates on the transformative aspects of design, mostly from a reflective point of view (Schön, 1992). The objective is to create a reciprocal relation between designers and other actors in order to continuously shape the perception of an artifact based on a reflective conversation. Design as a catalyst focuses on the participatory aspects of designing and compares a design process with the procedural nature of games. For example, how one can increase the agency of actors through design to better diffuse new knowledge and experiences (Bayrak, 2019). In contrast to these approaches, reflexive design has more critical implications, with a special focus on the issue of power, particularly on how the power of one actor might (or might not) influence knowledge validation, i.e., the extent to which a new experience can be assigned in a design process (Sangiorgi, 2011). In line with a reflexive approach, critical design (Liene, 2019) or disruptive aesthetics are more provocative (Vink et al., 2017), meaning that they aim to design objects to challenge the existing patterns of thoughts or behaviors (Heidingsfelder et al., 2019). For designers working in the social sectors, utilizing such critical lenses has few advantages. It retains the attention on one fundamental question of designing, i.e., what is the right thing to do, or it discloses the design responsibilities as advocate of (marginalized) people.

One can claim that using such ontological lenses, e.g., seeing designers as activists or advocates of design in social systems (Rezai & Khazaei, 2017), often reduces the design capacities to a mere rhetorical device. This means they end up with some suggestive remarks on what has to be done at the product level and what should not when it comes to design in social systems. In response to the lack of a deep analytical approach and the pragmatic limitation of system sciences (Jackson, 2003; P. H. Jones, 2014; Sevaldson, 2018), systemic design (SD) or system-oriented design (SOD) methodologies and frameworks have been developed as an integrative, cross-disciplinary, and participatory approach (Costa et al., 2019b; Sevaldson, 2011).

Systemic design, by integrating the pragmatic and reflective notion of design and the designers' tendency towards community involvement, e.g., participatory design, co-creation design, aims to bring more feasible changes in a real-life context (P. H. Jones, 2014). Reviewing systemic design scholarly works clearly shows certain advantages of these methodologies regarding the complexity of social problems. A few examples are sensemaking in a complex context, envisioning the ideal future, or uncapping the places to intervene in systems (P. H. Jones, 2014b; Sevaldson, 2018). All draw attention to the transition from a purely human-centered approach into a socially complex and culturally multistakeholder way of reasoning and implementation (Bijl-Brouwer & Malcolm, 2020; Dewit et al., 2021). Undoubtedly, to some extent, such integration is appropriate for an analytical (system-oriented) approach. Nevertheless, the problem remains concerning design aspects (design as a process), implying how to intervene purposefully from underlying social structures. In other means, a form of a heuristic critical approach to empower the designer as a facilitator and design as a process is needed. Our premise is that by adapting a (heuristic) critical approach, one can shed light on the unknown part of the system (e.g., mindset and paradigm) and bring more meaningful changes from underlying social structures (Aguirre et al., 2017; Nogueira et al., 2019). In response to this limitation, we will shortly investigate a few aspects of SD methodologies based on the requisite variety principle (P. Jones, 2018).

- A Methodological Limitation

Looking into systemic design interventions, the limitation of SD methodologies is partly related to the optimistic view on the benefits of multilayer interventions and partly related to the limitation of participatory approaches for involving a real diversity of actors (Cuppen, 2012). In other words, although requisite variety is one of the main principles of SD (P. H. Jones, 2014), most of the collaborative frameworks in the domain of design are based on the similarities of viewpoints, bridging the gaps between neutral actors and finding a mutual agreement, which might not be effective in the complexity of social systems (Jackson,

2010; Seravalli et al., 2022). A purely positive and pluralistic mindset embedded in a participatory setting has limited its application to a simple democratic device to legitimize the assignment of power based on an indirect representation of opinions (such as voting system) rather than seeing what the actual intention of the people is (Christakis, 2014). In this case, one can claim that the outcome of the current methodologies is still more descriptive rather than critical and pragmatic (Ulrich & Reynolds, 2010). In other words, designers, together with other stakeholders, can only synthesize a complex view of the change in the form of boundary objects (e.g., products, tools, and techniques as a mediator) (Sevaldson, 2018), as they do not have a strategic focus on where they need to intervene and how this intervention should be processed. A few consequences of such a malfunctioning is a lack of a clear strategy (e.g., epistemological consistency) for hearing voices from hidden layers, such as contradictory voices, but also seeing the underlying narrative of the context (Hussain et al., 2012). This means they can hardly illuminate what assumptions are embedded in the underlying social structures and how to contribute to value co-creation with stakeholders in a contradictory context (Stirling, 2008; van den Hoven et al., 2015). Thus, reflecting on system paradigms, the outcome of existing SD methodologies is still more aligned with a soft system approach, rather than critical discourse, which is essential for more meaningful and value-oriented intervention (Jackson, 2010). In response to the limitations of SD, design-driven conflict (DDC) as a multidisciplinary, theoretical framework has been developed in order to address the limitations of a system-oriented approach by involving contradictory voices (Nedaei et al., 2022). Next, we will further elaborate on design-driven conflict and its contribution to the systemic design approach.

- The Underlying Theory

The main focus of design-driven conflict (DDC) is on social controversies and the possibilities for constructing them and opening places for social learning between antagonistic actors. As stated earlier, there is not a widely accepted theoretical framework that defines design abilities for a mindset and paradigm shift in social systems (Nedaei et al., 2022). By integrating

specific aspects of network theory with the design abilities for intervening in social contexts, DDC aims to empower the role of designers in dealing with complex social problems. Figure 11 is a conceptual visualization of this theory aiming to depict the circularity of change in social complex adaptive systems. Based on this model, (a) the extreme polarization in social systems by conflict and disagreement is one of the consequences of the increased complexity of social systems, (b) one characteristic of a polarized society is actively reproducing a contradictory form of social relationships, in particular, conflict and disagreement, and (c) the model highlights that controversies are not necessarily a destructive process but also that constructing them can create a condition for change on the level of deep culture and values, e.g., the mindset and paradigm level. This often happens through the diffusion of new knowledge, resulting from active and dynamic disagreements between social agents. One problem of this relational process is that a diffusion process and associated changes are not always a straightforward process: there is no guarantee that the result of controversies always leads to the transmission of desirable knowledge. For instance, one problem of a diffusion model is the dissemination and distribution of power between contradictory voices (d) (Gharajedaghi, 2012a; Hensmans, 2000). In this case, as suggested in DDC, one way to navigate the issue is to work with specific interrelational objects, e.g., boundary objects or any form of collaborative artifacts. In a contradictory context, design as a process of thought and planning can be a true representation of a translation process (Seravalli & Witmer, 2021), and the designer can act as a translator who not only can facilitate the involvement of actors but also brings certain abilities to empower actors toward being connected as a network of adaptive agents or allies (f). In the next sections, a set of methods will be presented in a structural order. Each part will be presented in detail, and the connection between them will be discussed in

order to highlight possible ways of intervening in social systems from the perspective of social controversies.
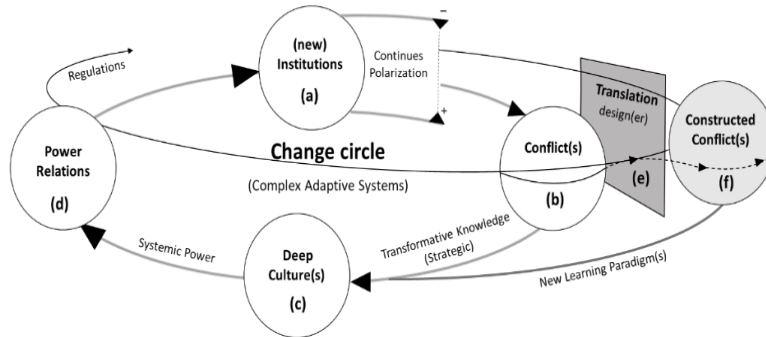
Figure 11 Adapted from design-driven conflicts (DDC).

3.2 Materials and Methods

3.2.1 Design Method Foundation

In response to the question of how design can facilitate the construction of a network of allies, developing a prescriptive framework or a design methodology is one essential step (Nedaei et al., 2022; Ulrich & Reynolds, 2010). The structure, the mindset, and the theoretical foundation of the method, including the goal and procedure, are based on the design-driven conflict approach (Nedaei et al., 2022). The method(s) rationale and framing has been developed based on some accumulative insights resulting from a set of panel discussions with other researchers.

The panel discussions were conducted in a lab setting wherein researchers from diverse backgrounds and locations were invited to participate in the sessions. In total, 12 PhDs, including 9 women and 3 men from the age of 32 to 45 (mean 37.25) with diverse backgrounds, including political sciences, design sciences, economy, and management, were part of the panels. The majority of sessions were in an online format; this was mostly due to the time and location constraints as well as some of the limitations associated with the Corona pandemic. Depending on the complexity of the

topics, the number of participants, assignments, and questions, the timing of each session was slightly different, from 70 min to 90 min maximum. The panel procedure involved that, firstly, each week, a researcher gave a lecture about one specific aspect of systemic design, often based on a selected project (which opened the room for further discussion on how to improve the framing capacity of the method) and, secondly, theoretical sessions, which, again, created the opportunity for a deeper discussion on what should be done to improve the underlying motivation and reasoning behind each step. Moreover, the organizers established the condition for a more reflective discussion by providing some study materials prior to each session and asking participants to bring their own questions before their attendance. The sessions covered various subjects including service ecosystem logic (Godsiff et al., 2019), black feminist thoughts (Collins, 1994), boundary objects ecology (Star & Griesemer, 1989), translation mechanisms (Callon, 1984), designer and system consciousness (Banathy, 1996), object consolation, and some introductory sessions about systemic design methodologies and principles (Bijl-Brouwer & Malcolm, 2020; P. H. Jones, 2014). After each session, there were also some additional coaching sessions conducted individually to allow participants to gain a better perspective of the content and participate more effectively in the discussion sessions. Each session has been recorded, and the content has been summarized by the organizer in order to integrate the essential insights into a cohesive body of knowledge.

Subsequently, these insights, along with our prior knowledge (from the model Figure), provided us the essential ingredients for developing the first version of the methodology. To develop the first draft of the methodology, we carried out 5 internal workshops with a group of 6 researchers at the University of Antwerp, including 3 Ph.D. students, 2 university professors, and 2 practitioners, to discuss further the limitations, possibilities, and places for further improvements. For instance, a comparison between transition model(s) and design for transformation, the concept of boundary object ecology and its relation to design intervention, design abilities, and the translation process have been

discussed through these sessions. The second improvement provides some additional clarifications in relation to the usability of the content and the difficulty of new terminology for the potential users.

3.2.2 Design Method Validation

After finalizing the first version of the methodology, we carried out a number of semi-structured interviews with a group of six experts in order to validate the efficacy, the effectiveness, and the efficiency of the methodology. The first two elements are essential to validate the method content, and the latter is needed for knowing the quality of the method artifact (Daalhuizen & Cash, 2021). The experts selection process was based on their levels of expertise and individual experiences in working with or developing a particular design methodology or framework. Among selected experts, two have expertise in social (systems) design, two have a special focus on actor–network theory, one on dilemma-driven design, and two have a special focus on strategic and systemic design innovation, each with at least ten years of teaching and working experience in the field.

The survey was organized into three sequential phases, starting with an introductory session, the semi-structured interview, and an open discussion session. Each session was planned for a maximum of 90 min, including 15 min for the introductory phase, 45 min for the interview session, and 30 min for the open discussion. During the introductory session, the foundational aspects of the methodology were highlighted, including the method goal and method rationale. It continued by introducing specific aspects of the DDC theory and its relation to the methodology content. Next, the researcher introduced five cycles of the methodology, including the context mapping, analysis, synthesis, translation, and scale-up processes, with a focus on the reasoning behind each step, the links between external dimensions, and the overall structure of the method. For the ease of understanding, specific steps such as the concept of power spillovers, boundary objects, and the translation process have been explained based on a problem scenario model in order to unfold the underlying motivations in a more meaningful way.

The second part of the survey was organized as a semi-structured interview. To frame the interview questions, we developed a seven-core questions model originally developed by J. Daalhuizen as a (design) method validation framework. As outlined by Daalhuizen, we used the four key elements of a design methodology that are independent of the users and context of usage (Daalhuizen & Cash, 2021). Measuring these elements is essential to investigate both the efficacy and effectiveness of a (design) methodology prior to the implementation in the real world. The first two questions are designed in a way to facilitate unfolding the efficacy of the method. The first element is related to ordering in time information, or procedural knowledge, of the methodology. The second one refers to the embedded goal of the methodology, which, in our case, means the capability of the method to support future designers to achieve a specific goal, e.g., social learning. Likewise, the effectiveness of the methodology has been investigated by asking two additional questions: first, the method rationale, which refers to the underlying motivation of the method, and second, the method flexibility, also known as method framing, which refers to the capacity of the method for being used in broader (or different) socio-political contexts. In addition to these elements, to explore the efficiency of the method, we asked different questions about the interrelational aspects of the methodology, including the mental conceptualization of the method, which refers to the relevance of the method for those who are the potential users, and two complimentary questions, including method goal-orientedness and method appropriateness. The former examines the trade-off or balance between rationale, consistency, and frame flexibility, and the latter investigates the relation between the structure and the goal complexity. The main reason for working with these seven elements is related to the following. While the user and outcomes of a methodology are dependent, a method's content and embodiments are relatively more stable. Therefore, it allows us to measure the quality of a method's content before any implementation, particularly in a case where the outcome has a relatively longer lasting impact, such as a change from the mindset and paradigm

level. Finally, the results of each session have been summarized and later transcribed. In the following paragraph, the different parts of the methodology will be presented.

3.3 Results

From a pragmatic perspective, the key objective of the methodology is to highlight the possibilities and the steps that one must take for constructing social controversies. The focus is on marginalized actors and on ways of constructing a network of allies from a design perspective (Nedaei et al., 2022). On one side, networks of allies can create preconditions for social learning and adaption (Ligtvoet et al., 2016; Nogueira et al., 2019), and on the other side, the designer's abilities are essential to utilize the revolutionary nature of conflicts (Nedaei et al., 2022). Both are needed, as they can contribute to the ideal of the mindset and paradigm shift (Nedaei et al., 2022; Nogueira et al., 2019).

As mentioned earlier, to improve the framing capacity of the method, each method has been selected by one or more experts coming from diverse backgrounds and opinions (Section 3.2.1). Thus, they originate partly from analytical approaches such as system dynamics and partly from critical approaches such as conflict studies or system transformation. To synthesize the methods in the form of a design methodology, each part has been adapted based on the classical design processes, including analysis, synthesis, intervention (translation), and scaling-up process. The methodology introduces the origin or background of a particular method, the aim, and the objectives according to the methodology's main goal. Each part highlights the 'what' questions and continues with exploring why such an integration is needed toward the ideal of mindset and paradigm shift. Next to that, the steps will be elaborated on, with specific complementary elements aiming to ease the instrumentation for method users. Exploring the 'how' question has been included as well. It is a prerequisite for knowing what type of tools or techniques are needed for future interventions. Finally, for a brief overview of the method, the

internal mechanisms including the inputs or outputs of each step and the links between different dimensions have been elaborated.

3.3.1 Context Mapping

The study of a problem's context is often defined as the earliest stage of a design process (Kummitha, 2019). From conventional techniques such as interviews and questionnaires to more comprehensive approaches such as context mapping, a designer uses different tools and techniques in order to obtain more in-depth information about the context (Joore & Brezet, 2015; Visser et al., 2005). By mapping a problem's context, they aim to create empathy with the actual user, avoid fixation or early assumptions, and define strategies that are best suited for addressing a design problem (Visser et al., 2005).

Likewise, the design-driven conflict (DDC) approach is looking at a problematic context as the starting point of the design process (Nedaei et al., 2022). The process starts with determining whether intervening by challenging the dominant mindset in a system is the right approach. This question is essential, as it can clarify the steps that one has to take according to the complexity of the related case or problem Table 2 (Joore & Brezet, 2015).

Context mapping		
*Input(s)	Methods	Output(s)
(a) the spatiotemporal aspects e.g. time and place	Multi-Actor Map F. Avelino et al., 2016	(c) the actors and actants e.g. roles and responsibilities
(b) the subjective attributes e.g. ascribed or achieved identities of actors	Paradoxical Map K. Dorst et al., 2011 C. Rhodes 2005	(d) shared resources e.g. the human, and monetary resources

Table 2 Context mapping phase starts with one essential question: Does the system need to change its deep mindset or paradigm? (the question is in line with the transformation objectives

The second step is to map the essential attributes of the context, such as the human or non-human actors and the spatiotemporal aspects of a problem. The latter aims to map the dynamic notion of a context, such as time and place (a) (Van Dijk, 2015), and the former is needed in order to describe the

subjective attributes of a context, such as individual differences (b), e.g., ascribed and achieved identities (Van Dijk, 2015; Velden & Mörtberg, 2021). From a pragmatic perspective, the two attributes are also complementary. Information about the spatiotemporal aspects of the context along with insights on the individual differences can identify actors' roles and responsibilities.

To make the process more practical, a set of complementary methods has been adapted for use, mostly from transition studies. The first tool is the multi-actor map. It was originally created by V. Pestoff under the title of 'welfare mix' (Pestoff, 1992) and later adapted by F. Avelino as a multi-actor perspective model (F. Avelino & Wittmayer, 2016). One essential objective of the actors' map is to cluster the results of individual differences, focusing on the mapping actors based on the communities or groups they are part of (c). For example, they can be divided based on state or public sector, community, market, and third sectors or voluntary organizations. While the suggestion is to adapt these categories according to the spatiotemporal aspects of the context to ease the completing of each part and to make the model more actionable, using a counterintuitive method, such as paradoxical mapping, is also recommended (Dalsgaard, 2014; Dorst & Hansen, 2011; Price et al., 2018; Rhodes & Brown, 2005).

One benefit of such a counterintuitive method is to facilitate critical dialogues and stimulate thinking and action in an oppositional way (DELW, 2014). Moreover, a paradoxical approach can facilitate completing the 'visible' aspects of the context, such as mapping actors' institutional differences. For example, several actors within a system, such as the health care system, might be part of the public sector. On the other hand, some might be affiliated with the private sector. The same is applicable for profit compared to non-profit and formal and informal sectors (F. Avelino & Wittmayer, 2016). For DDC, knowing how roles and responsibilities are distributed can ease the unfolding of the 'invisible' part of the context as well. In particular, resources that one has access to or can mobilize within the context (Dorst, 2015; Velden & Mörtberg, 2021).

In this approach, resources are the essential outcomes of context mapping (d). They can shape both the visible and invisible sides of the context, and they can influence the power dynamics within the context. As such, resources are the key property of every context, and they can be manifested in many ways, such as human or monetary resources as well as knowledge and experience (Nogueira et al., 2019). Unfolding the resources can support mapping the antagonistic form of relationships in the next step (Berger & Luckmann, n.d.; Nedaei et al., 2022). Defining the underlying resources as well as actors who share (or do not share) these resources is a way to better understand the power dynamics in a specific context.

3.3.2 Analysis

The second stage has been constructed in relation to the main dimensions of the social system: first, the subject's dependence on the systems, which is related to the multi-actor notion of the system (Flanagan, 2014), and second, the complexity of relationships between actors (Banathy, 1996). Similar to context mapping, the focus is on antagonistic relationships and defining actors with contradictory voices as well as power relations between them.

In particular, the analysis elaborates on the underlying drivers for a problematic context, focusing on the external and internal drivers that push people toward an antagonistic form of relationships. Looking from a broader perspective, actors are a representation of the components in social systems. As mentioned in Section 3.3.1, within a problematic situation, they often have different roles and responsibilities or experience a certain form of agency. While, in one way, institutional diversity might reinforce the collaboration between them, in social relations, they can also lead to conflict and disagreements between actors. Hence, the second part of the methodology aims to map the antagonistic power relations and the extent to which the roles and responsibilities are in contradiction with one another (Table 3).

Analysis		
Input(s)	Methods	Output(s)
(c) the actors and actants e.g. roles and responsibilities	Power Dynamics M. Hensmans 2000	(e) the power relations i.e. antagonistic actors
(d) the shared resources e.g. human, and monetary resources	Controversy Spillovers E. Cuppen, 2020	(f) the underlying causes e.g. historical and technological

Table 3 Analysis phase

Regarding the invisible part of the context (i.e., the power relations), the methodology explores the dynamic of power or how actors exercise power (Hensmans, 2000). For DDC, exploring the dynamic of power is one possible way to define the type of relationships between them (F. Avelino & Wittmayer, 2016; Nogueira et al., 2019). The goal is to map the relation based on their power, including actors with more (or less) power, actors with power over, and actors with a different type of power (c) (F. Avelino & Wittmayer, 2016; Hensmans, 2000). In transition studies, the literal meaning of power refers to the 'ability to mobilize resources' (Nogueira et al., 2019). Hence, to map the power, it is recommended to cluster the range of resources that one might possess and focus on the output of the previous stage where resources were defined using context mapping (d).

By categorizing the resources, one can illuminate how power is distributed and also facilitate mapping the contradictory voices, e.g., one with less access to resources. Prior research has defined that power dynamics between actors can be divided into three dimensions, including natural actors (or actors without any special connection), actors with synergistic relations, and antagonistic actors (F. Avelino & Rotmans, 2009; F. Avelino & Wittmayer, 2016). For DDC, the advantage of defining these three types of powers is to have more in-depth information about antagonists, the relation between them, and their conditions of existence. Moreover, it can help to explore the following questions: where does such power come from, and which forces drive actors to behave as antagonistic actors?

As such, the last part of the analysis phase aims to investigate the impact of spillover effects, both from neighboring systems and systems with

relatively similar structures. Based on spillover effects, change in one social system has certain impacts on the dynamic of power in other systems (Cuppen et al., 2020; Muir & Keim-Malpass, 2020). The concept has been originally proposed by E. Cuppen as a controversy spillover model (Cuppen et al., 2020). The objective is to investigate the impact of controversies in one (social) system on the speed of reforms in others (Meyer & Whittier, 1994). In particular, the focus is on the relations between different types of spillovers; for example, how geographical, historical, or technological spillovers might influence the dynamic of powers in other systems. Given the interconnected notion of controversies, the dynamic of power in one or more specific systems can uncover many hidden layers in other systems (Cuppen et al., 2020). The advantage of spillovers is to obtain more in-depth information about the invisible side of the context, in particular, the underlying causes of conflicts and disagreements (f).

In sum, the analysis phase aims to create a unique and transparent picture of the context, not as a stale or musty collection of rules and regulations, but rather as a dynamic entity. In other words, the study of the context must be in relation to the components, the quality of the relationships, as well as the underlying resources that one might share. In the next phase, the insights from the analytical tools, including the antagonists' power relations and the invisible or visible aspects of the context, become an input for the synthesis. The aim is to uncover the unique core story of each actor as well as the commonalities that they share within a controversy context.

3.3.3 Synthesis

The synthesis begins with exploring the stories and narratives behind each actor with a focus on antagonistic relations. The reason for working with stories is that stories area sort of medium, they can transfer meanings and values from one generation to another (DELW, 2014; Price et al., 2018). In other words, stories have a transformative power that can convey, distribute, and scale up messages from or within a community (Milojević & Inayatullah, 2015; Paulsen, 2021; Price et al., 2018). By synthesizing the

individual stories (g), designers can unfold the core narrative of the actors but also confirm the outcomes of the previous steps: context mapping and analyzing (Table 4)(Paulsen, 2021; Price et al., 2018). To map the story, knowledge about the drivers within a problematic situation such as spillovers, fears, obstacles, or barriers are the input of the process (f) (Rhodes & Brown, 2005). The stories can be completed if the drivers are ordered in time, in particular with the help of a narrative method.

Synthesis		
Input(s)	Methods	Output(s)
(e) the power relations i.e. antagonistic actors	The Hero's Journey K. Paulsen 2021	(g) the individuals' narratives i.e. antagonistic core stories
(f) the underlying causes e.g. historical, social, and technological	Boundary Objects Ecology S. Star, et., al 1989 KR. Fleischmann 2006	(h) the commonalities e.g. repositories, forms, and labels

Table 4 The synthesis phase.

As such, an adapted version of the hero's journey has been integrated. The method was originally developed by Campbell (i.e., Hero with a Thousand Faces book) and later used in other disciplines including by filmmakers, authors, or storytellers (Paulsen, 2021). The method focuses on one experience as a potential hero in order to discover their journey in a problematic situation. The journey map starts with an actor's story in an ordinary world, which is the current situation and progresses to the extraordinary world or the ideal situation (Aguirre-Ulloa & Paulsen, 2017). During the mapping process, designers can depict different milestones that one has to face to get through the journey, for example, the sparking moments, forces, enemies, uncertainties, and all challenges that one must tackle along the way. Our premise is that by working with such a narrative structure, designers can synthesize many aspects of a problematic situation, for example, what is needed to encounter one's enemy.

Similar to the previous part, a complementary method is proposed to synthesize the results of a hero's journey. The objective is to cluster the individuals' narratives to highlight the essential (i.e., antagonistic) commonalities (h) (Carlile, 2002). While doing so, the concept of boundary

objects ecology is proposed. It is a multifaced approach that can open possibilities for the mobilization of thoughts and opinions. The concept was originally introduced by Star in response to the limitation of M. Callon's and Latour's translation model (Latour, 1984). Boundary objects are aiming to ease the interrelation processes such as learning and adaptation by bringing different worldviews into one accepted system of reality. For DDC, such an inclusive approach including boundary objects is highly recommended, not only as a complementary approach for the synthesizing process but also as a prerequisite for the next step, the translation phase (the concept will be explained in Section 3.3.4) (Fleischmann, 2006). To map the commonalities, it is recommended to support actors to freely chose and reframe their own boundaries while uncapping the commonalities. To make it more actionable, the commonalities between actors can be divided into five categories, including repositories, forms and labels, ideal types or platonic objects, and terrain with coincident (Akkerman & Bakker, 2011; Carlile, 2002; Fleischmann, 2006). Each provides some tools and techniques to ease mapping the processes. Further, discovering the common deficiencies of people can additionally facilitate uncapping the commonalities. For DDC, knowledge about non-existing actants, such as lack of access to resources or financial limitation, is equally important as the commonalities between them (Star & Griesemer, 1989).

In sum, working with boundary objects has certain advantages for designers. On one side, designers can improve the balance of power by highlighting the potential commonalities or places to intervene, and on the other side, they can create common sense for (re)building the narratives of a context (Fleischmann, 2006). In the next step (Section 3.3.4), the network construction will be more inclusive if a designer includes more actors' narratives from the early stage of the design intervention. We will utilize the commonalities in a meaningful way: to facilitate the translation process, which is essential for network construction.

3.3.4 Translation

Translation aims to bring together actors with conflicts of views or interests in order to facilitate the ideal of a (new) network of allies construction (Nedaei et al., 2022). The objective is to gradually change the learning paradigm of the context through multiple moments of translation (Callon, 1984; Seravalli & Witmer, 2021). The literal meaning of translation refers to the ability to displace one's opinion and thoughts from a prior context to an ideal situation (Seravalli & Witmer, 2021). For DDC, the translation process is the core of the methodology and is similar to the intervention strategies in conventional design methods. It originally comes from M. Callon's studies, where he introduced elements of a 'sociology of translation' (Callon, 1984). Based on Callon's studies, translation is an opportunistic approach, hence never a completed accomplishment, i.e., it may fail under certain conditions. In other words, similar to the outcomes of a design process, the result of a translation is not an ultimate solution; it rather creates a condition or a situation for learning and adaptation in response to a problematic situation (Callon, 1984b). Therefore, to translate, one must facilitate continuous learning and adaptation between different social worlds. In such a situation, the designer's knowledge and design abilities provide added value to the act of translation (Latour, 1984); designers in practice facilitate the exchange of thoughts and opinions (Guindon, 2011), but they can also formulate problems as an open-ended process, which is essential for dealing with the uncertainty of a complex process (Nedaei et al., 2022). For example, by helping to involve multiple actors or to create an interpretive context, design abilities can support translation as a process to better mediate the exchange of thoughts and opinions (Latour, 1984; Norman & Verganti, 2014).

Likewise, to make the insights from translation actionable, we will further elaborate and reflect on four aspects of the translation process, including problematization, interessement (i.e., negotiation of interests), enrolment, and mobilization. All originate from the sociology of translation (Callon, 1984; Nedaei et al., 2022; Seravalli & Witmer, 2021b) and have been

reframed in a rational order to support future (social) designers toward mediating the translation process. Our premise is that the knowledge and insights from the last two steps, the commonalities between actors (h) and the individuals' narratives, along with the design abilities in dealing with the complexity, can be ideal inputs to greatly enrich the translation process (Table 5).

Translation		
Input(s)	Methods	Learning Output(s)
(g) the individuals' narratives i.e. antagonistic core stories (h) the commonalities e.g. repositories, forms, and labels	- Problematization - Interessement (negotiation of interests) - Enrolment & Mobilization M. Callon, 1984, A. Seravalli et., al 2021	(i) the new passage points i.e. new core stories (j) the network construction i.e. nominations & negotiations

Table 5. The translation phase

- Problematization (the new passage points)

The objective of problematization is to facilitate the creation of new possibility spaces known as passage points, essential for exploring new realities (Seravalli & Witmer, 2021). In order to define the underlying drivers or the core narrative of antagonistic actors (i), the new passage points aim to change one's objectives and thoughts from the current conditions into a new realm of possibilities and actions. Through problematization, by providing new alternatives, a designer can change actors' objectives and interests as well as the way they approach the problems. For DDC, redefining the passage points is, in particular, essential for a contradictory situation where more convergence is needed between antagonistic actors (Nedaei et al., 2022). In a situation of problematization, a designer, by using the commonalities between actors, can bring antagonistic actors together as a mutually negotiated community of people (h). As such, the feasibility of the problematization (as part of the translation process) is tightly entangled with how well the commonalities between actors have been discovered in the previous phase (3.3.3

synthesis). This means that, by utilizing the actors' boundary of objects and commonalties between them, one can claim that the flexibility or the openness of the new passage point has been negotiated in a proper way (Star & Griesemer, 1989).

Nevertheless, in the translation processes, besides the problematization, additional reflections are needed on the results of the problematization (Nedaei et al., 2022; Seravalli & Witmer, 2021). In particular, the focus has to be on the actors' capability, e.g., individuals' empowerment in obtaining the new passage points. This is partly due to the existing barriers or obstacles and partly due to the uncertainty of new trajectories for one with little experience (Callon, 1984).

One vivid example on the organizational level is the contradictions in health care systems, commonly between nurses and doctors. Meanwhile, to facilitate creating new possibilities, for example, a new system of affairs, designers need to create a convergence between actors, ideally based on their commonalities. Certain limitations such as the lack of or access to resources or facilities to work with might postpone the entire process of constructing new possibilities (Cullati et al., 2019). Hence, in addition to problematization, complementary steps are needed, including the device of interessement, enrolment, and mobilization. In the following step, we will further elaborate on the device of interessement along with essential approaches such as enrolment and mobilization to ease the feasibility of a translation process.

- The Prototyping Steps (Interessements, Enrolment, and Mobilization)

The term 'interessements', also known as negotiation of interests (Seravalli & Witmer, 2021), is part of the translation process. It aims to replace the boundary objects or any interrelational devices to ease the problematization in the face of barriers or obstacles (Section 3.3.3) (Callon, 1984; Seravalli & Witmer, 2021). For the DDC methodology, the negotiation of interests along with the next three steps, enrolment and mobilization represent the prototyping phase in a design process. In conventional

design methods, iterative prototyping is one mediating step between concept design and the production phase. Prototyping can allow testing a hypothesis or experiencing a concept that is abstract and complex. In addition, for users (or actors), prototyping is a representation of boundary objects that eases users' engagement, discussion, and reflections on a material object (Aguirre-Ulloa & Paulsen, 2017; Sanders & Stappers, 2014). Likewise, the negotiation of interests along with using the boundary objects (as an input for the negotiation) can reduce the uncertainty of problematization by creating new conditions for more in-depth discussion between actors. Similar to problematization, the focus is on the commonalities, this time with more concentration on interrelational aspects of boundary objects, such as ease of communication or the interactions between different social worlds.

Using the health care system example, the negotiation of interests can be effective in a condition where lack of access to resources might increase the risk of accepting the new passage points. For example, placing an inter-objective device such as a new facility or new actors in the context might ideally create a new form of connections that disconnect one from the current realities, which is a contradictory context, into a new direction. However, in reality, translation and the ideal of network construction are more complicated than only using such interrelational devices. Upon creating the new passage point(s) and placing new boundary objects, an additional iteration, with a focus on continuous negations, is needed (Nedaei et al., 2022). In particular, the device of enrolment aims to ease actors' performance within the problematization and the negotiation processes by assigning new roles and responsibilities, tools, and resources that one has to take before starting the journey. The enrolment can be done more effectively if the designer asks the following questions: (a) what level of problematization is needed and where should the device of interessements be placed within the problematic context; (b) is that a physical change or rather more seductive, or even a transactional movement?

Scale up		
Input(s)	Methods	Output(s)
(i) the new passage points i.e. new core stories (j) the new network of allies i.e. mutual learning	Story Sphere (e.g. core story, storyline, characters, objects, and universe) K. Paulsen 2021	(k) the narrative platform i.e. aspirational and gravitational (l) the new value set(s) i.e. mindset and paradigm shift

Table 6 the scaling up step

The fourth step is mobilization. The knowledge and experience from the previous problematization, interessement, and enrolment are the inputs for mobilization. The outputs are the lists of tangible and intangible items, which need to be designed by the actors within the problematic context. For example, a checklist of the requirements that can finalize any remaining complaints, questions, and limitations (Callon, 1984). For DDC, the mobilization step must unfold the potential concerns that one might have during the whole translation process. For example, one can come up with questions about who speaks in the name of whom, to what extent they believe in the results of the interessment, how to approve the spokesman, and what is the best way to scale up the result of problematization in a real social context. Hence, the final outcomes of the translation phase are rather intangible (j). For example, improvements in the quality of user engagement or better negotiations between them, which ideally leads to learning and adaptation along with a network of allies construction.

3.3.5 Scaling Up

The last part is the scaling-up process, aiming to disseminate the results of the translation process. The outcomes of the translation, in particular, a new network of allies, new knowledge, and experience, have to be scaled up from a community level (the translation phase) to a broader social scale, as shown in (Table 6). In other words, only through a scale-up process one can claim that the translation has ideally changed the main paradigm of a social system. As mentioned earlier, DDC has more strategic implications: it starts with the revolutionary mechanism of conflict, continues with the

constructive notion of design, and ends with strategic planning aiming to involve actors with conflicts of values or interests (Hensmans, 2000; Nedaei et al., 2022). Hence, the focus of the final stage is to change and to develop the core narrative of the actors who are skilled and committed to learning from one another (Rhodes & Brown, 2005; Westley et al., 2011). To scale up in social realms, Westly mentioned that it is essential to choose the right actors, e.g., people with more agency, as well as the right places, the core of the problem, to intervene (Westley et al., 2014). In other words, a kind of consciousness toward initial conditions, individual agencies, and power relations between actors is needed (Hensmans, 2000), aiming to unfold the underlying narrative of the context that created the problems in the first place (Rhodes & Brown, 2005; Westley et al., 2014). Therefore, the first part of the scaling-up process has already been elaborated in the first phases of the methodology, during context mapping, system analysis, and synthesis. The remaining part is about how to reconstruct a new narrative platform based on the outputs from the translation phase and how one can scale up the results of the new platform, essential for the lasting change in the social contexts.

For DDC, the objective of a narrative structure or a storytelling platform is to move and to spread the results of problematization across multiple scales (Price et al., 2018; Zaidi, 2019). Subsequently, a narrative structure is needed in order to open the opportunities to test and refine a complex system for the future (k). This can be defined as a purposeful attempt toward mobilizing the new forms of relations and the roles or responsibilities that one has to take within the problematic context (Zaidi, 2019). As such, to purposefully spread one's story, creating an aspirational core story is the first step. Studies have shown that hidden or underlying messages can come alive only through a deep connection with actual people (Milojević & Inayatullah, 2015). An aspirational story can involve every actor whose mindset and worldview are part of a problematic situation. In other words, a great story along with a creative storyteller can ideally move ways of thinking, persuasion, and belief within and beyond the context (l) (Paulsen, 2021; Zaidi, 2019). Thus, the proposed method for

the final stage is a refined version of the story sphere. It is adapted from K. Paulsen's model and designed in a gravitational structure, and it highlights the necessity to design from the core narrative of the context (Paulsen, 2021).

Working with the story sphere starts from the core narrative of the context and continues with defining the main layers, the outer layers, and the boundaries of the new system. The layers in between represent the potential storylines, actors and actants, the new roles or responsibilities, and the new objects or the environment of the system of the future. To ease the amount of work with the method, it is essential to involve all beneficiaries, in particular, actors with creative power and experience, focusing on designers with a background and experience in design for the social system. Utilizing the design abilities for envisioning the ideal future, along with designers' experience in empowering people's creative knowledge (Banathy, 1996; Price et al., 2018), provides added value for the scaling-up process. Designers along with other creative disciplines can idealize a desirable future, but they can also make sense of an abstract concept, such as metaphors. Such creative power is particularly effective when the level of abstraction is high, similar to co-creating the narrative of the context.

In sum, creating a deep connection between the actors, the storyteller or designer, and the story itself are the essential steps that one has to take toward scaling up the process. Only through a deep connection between actors one can claim that the high ambition of a paradigm shift can gradually change the deep narrative of the context (Gharajedaghi, 2012; Vigliano Relva & Jung, 2021; Walker & Westley, 2011).

3.3.6 Method Content Analysis

- The Method Goals

As mentioned in Section 3.2.2, the interviews started with an open question that required experts' opinions on what they see as the central goal of this method and how they see the structure (refers to the links and connections

between different parts). Our focus was on the quality of the method goal, such as the ease of understanding, the relevance, and the reliability, and about the quality of structure, our focus was on the timeliness, complexity, and reliability of the structure. In case of a negative response, the interviewees were asked to elaborate on their responses and give suggestions on how to improve one part of the method.

On the first question, most of the participants confirmed that the method contains a clear goal. Albeit with some differences, they all identified the main goal of the methodology to be a mindset and paradigm shift. While answers to the first question were clear and consistent, there was less agreement on the quality of the method goal. For instance, two participants had hesitations about the originality of the goal, as well as the intention and relevance of the method for one particular actor. In other words, it was not clear to them to whom the goal applied and to whom this notion of mindset and paradigm shift is desirable:

> *"The problematic is clear to me […] what is not clear is the design intention of the goal. For example, if 'continuous learning and adaption' is the design intention of the method (my thought), then to whom this intention has to be ascribed?(P2)"*

Likewise, one interviewee claimed that the internal goals of the proposed methodology are not sufficiently defined. She believed that the current version does not show the necessary connection between the objectives of each part, the essential functions, and the main goal of the method. From her viewpoint, an internal mechanism is needed in order to facilitate monitoring the results as well as to align each part with the main goal. She further continued that the clarification on the design intentions, method users (e.g., social designers), and other stakeholders can improve the goal-seeking aspects of the method. In other words, in her view, the ease or difficulty of transformation is tightly entangled with how early designer attitudes are transparent toward the main goal, which is not clear in the current version:

"[…] I would like to conclude that the more the goal or purpose is explicit at the beginning the more comfortable people are in the rest of the journey, hence the less they will suffer from the chaos or the uncertainty of the problematics. (P2)"

Nevertheless, for most participants, the lack of a design intention was not necessarily a negative aspect of the method. Instead, the limitation was partly related to the methodological uncertainty of design as a process in handling a broader community of people and partly related to the complexity of the mindset and of the paradigm shift as an outcome of a design process. In response to the limitation, they focused on the purposefulness of the design methodology in order to be used in a wider social scope. One interviewee claimed that in the design of social systems, purposefulness is a prerequisite for designing a method. A method should facilitate the production of different outcomes in the same environment, which requires a purposeful approach. From this view, contrary to the design intentions that can be considered as an early objective, the proposed methodology has to improve a purposeful quality as well. Only through a purposeful quality one can create more possibilities for interventions in a complex situation, which, at the moment, is only visible in the translation phase due to the engagement of multiple actors and the open condition for learning and adaption.

"To me, it is hard to define the (design) intention in the first place […] it is indeed problematic in design contexts that a complex goal such as a mindset and paradigm shift cannot be defined within a project's frame […] rather purposefulness is needed, or a form of openness, not only from the structural point of view but also in people and experts who want to join. […] we must go beyond our own projects' limits, by asking for the help of others (e.g., communities, societies, or disciplines) to help each other out in the face of problems (P3)"

In the end, two researchers had concerns regarding the reliability of the method goal. They pointed out how difficult it is to trust the controversies

and the values associated with conflicts, let alone to rely on the result of this process, which ought to be the paradigmatic shifts. For example, one interviewee had hesitation on the impact of these values in a broader sociopolitical context, particularly on the general discourse. From this viewpoint, whether these values are aiming to change paradigms or transcend and change the paradigms is something that requires additional investigation. Their suggestion was to revisit the notion of transcending the paradigm. In social systems, transcending a paradigm is a prerequisite for transformation and a necessary step toward systemic change [2]. They believed that even if "we decided to design a new system instead of transforming, we still have to transcend the existing state of affairs". Therefore, while the notion of paradigmatic shift can remain a central goal of the method, the recommendation was to highlight the relevant sub-steps, in particular, how the creation of a new narrative (platform) can facilitate the scaling-up process.

> *"If we talk about conflict construction, as a means for paradigmatic change then I would say it is more about 'transcending the paradigm' rather than paradigmatic change. In other words, the methodology basically tries to combine different worldviews rather than choosing one from others. For example, selecting the boundary objects or the commonalities between them [...] all can support (mutually) a new learning process(P1)."*

- The Method Structure

Similar to the questions about the goal, the answers related to the structure were relatively clear and consistent. The majority of experts claim that the method contains a stepwise structure, the prescribed procedure can contribute to the design goal, and that there is no particular gap between the different steps. In addition, the experts believed that the content of each step sounds familiar to them and is easy to understand. Despite the positive feedback, the second question revealed more in-depth information and concerns that one should be aware of before using the method. In

general, we divided these remarks into two categories: first, the complexity of the structure, particularly in the translation and scaling-up phases, and second, the linearity of steps, e.g., the high consistency of inputs and outputs, which requires an internal mechanism for iteration.

Regarding the complexity of the structure, two interviewees claimed that the current structure is complex, difficult to follow, and overwhelming for non-research experts such as practitioners and design students. From this viewpoint, translation and scaling-up phases require additional time and effort for learning and planning. One expert mentioned it is not possible to work with "the current format of the methodology, in an easy way such as in form of a booklet or cardboard". The method is not similar to a creativity card that is passed out to students or other stakeholders, rather, it requires more time to learn if one does not have the background knowledge. In response to this limitation, their suggestion was to invest more in the connection between different parts, making the design interventions clear, and translate what has been set into tangible things as input for the next step.

> *"[…] To avoid unwanted complexities what I normally do is to make a system map after the analysis as an input for synthesis. It is a kind of boundary object, basically to discuss the content with other stakeholders which in your case can be a form of boundary steps.(P2)"*

Nevertheless, to some experts, the complexity of the structure was not necessarily a negative aspect. They saw it more on the epistemological level rather than as the structure of the method. From this view, such complexity is inevitable and essential for one to design a method related to the mindset and paradigm level. In other words, the issue of complexity is more about the uncertainty of a design project, which aims to change the mindset and not the procedure or the structure of the method. Their opinion was that a design method must support the agency of the users who aim to use the method, including their rights and the possibilities to choose. They believed that such a quality can only be manifested through a high level of

complexity, which, in the current format, is visible both in the translation and scaling-up phases. Their assumption was that if the structure supports such a flexibility, then there are more possibilities to have a purposeful outcome (i.e., the purposeful outcomes- Method goal). The request for maintaining the complexity of the structure has been mentioned as follows:

"Only then with such complexity one can navigate the uncertainty of paradigm shift […]. So, I assure you the structure here is not too complex, all things we have here are needed, even as I mentioned the scaling up needs to be more complicated, for example on how to create a new narrative (platform) and how to scale it up.(P1)"

With regard to the second concern, the majority of interviewees considered the internal or external iteration an essential feature of a design method that is not elaborated on in the current version. The linearity of the current structure and the sequence of the steps, e.g., the consistency of the inputs and outputs, are at a high level. A linear structure leads to the high predictability of the outcomes, which is not relevant for designing in social systems. One interviewee believed that although the linearity and sequence of steps in analysis and synthesis can increase the predictability, they are not contributing to the diverse possibilities. They found the linear format of the current structure a limitation for one aiming to design in complex contexts. In response to that, additional iterations are needed in order the improve the flexibility of the sub-sections. The suggestion was an inner feedback loop or an internal mechanism in order to facilitate iteration between and after different steps. One interviewee elaborated his views through Latour's notion of circularity references:

"There is no doubt that we (designers) do graph our processes, and then they always end up with some timelines […] but the realities are not as simple. We cannot take the original problem for granted […] always going back and forth is needed, when we move along the way we should be aware of the problem as well. Things can evolve, while we obtain more insights from

actors and relations. Therefore, I think the space between the design experimentation which in your case is the translation and setting up the problem right is important to keep the circularity alive until we have a firm understanding of the problem which might be different from where we started. (P3)"

- The Method Rationale (Underlying Motivation)

Starting with the question on underlying motivation(s), we asked the respondents' opinions on what is and how they see the method's rationale. Moreover, we asked them to elaborate their responses based on ease of understanding and relevance of the rationale. The questions provided a situation for experts to have more in-depth discussions on the motivation of the method and its relevance to the main objective, i.e., network construction. Similar to the previous part, a majority of respondents claimed that the method contains a clear rationale that is appropriate for the proposed aim and structure. Despite the quick responses, there were also considerable differences in what they identified as a method rationale.

Two respondents believed that the main motivation is to deal with the uncertainty of paradigm shift and the necessity of a comprehensive approach "to bring and unify different methods". The design problems are becoming more and more complex and that requires designers to learn new skills or to explore new tools and techniques. At the same time, generating different tools and techniques without a clear rationale can lead to polarization in using the methods. This shows that "synthesizing the method in form of a design methodology" can be a motivation for one to design a methodology. Nevertheless, one interviewee had concerns regarding the reliability of such a rationale. In particular, her concerns were partly related to the epistemological origins of the methods, where these methods are coming from and how they are combined in a form of a design methodology, and partly related to the issue of contingency in social systems. For example, the relation between the consistency of the results in context mapping (i.e., actors and resources) and the dynamic change in a broader context has to be elaborated more.

Despite the epistemological concerns, the two responders showed a different opinion; they emphasized the normative aspects of the method as a means to bond different methods. They believed that the method aimed at a very high level in a social context, which simply means "how one (a social designer) can make the world a better place to live". They both trust the rationale, including the epistemological aspects, and they found it highly relevant in the face of today's social problems. As stated by one expert:

> *"Although there are some uncertainties, I would trust to the motivation of the method […] living in the time of crisis, such a social design approach has always been a part of the problematics in design projects. But now the situation is even more problematic, one can say: we 'badly need them (P4)".*

Finally, we asked them to elaborate more on the reliability of the rationale. This question showed a significant ethical concern by the majority of respondents. They claimed that "the method users should be aware" if they are going to map such a complex network that there might be entanglements of conflicting values. For example, at the end of the process, some people might have more profits than others, and this might be a problem for other stakeholders. From this viewpoint, there are always ethical limitations, resulting in a goal and means conflict and requiring additional clarification.

> *"It is basically saying that something goes wrong in the system and the way that you think about the system is not working as it is. So, it is wrong, you need to think differently, and here is the way to think […]. Then one can ask (from an ethical position) who you are to say this?" […] conflicts remain there until we clarify the ethical dimensions (P5)".*

- The Method Framing

We asked the same questions about the framing capacities of the method (Daalhuizen & Cash, 2021b). Framing, here, refers to the flexibility of the method for being used in different socio-ecological contexts. For example,

what are the ideal types of situations to implement the method or what kind of problems might occur during the implementation? We asked them to elaborate on their responses based on the relevance, reliability, or completeness of the method.

Albeit with some differences, the majority of respondents believed that the method (including the goal and structure) is flexible and can be used in different contexts. When we asked them to elaborate further, they said "mindset and paradigm are at the core of every systemic problem, whether in social, political, or even cultural situations". It is feasible to work with such a method. They also claimed that the ingredients of this methodology, such as resources, actors, or power dynamics, are available in almost every context. Hence, independent of what type of problem we are addressing, the method has the capacity for being used in broader and different contexts.

While the majority of respondents believed the flexibility is an added value for the method and even some encouraged more flexibility (including openness), one interviewee had a different opinion. She did not find the flexibility of the method an added value; rather, more consistency is needed when it comes to design for social sectors:

> *"[…] I don't think this is the strength of the methodology. If your methodology is being applied in a different context it doesn't mean that it is a better methodology. In other words, you cannot use the same method for dealing with an issue regarding racism compare with one aiming to address a problem in the health care system. Hence, from my perspective, the more concrete and solid you be the better you can handle this sort of problems (P5)"*

At the end, there were a few concerns about the flexibility of the sub-sections. For example, in the synthesis phase, a few experts claimed that the "boundary objects are too defined and structured". In addition, the translations phase (i.e., interessment) is rather abstract in the current

format. Additional explanations are needed for non-designer experts, students, or researchers from different backgrounds. Moreover, the normative orientation of the method limits the applicability of the method for systemic designers working in different area such as energy or financial sectors. Their suggestion was to simplify the difficult terminologies in the boundary objects and elaborate more on the epistemological aspects of each part. It has been suggested to give more agency to actors who are part of the problematic situation. For example, rather than defining a selected type of boundary object, they recommended to keep open the selection criteria of the commonalties, which can ease negation of interests.

> *"I do have a bit of epistemological concerns here about the use of different terminology. For example, what do you mean with a wicked problem might be different compared to someone who comes from a different background […]? We cannot expect this from designers, they cannot take the responsibility for everything, if one wants to apply this methodology, equal attempts are needed from other sides or stakeholders. To what extent does the method support such flexibility? In other words, people must trust their own judgment and the method must support and reinforce people's judgment about their own judgment(P1)"*

- The Interrelational Aspects (the Efficiency)

The last three questions assess the interrelational aspects of the method, including the method mindset versus the user mindset, structure complexity versus goal ambiguity, and frame flexibility compared with the rationale consistency (Daalhuizen & Cash, 2021b). As in the previous parts, we asked three questions in an open format, allowing respondents to further elaborate on their responses.

The first question asks for the method mindset and its alignment with the user mindset. Mindset, here, refers to the appropriateness of the method content to the perspective of the potential user, which, in our case, is a social designer. In general, respondents claimed that the method mindset

is aligned with the designer's mindset who is willing to work in social sectors, such as systemic designers and social or participatory designers, even though their opinions were diverse depending on their background, expertise, and school of thought. One found the method appropriate for a designer willing to work with systemic issues, and two mentioned the normative aspects of the method, which makes it appropriate for one with the social design background. From this view, embracing multiple perspectives is an essential attitude of a systemic designer, which can be clearly seen in the entire process, particularly synthesis and the translation phase. Nevertheless, three interviewees had concerns for those who are not using a critical approach or avoid working with antagonistic actors such as participatory designers. This was mentioned by one of the interviewees as follow:

> *"I can clearly see a systemic designer mindset to use the method and enjoy working with it, in particular for a social problem, but I cannot claim that one with a background in participatory design uses the method at least with the same experience […] there might be clash of epistemologies for them (P2)".*

Despite that, few interviewees claimed that it is not possible nor desirable to categorize or to separate designers' mindsets only based on their interests or background. They believed each part of the method can be suitable for a specific approach. For example, using boundary objects can be aligned with the mindset of a designer with a socio-technical background, or the translation phase might be interesting for one with experience in socio-political contexts. In other means, in their biggest mindset, "they are all designers and what they do at the end has social implications". For example, they all have the tendency for involving communities "or zooming out progressively" and using a holistic lens, which can be clearly seen in different parts of the methodology. This has been explained as follows by one interviewee:

"I don't think we really can divide whether someone is a social or techno-driven designer. They are all interested to work with the community, even to me, a designerly mindset is a voluntary mindset which always aims to bring improvement with or for people (P4)"

With regards to the balance between structure and goal, the majority of respondents found the main goal of the methodology to be at a high level (mindset and paradigm shift) and, at the same time, the structure (links and connections) sufficiently comprehensive. Based on their suggestions, improving the circularity of the method along with the possibilities for internal iteration such as monitoring the processes and results can additionally improve the balance of the goal and means.

A few experts, concerned about the uncertainty of the goal and subjective attributes of the context, believed that it is impossible for any designed structure to process every aspect of the change. This opinion was partly due to the expectations in the context (which are unstable) and partly due to the overarching impacts of the change (which are inherently uncertain). In response to the issue, their suggestion was to revise the current goal and discuss the limits of the structure. About the former, they suggest changing the goal from a paradigm shift to 'transcending the paradigm' and focusing on creating a new learning paradigm. Based on this view, transcending the paradigm can be manifested through the co-creating of a new learning narrative, which can start from the translation phase and end up at the scaling-up process. In terms of the structure, they recommend elaborating more on the ethical aspects of the method, the limits, and the conditions to use for future improvements.

"Regarding the goal, as a social designer, I do see the great potential in the translation phase, and its outcomes: the co-creation of a new learning paradigm. We social designers are talking a lot about mutual learning but it's more a matter of 'results', we rarely talk about how we can learn for the sake of learning. So, it is nice to see how one can use a design approach

to create a new narrative which encourages learning rather than merely instrumenting for learning (P3)"

In the end, we asked respondents about the balance between the flexibility of the method and the rationale consistency. The objective was to unfold the efficiency of the method in producing desirable outcomes. The responses were diverse but focused on a number of criteria such as improving the method rationale for diverse users. They claimed that what motivates someone to work with the method might be different from context to context. As such, the method rationale should support such a flexibility to ease producing desirable outcomes.

"To what extent you are considering the contextual aspects that are outside of your control? Like you are talking about social norms and social pressures, but we know the way knowledge is considered as truth in one society might be different from others. So, the motivation is sometime context dependent. There are situations where these imbalances are absent, and the method has to reflect them…(P3)"

Likewise, two experts recommend diversifying the level of abstractions as well as the flexibility of method users. There was a general agreement that the method users and the level of abstraction can be separated from the context of usage. One interviewee claimed that the "flexibility is not always a property of design methods", instead, it requires a designer's ability to go beyond the rationale consistency when it is needed. Based on this view, there are possibilities to define the interrelational balances in advance, such as in the context mapping or by additional clarifications on the epistemological origins of the translation phase.

In sum, there was a general agreement that it is rather difficult to sufficiently evaluate the interrelational aspects of the existing methodology. Depending on how dynamic the contextual elements are, such as time, places, or actors who are part of the problematics, one can obtain a different result from the method. Hence, there are difficulties in

terms of knowing how flexible the methodology is and how consistently the rationale compares with it. Suggested by experts, "to improve the relation between rationale and framing", a strategic openness or a flexibility over flexibility (i.e., the ability to back to initial rationale) is needed both on the content and the users. In addition to that, there was a consensus that a proper response to this question requires testing out the method content in a real-life context, which was one of the methodological limitations of this study. Figure 12 provides a schematic visualization of the DDC method.
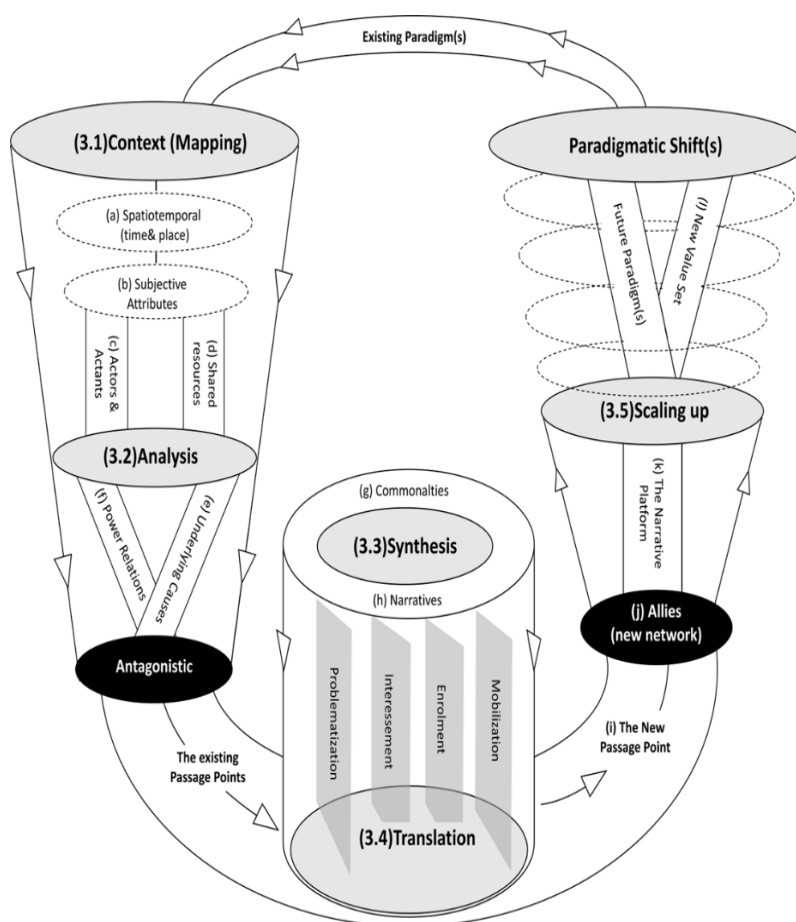
Figure 12 The design method conceptualization

3.4 Discussion

Transformability is one of the essential attributes of social systems that defines the future trajectories of human systems in the face of social crises. One can enhance the transformability of a social system by improving the paradigmatic capabilities of a system, in particular, a shift in the mindset, worldview, or deep narratives of a social system. To create the precondition for a paradigm shift, it is recommended to make the normative attributes of a social system as explicit as possible. Based on critical system discourse, such a transparency requires a dialectical approach, which is embedded in the core concept of conflicts and disagreements. Adapted from construction theories, controversies are an essential property of human systems. They are an authentic form of relationships, and they have a reflexive power ideal for transcending the mindset and paradigm of a social system. From a theoretical view, one can create a dialectic condition, necessary for reflexive exchange of thoughts and opinion, by (re)constructing social controversies in human social systems.

With respect to the increasing needs of an authentic dialectic approach, a framework for design-driven conflicts (DDC) has been proposed here in order to facilitate conflict construction in social systems. The focus is on the features of the DDC framework for involving a broader community of people in the sensemaking processes. Learning from the literature, an inclusive approach is needed not only to address the limitations of systemic design such as how to involve the contradictory voices in a sensemaking process (which has been discussed in Sections 3.1) but also to unfold ways of designerly constructing social controversies in social systems (Section 3.1.2).

Subsequently, an actionable version of the DDC framework, known as a design-driven conflicts methodology, has been presented here. The proposed methodology is partly based on the theoretical insights on the DDC framework and partly related to a number of panel discussions

(which have been elaborated on in Section 3.2). The main objective of the DDC methodology is to integrate the pragmatic and systemic aspects of design to purposefully create a network of allies suitable for the higher-order possibilities: mindset and paradigm shifts.

Overall, the proposed methodology has five distinctive phases connected externally and prescribed internally based on the input and output of each step. It starts with context mapping, continuing with analysis and synthesis, and ending with a translation and scaling-up phase Figure 12.

During phase 1, the context mapping, the goal is to map the social, spatial, and temporal aspects of a problem. The first intention is to depict both the human (or purposeful agents) and non-human actors (or persuasive agents), such as rules and regulations, tasks, and resources that they share within a problematic situation, e.g., a co-defined boundary of the system.

Phase 2, the context analysis, will focus on mapping the antagonistic forms of relationships as well as individual access to the resources. The objective is to map the power dynamic and underlying motivations that drive actors within the problematic situation. These two elements are the intended outcome of the analyses phase and the potential input for the next step: synthesis or mapping the commonalties.

Phase 3, besides for knowing the drivers and the power relations, is essential to change the attention from the antagonistic actors themselves to the underlying narratives of the context and the individual story within a problematic situation. The phase 'synthesizing' aims to map the commonalities between actors and define the possibilities for reassembling antagonistic relations. Actors' narratives as well as knowledge about the commonalities become the ingredients for the next step, translation.

Phase 4, translation, is similar to designing interventions in conventional design methods. The goal of the translation is to change the objectives as well as ways of obtaining ones' ideal ends. In other words, a new pathway has to be designed to change the antagonistic actors' directions (which, in our case, is a negotiated passage point) from a problematic way into a

mutually accepted reality. By designing the new passage points, actors' commonalities along with individual narratives become the input for constructing a network of allies. The objective of the new network is to reassemble, mobilize, and facilitate (higher-order) learning and adaption between actors. Such a new learning paradigm must be extended into the last stage: the scaling-up process.

Phase 5 refers to the scaling-up process. The core narrative of a new community must be gradually amplified in order to involve a broader community of actors. It is essential to use the knowledge and experience from the previous part as an input for the creation of a new narrative platform. Along the scale-up process, the design abilities such as conceptualization or future idealization can assist a social designer to mobilize the new narrative, norms, and values from the existing situation into a new system of affairs wherein there are more possibilities for mindset and paradigm shifts.

Additionally, a number of expert interviews have been conducted in order to unfold the efficacy (3.4.1), effectiveness (3.4.2), and efficiency (3.4.3) of the current version before developing a higher-fidelity version of the method.

3.4.1 Efficacy

The first part of the interview was designed to assess two essential qualities of the methodology, including the structure and the embedded goal: both contribute to a better understanding of the efficacy (Daalhuizen & Cash, 2021b). Synthesizing the results revealed that the method content has the potential to support the users to achieve the main goal. Hence, the efficacy is visible in the entire process. Nevertheless, a number of remarks have to be taken into account for future iterations, including the (lack of) goal-seeking quality as well as the issue of iterations.

Despite the linearity of the structure, particularly in the context mapping and analysis phases, the goal-seeking aspects of the content have been missing in some parts. For example, it is not clear to what extent each part

can contribute toward the main goal or what the design intentions ought to be in the first place. The latter can be an extension for the context mapping (or the analysis) process, and the former requires a circular approach, which needs to be manifested in the entire process.

In the current version, the context mapping has been limited to certain criteria, such as actors and resources. One can ease the mapping process by additional elaboration on the design intentions as well as defining the users' attitudes in the earliest phases. In addition, it is suggested to improve the circularity of the method by continuous monitoring of results and by checking the alignment of each part with the main goal of the method.

Another challenge toward the efficacy is the issue of contingency and uncertainty of the paradigm shift. There is no doubt that moving towards a paradigm shift is an uncertain and complex process, but also, the design capacities are limited and time dependent. Therefore, there are few things that one can do: either impose more flexibility on the structure and results (which has been discussed earlier) or refine the main goal of the method, from obtaining a paradigm shift into transcending the paradigm. In the design of social system, transcending the paradigm is one step before transformation. Hence, there are more possibilities for designers to be part of the process (e.g., conceptualize, idealization, and envisioning the ideal future), which can be identified as an added value for the scaling-up process.

3.4.2 Effectiveness

The second part of the interview was designed to assess the underlying motivation and rationale as well as the flexibility of the method content: both contribute to a better understanding of the method's effectiveness (Daalhuizen & Cash, 2021). The effectiveness here refers to the degree to which the method content can contribute to meaningful results. Based on the remarks on the rationale and framing, except for a number of concerns on the ethical dimensions and the epistemological complexity of the

methods, the methodology has the potential to produce meaningful outcomes. As such, for future iterations, it is highly suggested to consider the ethical limitations as well as the complexity of the contents for non-expert users. Regarding the ethical aspects, the limitations are partly related to the goals and the means conflicts, for example, how to create a mutually accepted narrative, and partly related to the more fundamental question: who is giving the designers the actual mandate to work with the method?

To deal with the first concern, the goal and means conflict, it is recommended to identify the limitations of the method in the first place. For example, in a social design project, any prior clarifications, discussions, and reflections on acceptable outcomes can decrease the risk of conflicts during and after the process. Likewise, continuous negotiations between and across the scales, boundaries, and actors can help to nominate the right actor who has more popularity. Thus, our suggestion is a form of multilateral negotiation along with the continued adaptations during the entire process. In the high-fidelity version (which will include tools and techniques), the negotiations have to be extended to a broader community of people.

In terms of the epistemological complexity, there is no doubt that the method content has a high level of complexity, particularly for non-expert users. Nevertheless, there were less agreements whether such a complexity has a negative impact on the effectiveness. Only few experts believed that the complexity of the content might decrease the effectiveness of the method in a social context. Nevertheless, for future iterations, our intention is to provide a low-threshold version of the method, particularly with a focus on the boundary objects or the translation phase, which requires additional time and efforts for one without background knowledge on the sociology of translation.

3.4.3 Interrelational Aspects (the Efficiency)

Finally, regarding the interrelational aspects of the method, i.e., the method mindset, goal and means complexity, as well as the framing versus rationale consistency, there was a general agreement that the method is appropriate for being used in social contexts. Nevertheless, for future improvements, it is suggested to elaborate on the limitations of the method, particularly for users with a background in participatory design or collaborative design.

The proposed methodology originates from the critical system discourse. It emphasizes the evolutionary nature of controversies that might lead to epistemological concerns for those having a background in a soft system approach. For future users, it has been recommended to have a 'flexibility over flexibility' or a continued openness to improve the framing capacities of the method. Nevertheless, a proper response to the interrelational aspects of the method and the relation between framing capacity and rationale consistency requires testing the method in a real-life context. Only then one can define the actual efficiency of the method.

Therefore, for future iterations, the first step is to develop a low-threshold version of the methodology for non-expert users. This can be completed with a higher-fidelity version that introduces the potential tools and techniques suitable for more practical and purposeful interventions.

3.5 Conclusions

This paper presents a design-driven conflict (DDC) methodology in which design is an action-oriented strategic process, and it aims to construct social controversies in order to facilitate the construction of a network of allies. With regards to the future direction, DDC is a designerly attempt to cultivate the methods, perspectives, and thoughts in the form of a design-oriented methodology. By using DDC as a design method, a social system designer can define the right actors (antagonistic), the individuals' core narratives, and the essential commonalities between antagonistic parties.

Our premise is that having such a strategic lens provides additional value to the four cycles of the translation process necessary for a network of allies construction. The special agency of actors with conflicts of values along with the transformative outcomes of controversies can facilitate the creation of a new narrative platform, which, if scaled up in a creative way, can gradually change the main paradigm of a social system. The efficacy of the methodology has been evaluated based on the method's goal and structure and the effectiveness in relation to the rationale and frame capacities. While both elements have been approved by means of expert interviews, there are a few remarks that one must consider. In terms of efficacy, one can improve the circularity of the method by easing the internal iteration before and after each step, and in relation to effectiveness, it has been suggested to facilitate early steps of negotiations between the beneficiaries in order to unfold the ethical dimensions of the method before any interventions. There is a mutual agreement that the proposed methodology might cause a certain (epistemological) concern for one with a participatory design background, partly due to the origin of the method in critical system discourse and partly due to the linearity of the steps in early phases. Nevertheless, the main concern remains in relation to the efficiency of the method, which requires additional investigation in a real-life context.

Ch. Four

Chapter 4: **Creativity**

In Section 4 of this thesis, we introduce a refined version of the Design-Driven Conflicts (DDC) method, which draws on Dewey's pragmatism and outlines five dialogical solutions as prerequisites for experimentation in social systems. We adapted the descriptive components of the DDC method to improve the appropriateness of the participatory design processes. This adaptation includes employing action verbs, designing interactive templates, sequencing information effectively, and creating interactive cards to enhance higher order discussion. Employing iteration as a qualitative research method aims to enrich the design processes inherent to the DDC method. This approach facilitates the integration of communication with cooperative action while also fostering a situation akin to collective judgment. The chapter concludes with a discussion of how a creative approach can enhance the internal coherence and connections between the various steps of the method. For a future research we propose that improving this version of the method, especially by incorporating specific tools and templates, is crucial for its effective application in simulated environments.

4.1 Introduction

As Dewey articulated in his vision of democracy, creating a communal space within democratic systems and societies that are sufficiently open but face issues of polarization and segregation requires a strong trust in free inquiry. This also necessitates a fundamental method for peacefully negotiating conflicts in social systems (Dewey, 1946). The prerequisite for this progressive approach is understanding how the transition from a fixed

reality to a cooperative action space occurs, enabling the creation of greater possibilities for structural change (Dixon, 2020). The quest for mindset change is a normative approach wherein conflict of interest, as forms of social relations, can be constructed, through instrumentation, learning and social adaptions (Pourdehnad 2006, Nedaei & Jacoby 2023). In response to the growing necessity to explore conflicts as catalysts for change and to promote interdisciplinary research, the Antwerp Systemic Design Lab has recently developed a strategic design method known as Design-Driven Conflicts (DDC). This interdisciplinary method aims to establish a reflective space, akin to 'network of allies,' among actors with conflicting interests. The Design-Driven Conflicts (DDC) methodology seeks to contribute to existing approaches in interdisciplinary aspects of design and systems science by integrating the principles of critical systems heuristics (Ulrich & Reynolds, 2010). It advocates for essential transformations in power relations, which are necessary prerequisites for achieving progress, justice, and continuity in social systems.

During the first and second iterations, the appropriateness, effectiveness, and efficacy of Design-Driven Conflicts (DDC) method were investigated. Nevertheless, there remains a need for additional research concerning the practical utility of the method, its efficiencies, and its appropriateness for implementation in real-life contexts (Nedaei & Jacoby, 2023). Previous studies have shown that a key prerequisite for such implementation is establishing the conditions for social experimentation, with a focus on designing mediatory processes and steps (Nedaei & Jacoby 2022; Dixon 2020; Huybrechts 2017). This involves designing a collaborative design method, that includes sequential strategies and steps needed for a more profound and normative intervention in complex systems. Accordingly, a range of creative items, prescriptive components, and action-oriented elements have undergone translational processes through several co-creative interventions. This process converts specific insights into actionable verbs or questions, which are crucial for engaging key stakeholders in dialogical processes (Friedman 2012). Through this new iteration, the objective is to enhance the applicability of the method by

developing five dialogical solutions that can establish preconditions for mindset change in a simulated social system (Cuppen, 2010; Manzini, 2016). The premise is that leveraging the creative aspects of the method and design of accumulating action verbs will gradually facilitate its implementation in simpler and more familiar contexts (Friedman & Hendry, 2012a; Yoo et al., 2022a).

Learning from experience and establishing preconditions for effective collaboration between designers and key stakeholders—creating a space for mindset change—requires a participatory yet reflective environment (Nedaei & Jacoby, 2023). This study emphasizes the value of a designerly approach and iteration as creative methods for facilitating dialogical processes, which are essential for fostering in-depth discussions among diverse actors (Kurvinen et al., 2008; Sanders & Stappers, 2014; Srivastava et al., 2009). In the next step, after placing the method within a broader research framework (systemic design), we explore the extent to which framing a designerly iteration based on working hypotheses can enhance the development of a high-fidelity version of the DDC method. This involves translating key insights into tools and templates, and moving from abstract concepts to actionable processes. The objective is to refine the performative aspects of these elements and systematize the internal processes needed to optimize the application of the design method in higher-order systems (Simeone, 2016; Yoo et al., 2022).

4.2 Background

- Systemic design: The approach

Systemic design (SD) is an emerging field of study situated in the cross-section of design and system inquiry (Costa et al., 2019; Jones, 2014). The primary purpose of a systemic design approach is to integrate a creative and critical mode of inquiry into a relational way of thinking (Pourdehnad, Wexler, & V. Wilson, 2011), essential for leveraging human-human and human-systems relations in the face of modern world complexities and

tensions (Alexander, 2016; Jones, 2017; Nelson, 2022). A mix of design and system heuristics along with the action-oriented biases embedded in the core concept of design cultures makes the use of systemic design a developing area of research and practice (Nedaei et al., 2022; Nedaei & Jacoby, 2023). Methodologically, the primary focus of a systemic design approach is to integrate the analytical notions of system sciences with the design capabilities for sensemaking in complex contexts (Costa et al., 2019; P. H. Jones, 2014; Pourdehnad, Wexler, & Wilson, 2011). On a practical level, a systemic design approach has more strategic implications. The aim is to facilitate user engagement, enable value co-creation, and ideally establish conditions for systems-level change encompassing broader socio-political needs and desires (Bijl-Brouwer & Malcolm, 2020; Jones, 2014). A review of scholarly works on systemic design (SD) effectively demonstrates the advantages of an integrated, systems-oriented approach. This approach is particularly suitable for addressing higher levels of complexity and transitioning from static to dynamic problematics (Bijl-Brouwer, 2019; Roggema, 2016). Furthermore, this integration can address community-related issues, such as the challenge of creating networks of allies (Nedaei & Jacoby, 2023; Nogueira et al., 2019), and recognizes alliances as prerequisites for the co-creation of new strategies and means of connection. Additionally, it promotes guidelines for researchers, practitioners, and policymakers at various levels of abstraction to engage in framing a more equitable image of future. Hence, research in systemic design is particularly valuable given the increasing need for transdisciplinary research and practice to create social cohesion, sustainability and justice (Barbero, 2018; Nogueira et al., 2019, 2020). This popularization across various social domains has introduced new possibilities: internalizing essential topics related to norms, values, and equality; and utilizing theories and methods from emerging research areas to adapt to the specific needs of a new design culture. In light of the need for a new design culture, it is imperative to incorporate critical system heuristics and address issues of power relations, empowerment, and the engagement of marginalized actors in design processes (Nedaei & Jacoby

2023). This shift represents a paradigmatic change from merely designing objects (how objects can shape the public) to designing new policies, systems, and strategies (how the public can shape objects) within the framework of community-oriented practice.

- Design Driven Conflicts: The method

A recent study on the systemic design approach highlighted the need for structural change through the integration of principles from critical systems heuristics such as mindset change (Nedaei & Jacoby, 2023). The findings underscore the importance of developing a high-fidelity version of the Design-Driven Conflicts (DDC) methodology with a focus on action-oriented outcomes that provoke critical thinking, reflection, and dialogue at a deeper level. Thus, a new iteration of the systemic design method is essential, incorporating a comprehensive toolkit and related artifacts. The goal of this new iteration of the DDC is to integrate diverse perspectives, promote open inquiry, and consider diverse viewpoints as essential prerequisites for framing new system policies (Venturini et al., 2015). To explore the dialogical and relational dimensions of a context, it is crucial to uncover the unknown aspects of interlocutors, their agency, and power dynamics (DiSalvo, 2009). Drawing from a systemic thinking culture, the root of many problems often lies in the dynamics of relationships. By revealing contextual imbalances and power relations, valuable insights can be gained into how institutions shape relationships and influence temporal aspects of a given context. The premise is that these deep insights are embedded in everyday discourse, communication, and dialogue between individuals. In other words, identifying strategic leverage points for engagement requires defining complex situations through dialogical solutions, which can naturally drive meaningful changes at deeper levels of system structure (Buchel et al., 2022; Howes & Quinn, 1978; Loorbach, 2022). Therefore, DDC steps and processes represent a designerly effort to develop a new iteration of a systemic design approach. In the following, we use iteration as both a research and design method to address the

following question: What steps or processes must a designer or facilitator of Design-Driven Conflicts (DDC) undertake to effectively disseminate the results of dialogical solutions, thereby enabling preconditions for experimentation, such as community engagement? For example, how can new alliances be fostered to gradually create a situation conducive to a mindset shift, such as a narrative change.

- Third Iteration: The framework

The new iteration was developed based on eight working hypotheses, each corresponding to a specific rationale for advancing a higher fidelity version of the method. Five of these hypotheses are derived from critical systems thinking, while three are adapted from a culture-sensitive approach within the context of design science (Boeijen, 2015; Jackson, 2010). Each hypothesis serves as a guideline in the practice of a design-driven conflict (DDC) approach and corresponds to a particular phase of the DDC method. The goal of these hypotheses is to advance specific aspects of the design method, such as mapping context-related elements, analyzing power relations, and understanding actors' experiences. We propose that applying these principles can enhance the refinement the design method as a prerequisite for a higher-level of intervention (Nedaei & Jacoby 2023). Overall, these hypotheses and rationales aim to foster conditions that promote social experimentation (Dixon 2020).

First, it is important to gain insight into the dynamics of a context and to understand the elements that define the boundaries of a system. This involves framing the underlying resources, which allows for an analysis of power dynamics within the social system. Second, understanding these power dynamics is crucial as it can reveal areas with a higher likelihood of conflicts of interest. Third, these imbalances can help identify spillovers and uncover the root causes of the problems. This understanding clarifies how to initiate the problematization process, which is essential for effective network construction, engagement, and mobilization. Fourth, it is

important to scale up the network's core narrative, which is similar to the process of social experimentation. To apply these concepts in practice, a pragmatic approach should include designing boundary objects that connect various verbal, visual, and social realities (Dixon 2020). These resources might feature co-creative elements such as templates, action verbs, creative cards, or other tools that facilitate higher-level discussions. To create a high-fidelity version of the Design-Driven Conflicts (DDC) methodology, we followed established design guidelines and adapted its core narrative into three main categories: enlightenment (why), empowerment (how), and engagement (what) (Van Boeijen & Zijlstra, 2020). Our goal is to integrate these categories through an iterative yet also creative process to improve the method's effectiveness in complex multi-actor systems. Although initially designed for projects centered on cultural sensitivity and intercultural exchange, we modified these elements to suit the specific needs of systemic design projects. Our premise is that this adjustment helps address the temporal and spatial complexities of the system while incorporating the key aspects of a pragmatic culture: continuity, change, and process (Dixon, 2020; Dewey, 1946) (see Figure 13).

Systems rationales

1. *Insight* into the context, including the distribution of resources, is a prerequisite for defining the boundaries of a system and is essential for identifying the spatial and temporal elements that shape a specific power situation.

2. *Analyzing* imbalances within a system reveals areas where conflict is more likely to arise. In these situations, antagonistic actors play a strategic role, as they have a greater potential to disrupt the status quo and drive change.

3. *Synthesizing* the underlying incidents and drivers within a specific context illuminates commonalities among different systemic actors. This process helps to outline shared visions, collective incentives, and the core narrative of the problematic situation.

4. *Translational processes* underlying problematization redirect existing focal points toward the desired objectives. This entails creative and strategic approaches to engaging with a broader community. By employing problematization as a means, one can leverage design capacities to unveil the narrative of the context.

5. *Framing of desired future*; this is a collaborative attempt to create a new narrative for the context. This will result in identifying the components of the desired future, particularly the new core story and the storyline of the context.

Design rationales

6. *Enlightenment: The tools should assist designers and key stakeholders in understanding the underlying reasons or motivations behind the design of the tool (why they need to follow the steps). The objective is to enhance the effectiveness of the method while promoting transparency and justifying the 'why' question about the advantages of a systemic design process in complex social systems.*

7. *Empowerment: these tools should provide designers with a critical lens for analyzing complex systems. A prescriptive framework for effectively examining the complexity associated with the dynamics of a context could assist designers in distinguishing the relationships among components from individual differences (or human nature). The objective is to empower designers as facilitators and stakeholders as key players, instilling confidence that they are not wasting time while navigating this complexity.*

8. *Engagement: the tools should ideally support designers in their efforts to understand the diverse forms of relationships between key stakeholders. To achieve this, the DDC must establish various guidelines for fine-tuning the content of design methods and tools, thereby facilitating the development of new insights. The objective is to provide benefits to designers in their preparation for undertaking a systems mapping and analysis.*
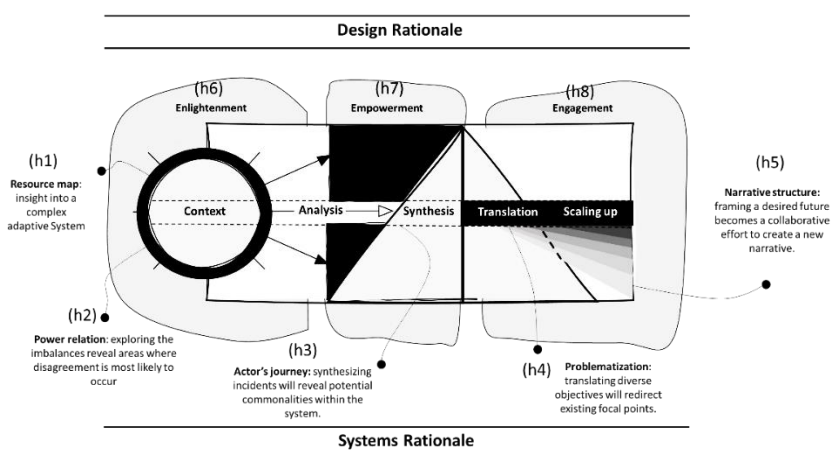
Figure 13, The DDC Framework: Seven Rationales and a Metaphorical Representation of the Method (Nedaei & Jacoby, 2023). A key premise is that integrating these insights into the design of interactive elements and processes will help address the primary research question and facilitate a new cycle of iteration: What steps or processes must a designer or facilitator of the DDC undertake to effectively disseminate the outcomes of dialogical solutions, thereby creating the necessary conditions for social experimentation.

4.3 Methods and Materials

To fulfill the research objectives, particularly the design of dialogical solutions as a prerequisite for social experimentation, it is essential to develop a number of interactive tools. The intention of this inquiry is to enable designers, in collaboration with other stakeholders, to establish preconditions for network construction. Our premise is that reflecting on dialogical solutions provides (1) insights into the participatory dimensions of the method, (2) appropriateness of higher fidelity, and (3) challenges and obstacles in the design processes. In the following sections, iteration is introduced first as a qualitative research method that includes seven hypotheses and second as a design method for prototyping interactive tools within the working environment of the Design-Driven Conflicts (DDC) approach.

4.3.1 Iteration: research method

Iteration as a research method requires refinement of what is learned at one point, often based on the results of surveys or interview studies, and further adaptation to the remainder of the research (Srivastava et al., 2009; Yen et al., 2017). During adaptation, one can capture real time information to update a design theory, method, or hypothesis in pursuit of a more complete, yet clear understanding of a phenomenon or context. This research is based on previous studies conducted at the Systemic Design Lab at the University of Antwerp, focusing on the effectiveness, efficacy, and efficiency of the design method in achieving structural changes (Carlile, 2002; Seravalli & Witmer, 2021; Nedaei & Jacoby, 2023). The inputs for the iteration were derived from the synthesis of insights during the second phase of method refinement, in which semi-structured interviews were conducted between May and September 2022. Through this new developmental process, the design processes and steps were adapted based on the DDC framework, including the four working hypotheses (systems rationale). The underlying rationale for developing this new version is to create prerequisites for social experimentation (Dixon, 2020),

with a particular focus on a meaningful alignment of items from a design and systems heuristics. Our goal is to facilitate the development of dialogical processes by integrating working hypotheses and promoting conditions for action-oriented change (Manzini, 2016). This integration offers the advantage of gaining deeper insights, which helps refine tools, maps, and creative items that support continuous meaning-making, translation, and idea generation. In addition, new iterations can improve the efficiency of the method, including aspects such as dialogical solutions and action verbs, ensuring that the co-creative elements align with user needs and expectations. These elements include in time procedures, designed for beneficiaries to shift narratives and create processes for mindset changes. The following part will explore iteration as a design method, focusing on the practice of prototyping; the design of templates, maps and processes as mediatory steps or boundary objects.

4.3.2 Iteration: design method

Drawing from experience, the prototyping step serves as a bridge between abstract knowledge and real-life contexts such as design research outcomes; simulation, and experimentation. To design the new tools, we followed three iterative steps, previously adapted from a study on creative cards (Yoo et al., 2022b). These steps include (a) identifying themes that capture the underlying narrative of an abstract concept, (b) creating images to represent these visual concepts, and (c) developing action verbs or design prompts to uncover thoughts, emotions, or intentions using unconventional methods. Each tool consists of a deck of 35 interactive cards and a question-discussion section to facilitate the communication of abstract concepts, themes, and ideologies. These mediatory items included simplified forms, examples, and standardized objects. Each prompt asks specific questions and requires users to perform activities, such as filling out forms, listing elements, or mapping scenarios (Friedman & Hendry, 2012b). Additionally, each tool includes introductory information or sidebars that explain the rationale behind the method and its relationship with the overall structure of the design method. Our goal is to develop

interactive items that facilitate translation and enhance both the verbal and visual aspects of the method, focusing on three design rationales: Enlightenment, Engagement, and Empowerment. Based on the existing literature, creating effective interactive tools requires the creative use of internal elements at various levels of abstraction, ensuring alignment between text, visual representation, and embodied experience (Van Boeijen & Zijlstra, 2020; Yoo et al., 2022). In this iteration, we refined the verbal and informational aspects while developing the artifact and components of the design method, with an emphasis on the steps and procedures essential for participatory processes. The maps were designed to provide a clear and comprehensive explanation of the DDC processes and to illustrate the inputs and outputs associated with each step. Our premise is that this will enhance the usability of the tools (empowerment), support stakeholder engagement throughout the process (engagement), and maintain the consistency of the rationale of the DDC method (enlightenment). The structure of the tools, including the placement of interactive cards, is depicted in Figures 14 to 18. Their characteristics, such as the sidebar content outlining the required steps, are detailed in Tables 7 to 11.

4.4 Results

As outlined in the DDC overview, the first phase of the methodology is context mapping (Nedaei & Jacoby, 2023), which involves various tools and techniques that are essential for defining the design problem. To facilitate this process, an interactive version of the resource map has been designed. The objective of a resource map is to elucidate the key elements of the problematic context, including actors, dual relations, and shared resources, which provide the essential means for connections between social agents. Understanding these contextual elements allows the facilitator to begin the exploration phase using more comprehensive information. Our premise is that knowledge of the basic components of a problematic context (Candy & Kornet, 2019; Visser et al., 2005) supports an analysis of the method's rationale (Nedaei & Jacoby, 2023). By mapping the

underlying resources, one can further illustrate power relationships at a broader socio-political level.

4.4.1 Resource Map

The designed resource map consists of two main parts and is equipped with four action verbs (Figure 14). The outside part clusters actors and facilitates the role-playing activities using a paradoxical structure pattern i.e., actor (a) vs actor (b) (Dorst & Hansen, 2011). The inner side of the template reveals the resources which have been previously defined as a key element of the power relations in a problematic context (Avelino, 2011). To ease the mapping, each resource must be connected to two particular actors (A and B) who might be willing to share, exchange, or mobilize one particular resource. The resources have been defined as follows: cultural (2), mental (3), human-related (4), natural (5), artifactual (6), and monetary resources (7). Each item depicts one potential capital in which actors might share a certain degree of autonomy. In addition to the structure, the map has been equipped with four successive action verbs (prompts). These verbs are identified in relation to the first hypothesis of the method which depicts the quest for the essential steps that one has to take in the analysis phase. By following these steps, one can gradually reveal the power dynamics in a problematic context (Table 7). Starting from the first prompt (a), the exploration must continue asking individuals to play a specific role, responsibility or activity, that previously was adapted, based on the individual narratives or the main story of the context. To complete the activity, the participants comment on the individual and shared resources (b). Whether they are a form of ability (e.g., mobilization of the resources) or a property (e.g., access to resources); the type of resource has to be discussed in detail. The third action verb (c) is more explorative, asking about the commonalities between individuals' resources. This has to be elaborated more in terms of the imbalances (d), for instance, how different the access to resources is or who has more ability to mobilize these items. The tool is accompanied by seven interactive cards which have been designed to provide complementary information about the variety of

resources. Using the interactive cards, one can communicate about the underlying resources associated with one or more particular actors within the context of the problem.
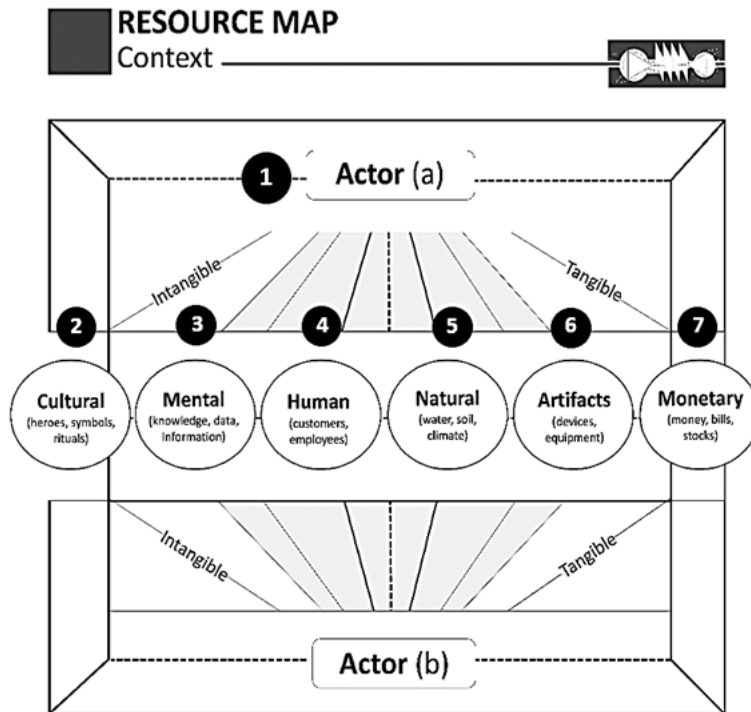
Figure 14 Resource Map Template

Resource Map		
Prompts (inputs)	**Artifacts**	**Prompts (outputs)**
(a) perform the individual's roles and responsibilities	Categories, and scenarios,	(c) draw the relations and explore the connections based on shared resources
e.g. state, private, and third sectors		i.e. commonalities
(b) surface the underlying resources	Maps, images, list of items	(d) discuss the differences or the imbalances in access to resources
i.e. use the resource cards		

Table 7 Resource Map Table

4.4.2 Power Relation Map

The second phase of the methodology focuses on analyzing the dynamics of the context which requires knowledge about resources as an input as well as the power imbalances within that context. The analysis phase ideally begins with the outcome of the previous phase. By having adequate knowledge about shared resources, one can unfold the dynamics of power which is a prerequisite for mapping the antagonistic power relations (Hensmans, 2000; Tureta et al., 2021a). This is aligned with the second hypothesis of the method: If one unfolds the dynamics of power, e.g., actors with less power, it is more probable to illuminate the antagonistic power relationships. In the context of DDC antagonists are actors with higher agency, also they are system challengers (Della Porta et al., 2014; Hensmans, 2000). Hence, they can be the key player. If one knows how to play with their contradictions, others can leverage the transformative power of the system.

The second tool aims to map the power relations (Figure 15). The map has been developed to discover three different types of power relations including actors with the 'power over', e.g., one with a higher structural position, actors with 'different power', e.g., one uses a different strategy and actors with 'more power', e.g., one with the ability to mobilize a larger amount of resources (Figure 14). Using these types of relations, the tool has a triangle structure, in which every angle is meant to depict one particular type of power (Avelino, 2011). Centered to each side of the tool, is a place for mapping the antagonistic actors' relations. Considering the map is an analytical tool, it is recommended to map other types of relationships as well, including neutral and synergistic relationships ((Avelino & Wittmayer, 2016). Nevertheless, the focus must remain on the antagonistic power relations as they are the essential ingredients for mapping the upcoming steps.
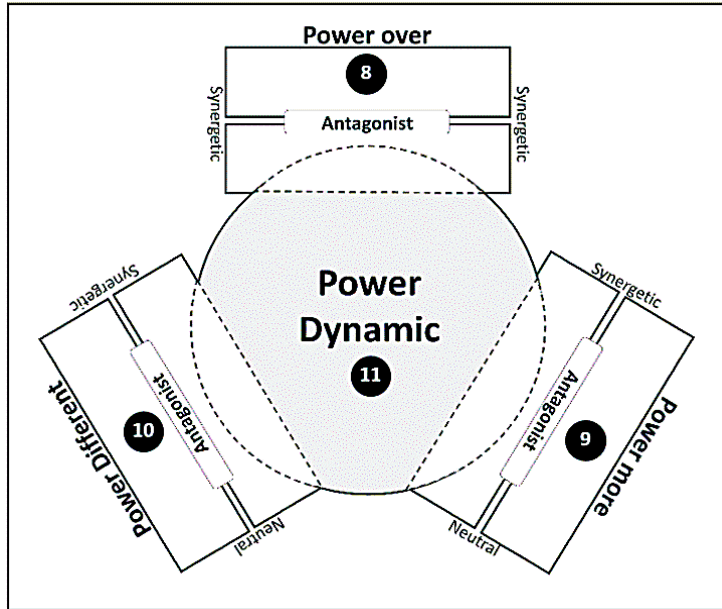
Figure 15 Power Relation Map

Power Relation Map		
Prompts (inputs)	**Artifacts**	**Prompts (outputs)**
(e) choose actors who share one or more types of resources i.e., power over, power more or different	Categories, list, and diagrams	(g) unfold the imbalances i.e., the connection between antagonistic actors
(f) discuss the individuals' capabilities in mobilizing the resources	Maps, and drawing	(h) explore the commonalities between the antagonistic actors

Table 8 Power Relation Table

In the sidebar (Table 8), four action verbs have been included. Similar to the previous part the intention is to move from an abstract concept, the designed tool, and the early assumption, into the design actions ideal for creating a dialogue between the participants. In particular, the action verb

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here is meant to create a venue for discussion on the topic related to the issue of diffusion, the extent to which the distribution of resources created the imbalances within the problematic context. As such, the first (e) prompt facilitates a reflexive dialogue, moving from mere knowledge of resources into power relationships (8, 9, 10). The second requires participants to contemplate, discuss, and elaborate on the power dimensions e.g., the discourse they are part of, their logic, capabilities, and strategies (f)(11). The third and the fourth action verbs are more explorative, asking participants to go beyond the dyadic relationship, finding out the antagonistic loops within the context(g), and exploring the potential triggers, spillovers, and constraints that cause the divergence of opinions(h). To ease communication over new terminologies, such as what it means when one has power over someone (Nedaei & Jacoby, 2023b), four interactive cards have been designed with the objective of picturing different types of power and to ease communication, reflection, and discussion over different power dimensions.

4.4.3 Actors' Journey

The third phase aims to ease the synthesis process and focuses on relational experiences including hope, fears, or common sense that one might experience in a problematic situation. Mapping these elements must begin with explorations from the past, and the present, and continue with envisioning the ideal future (Visser et al., 2005). The expectation is the inputs from the previous phases, the antagonistic actors' relations, and the individual experiences, e.g., their fears and desires, become the inputs for the third phase. In particular, the focus is on the constraints, synthesizing the critical items such as fears, doubts, and hesitations. Hence, the next hypothesis is that by mapping these elements and finding a meaningful relationships between them, e.g., the constraints and the paradoxes, one can reveal the underlying assumptions or the deep narrative of a problematic context.

In phase three, the journey map is designed to picture the individual constraints or desires (Figure 16). Based on the actors' journey, the tool

structure shows a successive process that must be completed by connecting four related sections. The tool is structured around eight sub-sections, starting from the hopes or fears as sparkling elements and continuing with situating the common senses as opposed to the individual forces. For DDC, knowledge about these items is essential in order to reveal what type of triggers might evoke destructive actions between conflicting individuals (Hensmans, 2000a; Nedaei & Jacoby, 2023). The process requires mapping the existing allies, or enemies, if applicable. Next, the requisites for one to survive or stop in the face of the problems (Paulsen, 2021) have to be identified. In the last part, the requisite is to further elaborate on the concept of 'ideal rewards' which refers to the desirable takeaways one might obtain by acting as an antagonistic player. In line with the highlighted hypothesis, if one unfolds the underlying triggers, these will help to gradually identify the deep narrative of the context.

In the sidebar section, i.e., the content presented in Table 9, we used three action verbs. The main objective is to ease mapping the actors' journey as suggested in the structure. Thus, the design verbs are rather explorative, asking to uncover the hopes (12) vs fears (13), common senses (14) vs drivers (15), allies (16) vs enemies (17), and the critical objects essential for the survival (18) vs dead-end constraints (19). To complete the session, two additional questions have been included in the sidebar (Table 9). One on contemplation and discussion over the ideal type of rewards (j), and one on the objective of knowing the commonalities, both in terms of constraints and desires one might experience along the way (k). Similar to the previous tools, to decrease he risk of misinterpretation, and the ambiguities associated with the use of abstract items, eight mediating cards[3] have been

THE ACTOR'S JOURNEY
Synthesis
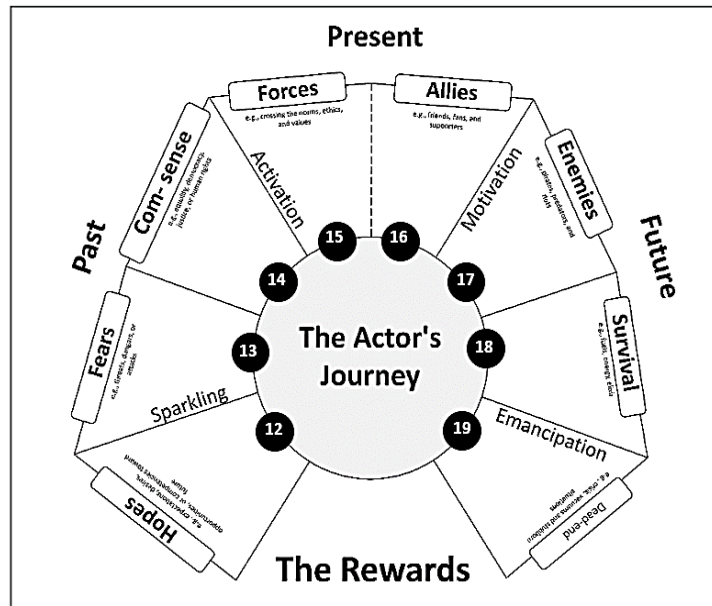
Figure 16 Actor's Journey Map

Actor's journey		
Prompts (inputs)	**Artifacts**	**Prompts (outputs)**
(i) explore, and elaborate on individuals' (i.e., in our case antagonistic) triggers i.e., fears vs. hope, common senses vs. forces, allies vs. enemies, survivals vs. dead-end objects	Categories, lists, and maps	(j) discuss the ideal type of rewards essential for ending the journey i.e., better to use metaphors (k) explore the commonalities or the boundaries one might share with other actors

Table 9 Actor's Journey Table

designed to ease communication and exchange of thoughts and focus on external concepts such as fear, common sense, or survival substances.

4.4.4 Device of Problematization

Translation is the fourth step in the DDC methodology and tries to transcend the deep narrative of a problematic situation from one existing condition into the ideal situation. Translation creates a precondition for the coalitions between the contradictory voices. The objective of the coalition is to create a temporary condition to change one's direction, thoughts, and opinions, from the current situation, into a new direction that satisfies a broader community of people. Hence, the ideal outcome of this process is a new infrastructure that gradually leads to a network of allies' construction. To translate a contradictory situation, one should identify a set of boundary objects, each corresponding to a particular type of commonality (Seravalli & Witmer, 2021; Star & Griesemer, 1989). For DDC, the inputs for designing the boundary objects are coming from the previous step, the actors' journey, the key elements of individual stories, the commonalities between them as well as the individual ideal type of rewards. These inputs will further create the essential space for a more in-depth discussion of the problematic situation. This is in line with the fourth hypothesis of the method: by cocreating a translational space between different social realities one can make sure that a new learning paradigm has been created which has the potential to be scaled up, as a new narrative in the long term (Nedaei & Jacoby, 2023).

The problematization tool has been designed to facilitate a purposeful deliberation between different social realities (Table 10) (Banathy, 1996). The intention is to map the potential elements, tangible or intangible devices, one needs to deploy in order to be equipped for dealing with the problems. Four hexagonal frames have been designed (Figure 17), each connecting different elements in a relational order. On top of the template, the individual core stories, and on the bottom, the individual ideal types of reward are written. The rewards are identified as the final objectives, the cores are the underlying intentions, and the key elements are the means that one might experience along the way. The space between the core stories and the ideal rewards is called the obligatory passage point aiming

to situate a meaningful combination of indicators, i.e., the type of items one must use to better navigate the steps in problematization processes (Callon, 1984; Nedaei et al., 2022; Nedaei & Jacoby, 2023). As mentioned earlier, the
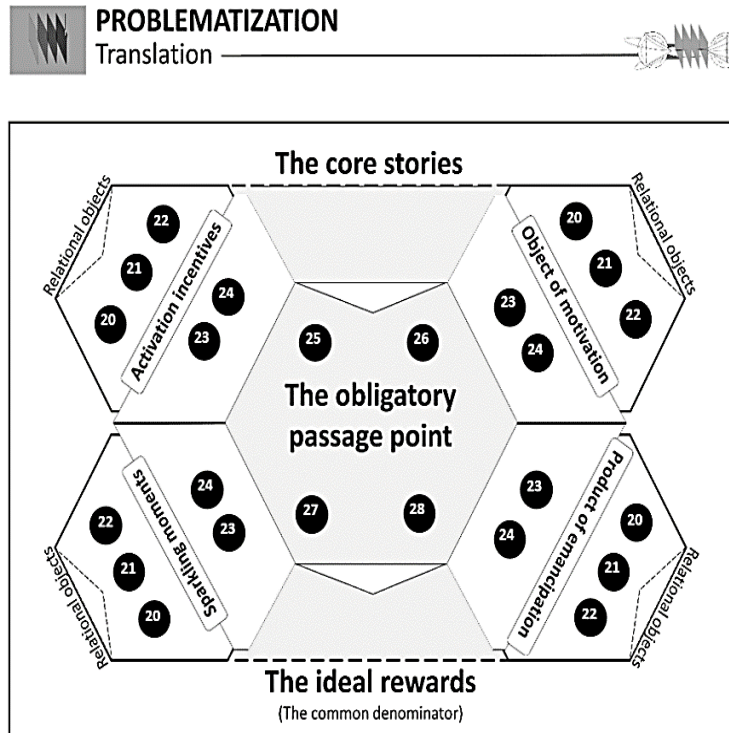
Figure 17 Problematization Template

Translation (device of problematization)		
Prompts (inputs)	**Artifacts**	**Prompts (outputs)**
(l) choose the most agreed ideal type of reward i.e., the common denominator	Categories, lists, scenario and timelines	(o) define meaningful relationships between the relational objects i.e., the new passage point rationale
(m) explore the commonalities between the systemic items (individuals' narratives)		(p) choose the stimulus one need in order to follow the new passage point
(n) perform the role: how with a relational object one can be empowered (or disconnected) i.e., boundary objects		i.e., the enrolment objects: physical, consent, transaction or seduction

Table 10 Problematization Table

intention is to create a change momentum from one's objective of reward to a collective interest that is mutually accepted by all actors. For instance, on the left side, the first hexagonal part, asks about awakening moments, e.g., fears vs hope. The second part refers to the activation incentives which include the common sense or the individual drivers which can motivate to take action. The third space (right side on top) is the object of motivation requiring discussion on potential allies and enemies. The last two refer to the emancipation stimulus, a type of relational item that one needs to use to be equipped in the face of a challenge, constraint, or enemy. In an ideal situation, these items can be helpful as survival objects, supporting the individuals to overcome a conflicting situation. While there is a certain advantage in the use of such relational items, in a conflicting situation, once actors cannot keep competing, these items might cause a dead-end situation.

In the sidebar section (the content of the sidebar is provided in (Table 10), we used five action verbs each stimulating one or more particular activities in order to ease the discussion between actors. The first action verb asks participants to bring the core stories as well as the ideal type of rewards and choose the common denominator, or the most agreed ideal type of reward that suits the majority of participants. A similar activity is required in relation to the essential elements of individual narratives, focusing on the commonalities between diverse insights shared by each participant in the previous step (actors' journey elements). The exploration continues by asking about the relational objects or so-called 'boundary objects' that, if selected, allow actors to be empowered, or disconnected from each other if empowerment is not possible, regarding the constraints. As defined in the previous study (Fleischmann, 2006; Nedaei & Jacoby, 2023b), boundary objects can vary and be defined as maps (20), modular objects (21) a form of standardized elements (22), common deficiencies (23) or repositories (24). Each number represents the code for the card provided in section 4.6 (appendix), describing the criteria for each boundary object. As such, similar to previous phases, a number of informative cards have been designed to explain the underlying motivation of each type of relational

and boundary object. The explorative questions require participants to find meaningful relations between different objects. The last action verb is about the enrolment process. Based on DDC, one has to make sure that the new enrolment, agreement on the new roles, and responsibilities, i.e., the prerequisite for mobilization into the new passage point, are granted to all actors. Similarly, to streamline the process, the number of cards has been expanded. Four creative cards have been designed, including the consent card (25), physical stimulus card (26), transactional elements card (27), and seductive objects card (28). The intention is to aid the understanding of the different types of motivational elements required before completing the enrollment process, specifically following the sub-indicators, the so-called components that can form a new passage point, and create the conditions for coalition status.

4.4.5 The Narrative Structure

The fifth phase of the methodology is the scaling-up process which aims to amplify the results of the previous steps: how to transfer the coalition from a temporary agreement into a permanent alliance which leads to a continuous dialogue on multiple social scales. To scale up, creating a mutually accepted narrative is needed. The new narrative has to be accompanied by the essential ingredients for a new narrative structure. This includes actors or actants, new characters, creatures, objects, and a universe as well as a new storyline which shapes the rise and fall of the new story. As highlighted in the DDC methodology, the input for the new narrative structure comes from the translation phase in which the indicators for the new passage point have already been defined through the process of problematization. For DDC, reordering the indicators, and identifying the most appropriate milestones is essential as they can shape the underlying rationale of the new story, i.e., depending on their directions they can create a different motivation (20-24). By utilizing the relational items, reordering the relation between boundary objects, and identifying the new elements of the problem context, the new story is

meant to ease discussion and turn the existing power relations into a strategic alliance.

The story sphere is a narrative tool equipped with a number of interactive cards (Figure 18), essential for designing a new story. The tool has a concentric structure, designed in a circular shape in order to facilitate mapping the key elements of the new narrative structure from the inner to the outer layers (Figure 18). The center is the place for designing the core narrative of the new system. On the second layer, the workshop participants have to define the new dynamic of the story which refers to the storyline, i.e., where the story begins, what would be the climax, and where the story ends. On the third layer, participants must explore the key elements of the space to ensure that the enrolment process, i.e., accepting the new conditions along with defining the new characters, creatures, and objects, will take place. This has to be completed by filling out the outer layer (on the right side) and asking participants to explore the ideal discourse wherein the story must take place. As outlined by DDC (the fifth hypothesis), it is desirable to create the ideal of a paradigmatic shift through a deep connection with the actors or actants, requiring a meaningful change in the current narrative of a social system. The objective of the story sphere is to ask the beneficiaries to redefine the core narratives of the problematics by using the coalition opportunity which has been created in the translation phase to create a new system narrative. In the manual section, four action verbs have been defined (Table 11). The first requires exploration based on the key elements of the new passage point, asking participants to surface the key elements or the indicators. The second one requires participants to reorder each element based on the dynamics of the new context, i.e., the rise, fall, or climax of the new story. To ease this process, a number of informative cards have been designed, each introducing a unique type of story line that might be suitable for the new narrative of the context, e.g., overcoming the monster (35), rags to riches (34), a tragic story (39), or rebirth line (Paulsen, 2021). The next prompt requires actors to choose the new core story of the context. This has to be in relation with the ideal type of reward which identifies the new
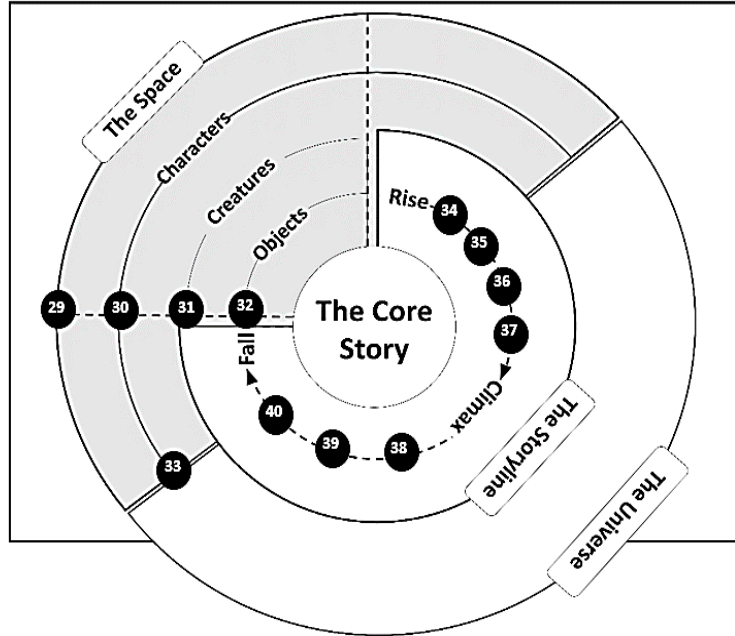
Figure 18 The Narrative structure Template

Story Sphere		
Prompts (inputs)	**Artifacts**	**Prompts (outputs)**
(q) iteration on the relational objects i.e., redefine the flow of the context (storyline) (r) choose the new core story of the context i.e., it must be gravitational (s) defining the new story space i.e., the roles and responsibilities, creatures and characters	Categories , scenario, and timeline	(t) explore the potential context, media, or environment which best suited for the dissemination of the new story. This must continue with selecting the best actor who can scale up the new narrative i.e., an author who can write a novel or theater character

Table 11 The Narrative structure Content

passage point direction. The suggestion is to choose the most anchoring core story (the most influential) with a higher possibility to preserve the connection between different story elements (Paulsen, 2021). The next

action verb asks participants to identify the entire universe-space, including individuals' roles and responsibilities as well as new creatures or objects and characters which suit the new storyline and the new core (29-33). Similar to the previous phase, several informative cards have been designed to assist in mapping the outer layers. Finally, the last action verb asks participants to explore the potential media, context, or environment, e.g., a novel, movie, music, or theater play which can assist one actor in transferring the new messages.

In the following section, we examine how a new iteration of the method, incorporating five processes, steps, and solutions, can support the participatory dimension. This involves evaluating where and for whom the design method should be implemented, as well as identifying the appropriate actors (end users), to ensure a comprehensive and reflective assessment of the higher-fidelity version of the method.

4.4.6 Participatory dimensions

Network construction is a complex process, and it is not surprising that few studies have rigorously showcased the processes and steps involved in engaging heterogeneous actors (Tureta et al., 2021; Venturini et al., 2015). Examining the participatory dimension of the method is necessary prior to experimentation and network construction. Many studies have indicated that mapping actors' unique contributions, situations, and relationships to collective practices is a challenging process (Grogan, 2021). Given the limited available evidence, defining the participatory dimension of a design method can offer valuable insights for future experimentation and enhance its applicability to real-life contexts (Dixon 2020). Integrating participatory aspects with the three design rationales seeks to offer foundational knowledge and guidelines for applying the method, while also empowering end users, such as designers working with key stakeholders, to engage effectively within the framework of a systemic design project.

As mentioned earlier, understanding access to resources is crucial for identifying the different forms of power relationships (see the resource map). The paradoxical structure of these maps requires end-users to examine their resources in relation to other participants. The participatory intention behind the design of such asymmetrical structures is to facilitate the generation of insights based on varying levels of competencies and connections between actors. This approach helps uncover previously unknown aspects of relationships with individuals who may hold higher ranks or positions in mobilizing resources (see H1) (Avelino, 2016). Similarly, the power relation map, designed to address both hierarchical and paradoxical situations, ensures that individuals can participate not only in identifying conflicts and challenges, but also in exploring different forms of power within the context. The underlying rationale for this asymmetrical structure is to create synergies between interlocutors by enabling individuals to reflect on, discuss, and critique differing realities (Manzini, 2016). To enhance the quality of analysis and discussion, it is ideal to involve a sufficient number of stakeholders—typically five to ten—to simulate a community-level intervention. Selecting a diverse group of actors is essential for gathering high-quality information, gaining deeper insights, and ensuring the effective implementation of the method (see H2). To enhance synergies (see H3), it is recommended to include extreme actors with diverse perspectives, such as marginalized individuals versus systemic players, or decision-makers versus challengers. Drawing from the literature, this approach should not exclude mediatory actors, as they play a bridging role in shifting power dynamics between extreme stakeholders, such as systemic actors (e.g., policymakers) and strategic actors (e.g., incumbents), while also linking different realities (Hensmans, 2000). Mediatory actors, such as reformists, are key stakeholders, as they facilitate translation and help streamline the depth and continuity of dialogues.

Furthermore, the participatory dimension of the method by means of the actors' journeys have been incorporated based on organized chronologically to provide insights into the past, present, and future. The premise is that this approach can enhance end-user engagement,

particularly when the context supplies sufficient information about the underlying narratives of past events, such as spillovers, tensions, and fears (see H3) (Tureta et al., 2021b). In other words, applying the tools in a more familiar environment—where the system's components, such as narratives, sectors, and stakeholders, are already defined—can increase the level of interaction. Literature supports this, suggesting that a thorough review of past events, can significantly improve level and quality of engagement at present (Cuppen, 2021).

Similarly, during the problematization phase, identifying commonalities and continuously exchanging goals and resources highlight the critical role of partnerships in enhancing participatory aspects. The goal was to foster new partnerships through this phase (Udoewa 2022). The structure of the template is designed to guide actors toward focused discussions and negotiations over shared goals, ensuring that participation is directed towards achieving specific outcomes. Integrating the three design hypotheses—insight into context, empowerment, and engagement—into both the problematization and scaling-up phases effectively bridges participatory aspects from smaller scales to broader social contexts. As such, while this integration—particularly in terms of empowerment and engagement—may require significant time and participatory efforts, our experience suggests involving a trained design facilitator, particularly one with expertise in systemic design, during workshop sessions. This facilitator can effectively guide the use of each template, ensuring that participatory processes are rigorously followed and the collaborative potential of the Design-Driven Conflicts (DDC) method is fully enacted.

4.5 Discussion

Transitioning to a cooperative action space, where there are greater possibilities for the exchange of deeper thoughts and opinions, requires insight into reflective situations conducive to translation, partnership, and network construction (DiSalvo, 2009; Dixon, 2020). As discussed earlier, the prerequisite for a mindset shift resides in reflective practices among

actors with conflicts of interest, which requires translations, and a strategic approach to systemic change (Pourdehnad 2006, Nedaei & Jacoby 2023). The Design-Driven Conflicts (DDC) method is a system-oriented approach that integrates the principles of critical systems heuristics. It aims to create preconditions for effective change by emphasizing the role of actors with conflicts of interest. In this recent iteration, we investigated the last version of the DDC method. The objective was to enhance the method's fidelity by developing dialogical processes that could establish preconditions for social experimentation. While the experimentation itself did not occur and requires further study, it can be concluded that leveraging the creative aspects of the design method—specifically through the use of action verbs—can help create conditions for implementation in simpler, more familiar contexts.

We support this argument by integrating eight hypotheses that incorporate rationales from systems and design sciences. These hypotheses resulted from an iteration based on the results of semi-structured interviews with a group of six experts and have been integrated into a design framework for prototyping the iterative version of the design method (Nedaei & Jacoby 2023).

4.5.1 Iteration: Enhancing the fidelity level

Drawing from a pragmatic approach (Dixon 2020, Dewey 1946), one can argue that a designerly attempt for instrumentation facilitates the emergence of collaborative outcomes, necessary for examining the performative aspects of a design method. The five interactive design elements (templates, sidebars, and creative materials) represent a knowledge translation effort that embodies the dialogical design process (Simeone 2016). These instruments utilize design competencies and offer a dynamic range of possibilities for reflective practices. Our premise is that this new iteration of the method can enhance the quality of the design approach and address the need to advance the collaborative aspects discussed during the second iteration of the Design-Driven Conflicts (DDC) method (Nedaei & Jacoby). learning from experience, although

systems theory may inherently seem abstract and complex, the prescriptive aspects of this iteration have made the design method more actionable and process-oriented. Throughout this research, we found that this integration becomes more pragmatic when additional reflections on the diverse objectives and hypotheses inherent in each phase of the DDC method reveal potential situations for actions that could stimulate higher-order discussions.

Through the new cycle of iteration, it becomes evident that, although the design rationale behind the dialogical solutions was not addressed in earlier research (as it was not the focus of the initial iteration), the higher fidelity of the method, along with the inclusion of prompts and action verbs, facilitates a process akin to knowledge translation. The connections between the different parts of each template can create new possibilities for design processes, potentially leading to the development of a diverse boundary object ecology. Therefore, a higher-fidelity version of the method that includes its participatory dimensions is valuable for clearly defining the steps and processes. This iteration integrates abstract concepts inherent in systems thinking in a relational- and action-oriented manner, encourages reflection, and addresses the specific contextual needs of systemic design projects. Our understanding is that through design iteration, abstract concepts can be effectively and efficiently applied to drive changes in a complex situation, including collaborative design spaces and experimental conditions.

Overall, we argue that this iterative approach improves the knowledge translation process by effectively linking abstract concepts to actionable process and steps (Charania & Tsuji, 2012). It presents design iteration as a prerequisite for advancing a pragmatic approach that integrates analysis, synthesis, translation, and ethical application of knowledge. This approach helps develop a cohesive and narrative system structure, which is especially suitable for design experimentation.

4.5.2 Reflecting on the Process

In this study, we adapted iteration as both a research method and a design method for creating interactive maps and templates. The former, iteration as a research method, aimed to refine the informative aspects of the method by integrating insights from the first and second iterations. The latter iteration, as a design method, was employed to prototype the artifacts of the method. By considering both perspectives, we can identify various advantages in the design processes of the Design-Driven Conflicts (DDC) method as well as a few shortcomings that warrant further investigation.

A clear example of the application of this method through iteration is the design of various maps to facilitate the understanding of system complexity, including the relational links between structures, verbs, and processes. This approach highlights the novel use of inputs and outputs in the design of participatory items. The integration extends to subsequent phases, such as transitioning from the resource map to the power relations map, where we aim to leverage the overarching aspects of each map to enhance underlying solutions that facilitate dialogue. This includes dialogical processes and insights into abstract prompts such as questions regarding power over, power with, and power to criteria. The effectiveness of the method currently relies heavily on transitioning from static, prescriptive processes to dynamic processes, which have been incorporated into different maps as visual content. Dynamic processes, especially during the problematization phase, facilitate the ongoing exchange of information (inquiry and action verbs) and dialogic interactions for future inquiry. However, despite these findings, the focus on designing templates revealed certain shortcomings in the iterative process. For instance, outcome uncertainty remains a significant challenge, highlighting that iteration—continuity and change-continuity are inseparable from design processes. This challenge underscores the need for continuous adaptation and refinement, as previously discussed concerning the objectives of each method. One example is the need to transition from dyadic or dual relations between actors to a more complex and integrated

network of resources and relationships. While dual relations are essential, the current format's reflections on resources may result in a less detailed map of dependencies, thereby increasing the ambiguity of the means and processes.

Addressing the limitations of participatory processes such as time constraints could enable a shift beyond a systematic approach and allow for more flexibility and openness throughout the entire method. Through the design process, we observed that, while we focused on antagonistic power relations, we overlooked an in-depth reflection of other possible types of power. Although this limitation can be justified by the method's key objective (addressing the needs of marginalized actors), it is crucial to acknowledge additional forms of power in systems. Moreover, during the design process, we realized that incorporating the notion of paradoxes can significantly advance design methods. In the DDC approach, paradoxical elements serve as the cornerstone of most templates(see actors' journeys). Our premise is that this incorporation enhances the potential for a more insightful and in-depth mapping of actors' experiences, which necessitates further empirical investigation. Such an empirical investigation can simplify the underlying processes of the translation phase. Questions such as what it means to redirect elements linked to the deep narratives of a problematic context into a new situation or how to ideally satisfy the desired rewards for a broader community of actors (collective) require additional clarification. Our realization is that prompts associated with the problematization phase are predominantly reflective. Nevertheless, any discussion should focus on multilayered negotiation, guiding actors toward the most agreed-upon and authentic ideal type of reward. In other words, the selection of appropriate triggers, means, and stimuli is a sensitive and often subjective process that must be tailored to individual desires and objectives before joining any future collaborative sessions.

4.6 Conclusion and Future directions

Throughout this research, it has become evident that interventions in complex systems require equipping members with dialogue tools and templates. These tools should not only simplify and enhance the image of the context but also draw on the morphology of the system, including key actors and their relations. Although a detailed overview of these items and the internal hypotheses of each method are provided in the preceding sections, certain aspects of this method can be identified as prerequisites for reflection. Therefore, it is necessary to continue refining the performance of this method. This can be achieved by examining the insights gained from applying it in a design-related context, such as the extent to which the performative aspects of the method can transform the existing narrative of the context. Our premise is that, while quantifying the impact of community participation is methodologically challenging, building upon the pragmatic mechanisms presented here can create a more desirable and feasible image of systems. The usability of each template can be evaluated by focusing on the dialogic aspects of the Design-Driven Conflicts (DDC) method. This includes exploring the depth and novelty of the insights associated with the use of these methods in a collaborative setting. While implementing the design-driven conflict (DDC) method in a participatory format may encounter certain constraints, such as time limitations, it is recommended to encourage the selective application of parts of the method based on the phase of engagement—whether planning, design, or implementation. This latter is likely to yield outcomes that are both feasible and appropriate for future policy makers. Therefore, it is recommended that future iterations of the method focus on enhancing the engagement between different perspectives. Our premise is that by leveraging the dialogical aspects of the design-driven conflict method, designers and stakeholders can be empowered and equipped with the necessary resources to facilitate the process of network construction.

Ch. Five

Chapter 5: **Simulation**

Chapter 5 focuses on validating the design method with a specific emphasis on the dialogic processes introduced in Chapter 4. A high-fidelity version of the Design-Driven Conflicts method was applied in a simulated social context to evaluate how effectively a designerly ways of doing can drive systemic change in the deep narrative of a problematic context.

Abstract: This paper introduces an actionable version of the Design-Driven Conflict (DDC) methodology, in which stakeholders in a problematic context actively engage in designing and conceptualizing a desired future. This study aimed to evaluate the effectiveness of the DDC methodology by examining its application in a simulated social context. To achieve this goal, a high-fidelity version of the methodology was implemented in five co-creative workshop sessions. This enabled us to explore the usability and the performative aspects of the method by means of expert analysis and the extent to which the approach could affect a system's narrative structure. In each workshop session, the designer acted as facilitator, participants as organizational actors, and the tools as boundary objects in order to create a situation of social translation. Synthesizing individual narratives based on five archetypes of the organizational movement theory—ranging from systemic, strategic, reformer, and moderate—DDC scaled up the results of the translation phase and facilitated a dialogical interaction among key stakeholders. This situation effectively changed the old narrative of the context, revealing that the DDC method can create preconditions for transforming the deep mindset and worldview of a social system. The main conclusion is that in the context of design for social systems, DDC is an appropriate method that can facilitate exploration, translation, entanglement, and idealization in a problematic social system.

Introduction

The literal meaning of problem refers to the unsatisfactory situation, person, or thing, that needs to be dealt with in order to avoid undesirable consequences of individuals actions (*Problem Definition & Meaning - Merriam-Webster*). The word 'context' also refers to a situation within which something exists or happens, and that can help to explain the occurrence of an undesirable matter (CONTEXT| Meaning in the Cambridge English Dictionary). In employing a conjunction phrase to introduce a phenomenon, one may use the term 'problem context' to denote an unfavorable state of affairs in which a problem arises and disrupts the balance of a socially self-organized system (Buchel et al., 2022; Heylighen, 2002).

In social systems, it is commonly assumed that when actors or their interactions encounter a 'problem context, it evolves into a complex web of interconnected elements, often referred to as an ill-defined situation (Ackoff, 1981; Buchanan, 2016). Furthermore, in the realm of chaos and complexity theory, an ill-defined situation, such as a pandemic, is typically seen as a metaphorical portrait of a complex system (Boy, 2017; Gharajedaghi, 2004; Lambert, 2020). Such a complex system has certain characteristics, known as emergent properties, something that none of its individual parts possess, and that may cease to exist (or operate) when the components of the system are separated (Bijl-Brouwer & Malcolm, 2020; Laszlo, 1972). Thus, in social systems, problems can be viewed as messes, which are subsystems of a larger system (the social system)(Ackoff, 1981; Gharajedaghi & Ackoff, 1984). These messes entail certain characteristics that emerge from the interactions among key components of the system, including relationships between actors or the beneficiaries of the system.

A review of the literature shows that in a complex situation, dealing with such problems has no absolute solution, nor is there any superior strategy to deal with (Family, 2003; Nelson, 2022). Rather than relying solely on a rational approach, one should adopt a relational mindset and a critical

heuristic that integrates elements through their relationships (Banathy, 1996; Dorst, 2015; Gardner, 1988; Ulrich & Reynolds, 2010). This necessitates the deployment of strategies that incorporate a greater diversity of systems components, including the resources that actors have in common or the relationships between individuals (Akinyemi et al., 2021; Avelino & Rotmans, 2009; Cuppen, 2012). Previous studies have shown that understanding such elements requires a dynamic and context-specific approach rather than a stable, or rational perspective. A creative and holistic approach that considers history, past experiences of actors, and insights into diverse resources can offer a more innovative understanding of the context (Cross, 2006; Dorst, 2015; Family, 2003; Verschueren, 2008). According to the literature, this approach is integral to the interdisciplinary nature of a pragmatic culture: a designerly way of knowing in social systems (Dixon, 2020).

In the interdisciplinary aspects of design science, including creative education and culture, the phrase 'problem context' is seen as a dynamic situation in which people's requirements, socioeconomic factors, and the roles and positionality of various interlocutors play a significant role in shaping the complexity of the situation (Boy, 2017). For designers, understanding the 'problem context' involves incorporating the needs and desires of key stakeholders, collaboratively defining the unknown aspects of the problems, and designing relevant strategies and methods to apply the creative competencies of the design science (Bijl-Brouwer, 2019; Costa et al., 2019; Udoewa, 2022). In other words, designers must integrate the creative aspects of design science with the insights from other disciplines (Bijl-brouwer, 2022; Dorst, 2015; Papalambros, 2015). This integration is essential for enhancing the applicability of design culture, particularly for improving community participation and developing innovative strategies to foster cohesion and collectivity in social systems (Hocking et al., 2016; Ostrom, 2011; Udoewa, 2022).

Previous studies have highlighted the need to integrate designerly ways of knowing with the analytical concept of systems thinking, particularly its

latest iteration: critical systems heuristics (Costa et al., 2019; Nedaei & Jacoby, 2023; Ulrich & Reynolds, 2010). One advantage of this integration is that it fosters a creative and innovative design culture that focuses on elements shaping the normative aspects of the context, including power relations and the co-creation of values for a more equitable distribution of resources (Avelino, 2011; Avelino & Wittmayer, 2016; Bijl-Brouwer, 2019; Family, 2003). It allows for critical boundary framing, engages a diverse range of people, and brings together differing realities to support ethical and impactful interventions in higher order systems (Gertz & Ozkaramanli, 2024; Nedaei & Jacoby, 2023; Udoewa, 2022; Vink et al., 2017).

In the last two decades, despite a significant shift in the descriptive and theoretical benefits of merging these two ways of thinking – design and systems inquiry – the critical task of framing of problems in social systems still requires further adaptation, particularly at the design method and process level (Costa et al., 2019; P. Jones, 2017; Jones, 2014; Ulrich & Reynolds, 2010). While the focus on why such a creative method is needed or what principles guide designers of social systems to effectively engage with key actors has been discussed elsewhere (Bijl-Brouwer & Malcolm, 2020; Jones, 2014; Lambert, 2020), there remains a lack of evidence at the method and application level on how these principles can be effectively mobilized to facilitate the emergence of positive outcomes in design processes for positive social change (Boy, 2017; Costa et al., 2019).

To fully realize the benefits of design as a creative practice and critical systems thinking as an analytical approach, it is crucial to incorporate dialogical solutions into design methods and processes level (Manzini, 2016). This approach highlights the effectiveness of the design method in simulating complex scenarios and identifies its strengths (or limitations) in facilitating situations that drive systemic change (Gharajedaghi & Ackoff, 1984; Schön, 1992; van Laere et al., 2018). We hypothesize that simulating problematic situations, including relationships between diverse actors, not only enhances the application of design culture for higher-level innovation,

but also refines the usability of the design steps and processes (Grogan, 2021; Nedaei & Jacoby, 2023; Sassenberg et al., 2023). The aim of this paper is to evaluate the latest iteration of the 'Design-Driven Conflict' (DDC) method, with a focus on its underline processes and steps. We investigate how this interdisciplinary design method can create opportunities for meaningful changes in the core narrative of a problematic context. We assess how effectively the design method facilitates dialogue and discussions among diverse actors, and how it supports engagement as a prerequisite for systemic change.

5.1 Background

Given these requirements, we previously conducted iterative research to transform the Design-Driven Conflicts (DDC) approach from a conceptual model to a practical design method (Nedaei et al., 2022; Nedaei & Jacoby, 2023). The framework of the DDC method comprises five creative steps: mapping the context, conducting a system analysis, synthesizing system narratives, identifying problematization mechanisms, and designing intervention models to facilitate structural changes.

The DDC framework has shown that leverage points can serve as valuable guidelines for the design of interventions in complex contexts. The main objective of the DDC (in both its first and second iterations) was to integrate insights from the literature and experts to create a framework aimed at mindset change. Moreover, research has indicated that shifts in mindsets or paradigms are among the most effective leverage points for addressing problematic situations (Abson et al., 2017; Family, 2003; Meadows, 1999). Efforts to shift mindsets can lead to significant changes, including adaptations in relationship patterns, shifts in regimes, and transformations in the structure of social systems (Huybrechts et al., 2017; Lambert, 2020; Pourdehnad et al., 2006). Expert analysis confirmed that the DDC method was developed thoroughly and effectively as a mediatory process for facilitating a mindset change (Nedaei & Jacoby, 2023). However, they also highlight the need for further investigation, with a

focus on the applicability and usability of the design method. Both the literature review and expert recommendations suggest that assessing how well this creative approach facilitates intervention i.e., in the core narrative of a problematic context, is crucial for enhancing its effectiveness in driving a structural change (Dixon, 2020; Huybrechts et al., 2017).

Thus, to enhance the applicability of the DDC method, we established a collaborative environment and conducted a series of interactive workshops with six participants. The objective of these sessions was to refine and evaluate the effectiveness of the DDC method. We adopted a system simulation approach and applied various components and connections between the steps, and processes of the DDC focusing on the development of creative templates and action verbs.

To streamline the simulation process, we drew on Hensman's (2000) study of organizational change to uncover the normative aspects of the system. These aspects are essential for identifying key drivers and incorporating inputs to foster social change, focusing on creative processes and involving actors in the structural dialogue (Caldwell, 2012; Pinheiro & Cruz, 2014; Sassenberg et al., 2023). Hensman (2000) and Van Laere (2018) emphasized that transforming knowledge related to archetypes, combined with simulation strategies, can create conditions conducive to meaningful changes. They argue that actor simulation has the potential to catalyze change, akin to the complexities of social systems (van Laere et al., 2018). In design science, Grogan (2021) highlighted the benefits of simulation as a "supportive information system" that enhances the application of design methods. Similarly, a recent study on creative research by Sassenberg et al. found that simulation can serve as a mediating step, promoting openness, fostering innovation, and increasing flexibility. Accordingly, we integrated a simulation into the DDC method to facilitate information exchange. This mediatory approach, supported by the literature, streamlines design scenarios and incorporates narratives from past events, helping capture nuances and ultimately improving the effectiveness of the design method (Family, 2003; Gruber, 1988; White et al., 2023).

To establish a narrative for the simulation, we began with a preliminary meta-analysis of the context and its key components. The core narrative for the simulation process was set in the late 2000s, a transitional period when the emergence of the Internet began to significantly impact the music industry (Hensmans, 2000). During this period, Hensman identified the key components of organizational archetypes based on three criteria: actors' ideologies (e.g., progress or justice), spatial positions (e.g., incumbent vs. disruptor), and types of relationships (e.g., antagonistic vs. friendly). These criteria later inspired us to incorporate same approach for the design method validation. We developed a primary questionnaire: (a) aimed at capturing individuals situation before their participation in a series of discussion sessions. (b) The results of this context analysis were used to define diverse views, roles, responsibilities, resources, and power relationships within the problematic context. These results (c) and (d) then serve as dialogic materials for the synthesis and translation phases, including individual stories from past to present. Through multiple iterations of the content (e), the insights were refined into a coherent narrative of the context, providing participants with access to a series of scenarios during the co-creative sessions (see Figure 19, and research method).

In this study, the simulation environment, together with creative items, is viewed as a boundary object designed to meet the diverse needs of different participants and thus bring about different realities. Drawing from the literature, our premise is that this environment encourages deeper discussions, idea generation, and knowledge exchange across various levels and among key stakeholders (Grogan 2021; van Laere et al. 2018). Therefore, we used the latest version of the DDC method, which includes tools, maps, templates, and action verbs, to support dialogue and improve discussions. The following guidelines provide a summary of the DDC framework adapted to the specific requirements of a narrative simulation:

- The first part of the method involves building the social, spatial, and temporal aspects of a problem. This includes describing the emerging phenomenon, archetypes of human

and non-human actors, the situation of disruption (such as changes in rules and regulations), and the concerns that individuals share within a problematic situation (Tureta et al., 2021). These elements were briefly highlighted based on the results of Hensman's study and shared among participants before planning the workshop sessions.

- The second part of the method, presented during the sessions (resource map), focuses on mapping antagonistic forms of relationships as well as individual access to critical resources. The objective is to map the imbalances within the context and create a situation for reflective discussion of the underlying drivers that challenge actors to perform their routine tasks within the problematic situation. During the workshop, these two elements served as the intended outcomes of the maps and potential inputs for the synthesis phase.

- In the third phase, the DDC method shows how, by mapping drivers and power relations, one can change the source of system engagement from individuals themselves to the underlying narratives of the context (Nedaei & Jacoby, 2023). In the third workshop, we attempted to use the template and questions to map the commonalities between actors and define the possibilities for creating new alignments between antagonistic actors. Our premise is that knowledge about the narratives and commonalities between actors becomes the ingredients for the translation phase.

- In the problematization workshop, the goal is to change individuals' objectives, strategies, and ways of achieving their ends in a mutually agreed direction. The method proposes a template to redirect the direction of antagonistic actors (in our case, through negotiated passage points and questions) from a problematic approach to a new reality that satisfies a broader community. By designing these new passage points, the commonalities between individuals and their narratives can be scaled up to a greater system level. The method shows that this new network can facilitate higher-order learning and a certain degree of adaptation (as input) for the last stage: the scaling-up process.

- The objective of the final workshop was to utilize the DDC approach to scale up the core narratives and involve a broader community of actors. It is crucial to leverage the knowledge and experience gained from previous sessions as input to create a new narrative platform. The designed templates are intended to facilitate conceptualization and future idealization and encourage critical discussion. Our premise is that this becomes a higher-order dialogue (or instrumental dialogue), thus assisting key stakeholders in mobilizing the new narrative, norms, and values from the existing

situation into a new system of affairs where there are increased possibilities for mindset and paradigm shifts.
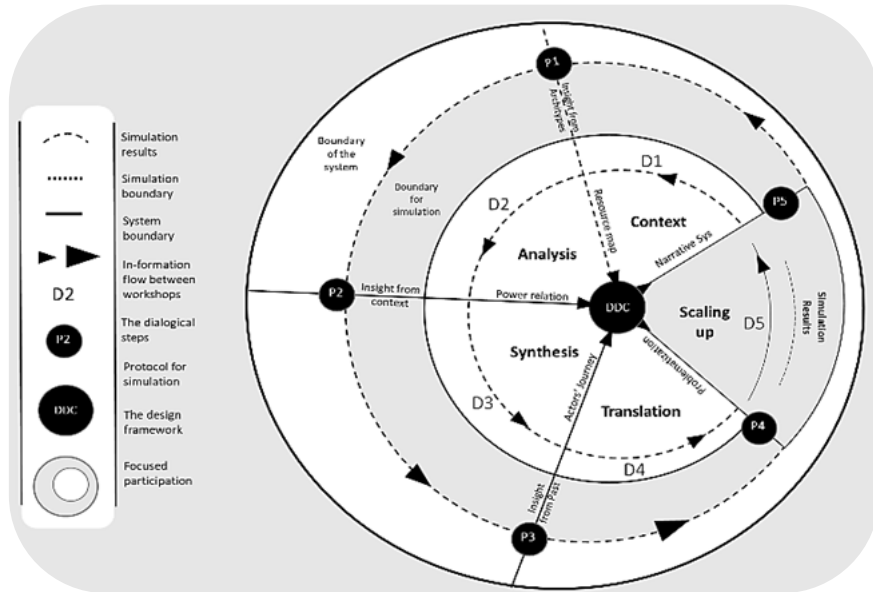
Figure 19 illustrates how a simulation can be implemented as a participatory process when a complex artifact, such as a design method, needs to be applied in a complex context. This research specifically aimed to integrate the DDC method as a guideline in practice to facilitate systemic changes. The focus is on achieving meaningful change in the deep narratives of a context through the use of dialogical steps and processes. The image illustrates the relationship between different system boundaries, contextual elements, simulation sessions, and placement of dialogical solutions. These elements will later guide the internal processes in assessing the applicability of the DDC method as a medium for reflective inquiry and social change.

5.2 Significance

Through the course of this research, it becomes evident that evaluating the applicability of a systemic design method is more feasible once we implement and test a higher-fidelity version of the method in a simulated social context. Furthermore, the use of AI chatbots such as ChatGPT can enhance the quality of simulation by rendering out diverse possibilities and relationships between actors. This can range from generating new

narratives to using non-human actors for co-creative sessions. Although the latter, co-creation was beyond the scope of this research, our premise is that it can reveal many unknowns regarding the complexity of a design method as well as the context of the study and the users of the design method.

5.3 Research Method

The decision to test our method in a simulated environment was partly driven by concerns about the potential unintended consequences of a paradigmatic change and partly due to the undefined ethical dimension of the DDC method (Nedaei & Jacoby, 2023). Learning from prior experiences (Johansson et al., 2017; Nedaei & Jacoby, 2023; Siebers et al., 2017), in design for social systems, it is essential to evaluate the performative aspects of the method at a lab level before conducting any experiment on a broader social scale. During the interactive sessions, the main focus shifted from the content of the stories to usability and performance aspects. This involved examining the artifact quality of the method, including the usability of the templates and supporting prompts. As part of this investigation, the focus was on the changes in individuals' and groups' mindsets found through cumulative processes that eventually shaped the new narratives of the context, such as revisions in the core story, storyline, space, and universe, compared to the initial conditions.

5.3.1 Participants

A number of six participants, consisting of two women and four men, were recruited to participate in this research cycle. Their ages ranged from 28 to 36 years (mean age = 31.16, SD = 2.96), and they have been working or studying in the area of design for social systems, design for behavioral change, or system-oriented design research and practice for a period of 3 to 10 years. They were all informed about the objective of this study as well as the anonymity of all personal information. Prior to their attendance, all participants received and signed a consent form which included a pre-

study questionnaire to get their approval for using the data during and after the interactive sessions. In general, the risk of participation in this study was considered very low and participants were allowed to withdraw from the study at any time.

5.3.2 The Simulation Sessions

To evaluate the performative quality of the method, we asked six participants to engage in a role-playing activity, designed in a simulated environment. We conducted a number of five interactive workshop sessions in which the participants were encouraged to gradually change the main narrative of a problematic context. We borrowed the key elements of the context including actors, actants, creatures, objects, and the universe from a real case scenario.

As mentioned earlier, the scenario context is based on a research study conducted in late 2000 by Hensmans. This study highlighted the relation between six different music industry archetypical organizations during a revolutionary period starting with the emergence of the internet as a game changer. Using OpenAI, ChatGPT, we asked the chatbot to generate a number of context-dependent narratives, using specific keywords previously used in Hensmans' organizational archetypes model (Hensmans, 2000). The stories have been combined, the similarities between the narratives have been rephrased, and the results have been checked for plagiarism using an online version of a plagiarism checker software (iThenticate). In addition to that, a short survey was conducted based on the characteristics of the organizational archetypes in order to ask participants a number of questions about their ideal role as an organizational actor. The results have been clustered in relation to Hensmans' organizational archetypes and synthesized in the form of individual statements describing the organizational archetypes of each actor. The final results, including the main narrative of the context (resulted from ChatGPT) as well as the unique core statement of the individuals (resulted from the online survey), have been sent to the participants before their attendance. This allowed the participants to have

in-depth information on the simulated environment in which they were asked to perform a role.

During the sessions, the facilitator presented the content of the interactive tools in a digital online collaborative platform (Miro 2023 version). In addition, the facilitator explained for each template the structure, and the steps one should take, or the activities, in detail. The activities required all participants to engage in an interactive dialogue using the interactive cards or following the action verbs embedded in the prompts section of each template. Using a small piece of digital paper (sticky note) we asked participants to share their ideas and engage in the co-creative processes by temporarily attaching their insights to the required parts of the templates.

At the end of each session, a short discussion and reflection was organized asking participants to elaborate on the content and the structure, with the intention to prepare them for working with the next template. During the entire session, participants were allowed to change, revise, and bring insights (sticky notes) from one part to another. Nevertheless, the time spent on working with each tool was limited to one hour, except for the final part of the discussion session. This intense timeline was allocated to ensure that the participants remained focused and updated during the workshop sessions. In particular, our experience shows that efficiency during the working sessions is important because of the systematic structure of the design method itself, where the input of each step is closely tied to the decision-making processes that individuals undertake in the prior sessions.

5.3.3   The Discussion Sessions

Using a system usability scale (SUS) (Brooke, 1996) and an end-user satisfaction index (EUS) (Doll et al., 1994), we developed five qualitative open-ended questions to receive feedback or suggestions from the actors who participated in the first phase of the experiment. Learning from past studies, SUS and EUS are validated measurement tools that can be used in human-centered design or human-computer interaction in order to

measure the usability of a designed object in a simulated context (Brooke, 1996; Dianat et al., 2017, 2019). We conducted the discussion parts in separate sessions which created a situation for more reflection on the method's usability and satisfaction. After the simulation sessions, the individuals filled out the templates and they engaged in a panel discussion on what they experienced during the workshop session. At the end of each session, the discussions have been recorded, transcribed and if necessary, analyzed. This process has been conducted manually which resulted in qualitative feedback on the usability of the tools and ways of improving the current structure and formats.

5.4 Results

5.4.1 Simulation Introduction

The simulated story begins with a period of crisis, a technological phenomenon called 'Hich' which emerged within a social context. 'Hich' originates from Persian literature, it is equivalent to a situation of complete vacuum (= nothing), the opposite of 'everything' in Western literature. In this article, the concept refers to an artificial (or fake) phenomenon that caused a situation of ambiguity and vagueness. Based on the simulation criteria, the initial narrative of the context underwent gradual improvement, depicting the situation of the phenomenon itself, the archetypes, and disruptions caused by these phenomena in a crisis situation. An extended version of this narrative was submitted to the participants of the DDC workshops two weeks before their attendance. As outlined in the simulation method, the objective was to explain the individual situations according to the existing archetypes. By providing participants with an extended version of the narrative, the workshop facilitator aimed to obtain richer insights during collaborative sessions, fostering a deeper understanding of the complex dynamics at play.

5.4.2 Phenomenon

In the early 2000s, the emergence of 'Hich' created a series of legal and institutional challenges for several actors in the music industry landscape. The advent of digital music and file-sharing platforms has significantly destabilized traditional methods of production and distribution of products in the music industry. It destabilized the status quo for many, but, created new opportunities for those strategically positioned as challengers. While the ease of downloading and sharing files presented a paradoxical situation for a few, it offered listeners unparalleled access to a vast catalog of songs. During this period, many who held strong positions within the market found their businesses and revenues in a difficult situation. This disruption triggered a complex web of disagreements and confrontations among a few stakeholders in the industry. This situation forced the music industry as a system to undergo a paradigm shift, but with no clear image of its future and no unanimous agreement on how and where the consequences would end.

5.4.2.1 *Archetypes*

The initial narrative of the system depicts the situation of a few archetypes (Hensmans 2000). These range from actors with strong systemic powers, such as resistors and incumbents, to those who play a mediating role, such as classic or modern reformers. The narrative also includes actors who play the roles of challengers and revolutionary figures. For instance, resistors and incumbents actively seek to maintain the status quo. Some of them approached this with a progressive mindset (their thought), asserting that success in the current situation requires resistance to new changes. They advocated this idea by rejecting all new phenomena in favor of preserving the existing status quo. In contrast, both challengers and revolutionary actors aimed to leverage the advantages of Hich and utilize the disruptions it created to destabilize the dominant equilibrium of the system, including the power of incumbents within the system. Despite challengers strongly advocating change and resistors being inclined to maintain the status quo, moderators played a slightly reformist role. They partially agreed with the

necessity for change while also aiming to preserve the status quo, particularly concerning the underlying values. In particular, both modern and classic reformers aimed to carefully observe the situation and adjust their relationships with other parties while leveraging the advantages of the new technology.

5.4.2.2 *Systemic disruptions*

Once we identified the initial situation of the context, we utilized AI software (GPT-4) to generate and extend the narratives. This facilitated a deeper dive into our descriptive approach, enabling content adjustments and the identification of potential disruptions associated with the emergence of Hich. Throughout this generative process, we focused on the various disruptions caused by the phenomenon across multiple components of the system, including nodes and networks, individual objectives, and relationships within the context.

- Networks destabilization

Hich began to alter various aspects of the networks, leading to a series of consequences that encompassed both constructive and destructive outcomes for the key stakeholders. These changes primarily affected the distribution of resources and the speed and rate of access to these items. The altered access to resources created new opportunities for bonding among homogeneous actors, such as resistors and incumbents, and introduced new bridging opportunities between those who were among heterogeneous actors, such as challengers and reformers. Alongside these structural changes, the emergence of Hich also fostered the self-organization of the systems, forged new links, and created a series of informative channels that later challenged the traditional ways actors had access to resources. For instance, a transition has occurred from the popularity of tangible resources, such as albums, to intangible items, such as digital downloads.

- Destabilization in objectives

Hich also causes many uncertainties at the individual level, placing key stakeholders in challenging situations. For instance, privacy concerns have

prompted significant shifts in career objectives and led to changes in individual learning strategies. This new situation created immense pressure for systemic players, who had to adapt their skillsets and align them with the requirements of new technologies. Resistors soon realized the importance of staying updated daily as disruptions expanded. During this time, many actors sought to align their strategies with the evolving landscape, while a few, particularly incumbents, chose to resist these changes. During this period, what became certain was the need for collective engagement, support, and alliances, which was not an easy task for the systemic players. The key stakeholders were hesitant to share their resources and tried to hinder the formation of partnerships. The evolving technological landscape created a complex environment in which actors had to actively balance their strategies adapting to new changes while taking into account the preservation of their individual interests.

- Frictions in relationships

In the second part of the narrative, we sought to identify how the emergence of new friction resulted in new forms of relationship among actors, including incumbents and challengers. We realized that with the new changes, no commonalities were identified, neither among like-minded actors nor among those with opposing opinions. In particular, the new narratives revealed that after the void emerged, a discourse of "no collaboration" gradually spread within the context—a controversial challenge that further polarized and divided actors into different opposing cultures. In the subsequent stages, we delved deeper into the narrative of the context, aiming to elaborate on all the possible relationships between key stakeholders. AI software, specifically GPT-4, played a crucial role in enriching the narrative by synthesizing the content of individual stories. Using the five designed tools, we aim to understanding the extent to which the dominant narrative of the context, i.e., 'no collaboration discourse', underwent a gradual change during the five workshop sessions. We began this endeavor by generating inputs for the resource map and continued until a shared story of the context emerged from the narrative structure.

The cumulative results of these analyses will be compared with the usability index to assess the validity of each method hypothesis.

5.4.3 Resource map workshop

The first session was organized around the resource map (figure 19). The participants played the role of a specific organization, and they were required to fulfill the individuals' responsibilities within the mess. The inputs e.g., the information or materials for the role-playing activity had already been defined, either by means of the context narrative or based on the result of questionnaire. Based on the initial narrative, six organizational characters had been identified and each participant was asked to choose and perform the role of one particular actor:

- A1: Ali Brothers (A)
- A2: Fairsound (F)
- A3: M&N cooperation (MN)
- A4: Music Academy (M)
- A5: RinetStudio (R)
- A6: Seun Music (S)

Firstly, participants were required to surface the individual resources within the context. They reviewed the context and identified 42 different types of resources or capitals to which each had access. Using resource cards, participants were able to categorize each item based on its quality. For instance, with regards to the cultural resources a diverse range of rituals were identified e.g., a traditional style of dance (M&N corporation), a different form of seasonal community events (Fairsound), or a form of tribal songs that inspired the production of music products (Seun Music). Likewise, concerning mental resources, they all identified access to a type of data-driven information to shape their mental competencies. For example, a music blog that provides technical support to the artists (Seun Music), an extensive database of music history (Music Academy), or a bank of ideas on how to create more than community knowledge (Ali & Brothers). The spatial location of the resources is displayed in the middle

of Figure 2 (Section R). Actors utilize the middle to draw and discuss potential links and relationships between possible opponents (or proponents) who might have access to the same type of resources. After identifying the resources, the participants continued the discussion to reveal actors who might share a degree of organizational commonality (e.g., same objectives in using the resources) by sharing the same items.

Secondly, the participants were required to draw the dual relationships i.e., a minimum requirement for a social relationship. Fourteen dual connections were identified and a full list of these dualities was extracted. A vivid example of these relationships was the connection between Rinetstudio and Seun Studio. In particular, both actors agreed that they have access to a strong knowledge repository. For Rinetstudio this connection was rather tangible such as a physical library to keep their knowledge properties protected from the possible threats such as cyber-attacks, and for Seun this was rather virtual to maintain an agile connection with a broader community of actors. Fairsounds and Music Academy both mentioned that they shared a strong connection in terms of access to human resources. The Music Academy trains young artists, whereas Fairsound had a long history of access to a community of professional artists who together have created a strong agency in the past few years. This dialogue continued until all dual relations between actors were identified.

The last inquiry was rather explorative, requiring participants to discuss the issue of distributions such as the imbalances within the context. Despite the limited time (only ten minutes remained at the end of the session), a few key elements of the context, the unknown aspects of relationships, and the implicit dependencies between actors—such as the underlying reasons for sharing specific types of resources—were revealed during the first part of the discussion. These insights into dual relations and resource distribution were essential for initiating the discussion for the next round of workshop sessions. Figure 20 illustrates the outcomes of the tool used during the working session.
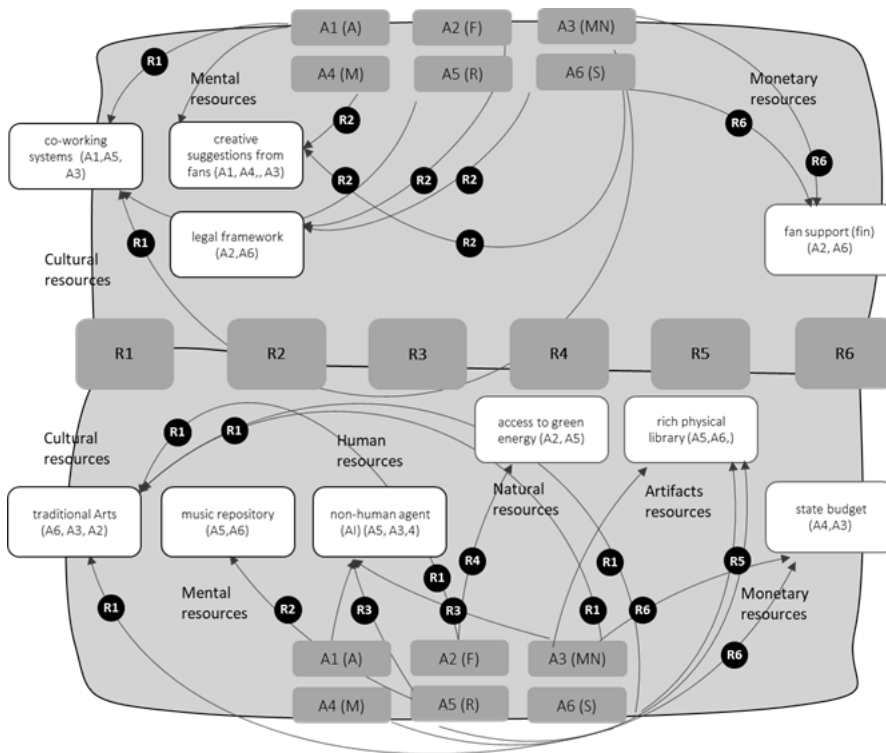
Figure 20 presents the outcomes of the resource map and displays the items identified based on context related inquiry.

Simulation protocol: *according to the DDC guidelines, it is recommended to position actors on opposite sides of the map, with resources (Rs) placed in the center. This layout is intended to prompt reflection on the varying degrees of access to essential items among individuals. It also facilitates discussions among participants about their positionality and roles in relation to these resources, leading to a deeper understanding of the specific items involved. The arrows on the map indicate connections between actors and the resources they share, while the colors are used to distinguish between two main categories of resources: tangible items, such as infrastructure, and intangible items, such as culture, rituals, or specific types of art. A full list of these resources is provided in the supplementary materials.*

5.4.4 Power relation workshop

At the beginning second session we prompted participants to select and highlight dual relations among actors from the resource map for analyzing power dynamics. The analysis aimed to delineate three distinct types of power relations (F. Avelino & Wittmayer, 2016). Using the power cards, they were able to cluster the dual relations based on the 'power over', 'power more', or 'power different' criteria. For instance, in a comparison between M&N corporation and Music Academy, they both agreed that while they received monetary resources from the same organization i.e., the governmental subsidies, Music Academy, due to a better connection with the decision makers, often received more subsidies for the governmental actors. This statement was mentioned by one of the actors as follows:

> *"Despite the smaller size of the organization (music academy), it seems in many cases, when it comes to the financial competencies, they have more power than us as [..] they have a better lobbying with the government, the systemic player […] (MN)"*

Another vivid example was the power dynamics between Ali&Brothers and RinetStudio. Both actors highlighted that during crises, the well-being of employees is the core value of their organizations. They both actively support a non-competitive culture and invest in work-life balance activities. Despite that, once the facilitator encouraged the actors to elaborate more, it came to surface that Ali&Brothers had a stronger commitment to these values during both crises and peacetime. By law, a non-competitive culture is part of their institution (formal), allowing them to exert more power and competency in supporting their employees. One actor highlighted this as follows:

> *"it has been rooted in our core culture, a value of a non-competitive environment, not only from the organizational standpoint, the law but also from the system point of view, once*

a decision has been made that decision can be reframed, depends on the consequences of the decision on the wellbeing of our employees (A)"

Overall, from the list of possible dual relations, seven have been clustered in the 'power over', five have been identified as a condition of 'power more', and five dual relations have been clustered in the 'power different' section. In a situation where actors couldn't reach a mutual agreement about the type of power relations, they replaced those relations in two or more particular sections where they could identify best that relationship within the context.

The process continued asking participants to explore the power dynamics between individuals, with a focus on the quality of the relationships: the synergistic relation, neutral, and more importantly the antagonistic power relation. Actors were encouraged to write the imbalances in the most appropriate part of the template i.e., synergy, neutral or antagonistic. For instance, in the power differences section, three types of relationships were identified as antagonistic relations. One peculiar relation was the power imbalance between the Music Academy and M&N corporation and the other was the relation between Fairsound and Ali&Brothers. With regard to the former, despite the same type of knowledge resources that both actors claimed, when it comes to the mobilization of the resources, each organization follows a different strategy. For instance, the Music Academy due to its classic (educational) role within the context normally avoids the use of traditional techniques (tribes' music) in the training activities whereas M&N corporation rather uses a different approach i.e., of diverse type of indigenous techniques. For this, both actors came to the conclusion

that these sorts of differences e.g., the diverse use of the musical instruments, might cause a certain degree of disagreement.
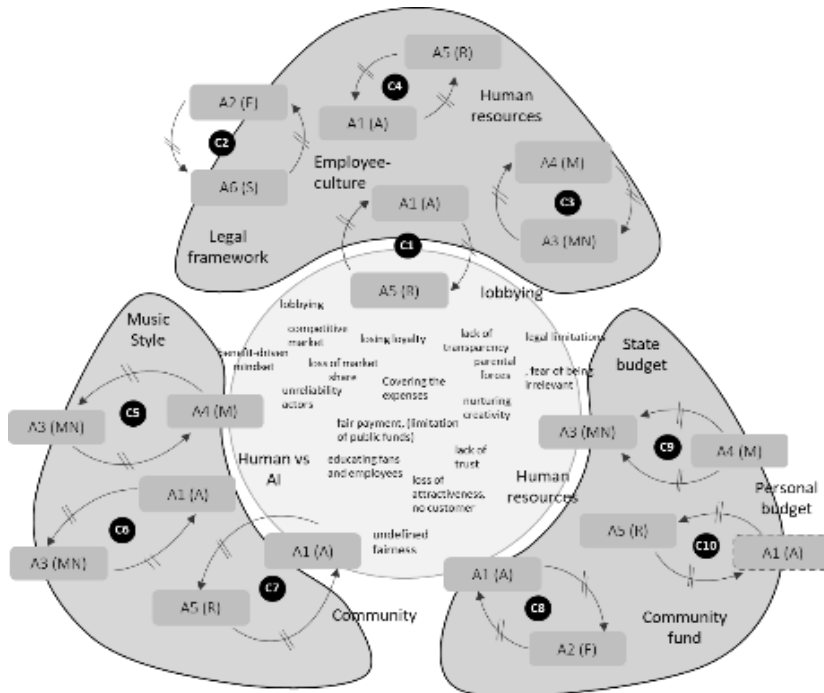
Figure 21, The power relations map illustrates how participants shared diverse perspectives during the collaborative session.

Simulation protocol: In the second session, insights from the first session, along with information on resources and the positionality of actors, were used to guide the discussions. The structured template facilitated the categorization of insights into three main types of power relationships: "power over," "power more," and "power different." The map also highlights power imbalances, particularly focusing on antagonistic actors relations (depicted as gray boxes) who experience more than others a power vacuum (Cs). Arrows on the map indicate the flow and dimensions of power between actors. According to the DDC method, power dynamics are fluid, with an actor's position being defined by their relative access to resources in comparison to others. At the center of the map, participants, including the antagonistic actors, asked to explore the underlying reasons for these imbalances, such as fear, historical legacies, or various forms of positive or negative influences. The full list of this latter has been provided with the supplementary materials.

The dialogues continued until all dyadic relations had been examined in terms of the quality of the power relationships between actors. In total ten antagonistic power relations have been clustered: four with regards to the 'power over' criteria, three in relation to the 'power more', and three related to the 'power different' sections. A full list of these items was provided before the start of the next session. At the end of the workshop, participants were encouraged to briefly elaborate on the types of drivers or incidents that might cause friction between them; articulate what is critical to maintain; and identify elements, actions, or decisions that could evoke concern. For instance, what are the underlying motivations for spillovers or the triggers that cause the imbalances between them? This allowed participants to elaborate more on the power relations and obtain key insights about individual differences before the start of the third session. Figure 21 shows the tool outcome during the working session.

5.4.5 The Actors' journey workshop

Phases One and Two were part of the analysis process, while Phase Three focused on the synthesis of the elements. Thus, during the third workshop, participants were encouraged to extract key insights from the power relations map and uncover the drivers that caused conflicts between one or more actors. The participants were then asked to group a number of paradoxical items, such as fears, hopes, forces, allies, and enemies. With the help of the facilitator, participants were able to discuss and reflect on each item. Additionally, the use of interactive cards helped individuals understand the differences and meanings of each item. In the first category (fears vs. hopes), the actors synthesized twelve key elements. In the second category (common sense vs. forces), they highlighted fourteen different items. In the third category (allies vs. enemies), they identified twelve possible elements. In the last category (survival vs. dead-end), they discovered fifteen items.

One vivid example was a discussion initiated by Ali& Brothers about the importance of financial drivers. For instance, to cover a portion of their expenses, in many situations, the only option was to act as a challenger,

i.e., one who negates the current distribution of money within the systems. The financial power of Fairsound, access to diverse app owners' resources, the support of community fans, and even engagement with governmental sectors created a degree of monetary concern for some actors. For Ali& Brothers, the insecurity in the financial resources, as opposed to their opponents, was a means for pursuing the role of a challenger.

> *By doing this, we hoped to attract more members from the young actors who are open to new challenges or can invest financially in middle-size organizations (Ali&Brothers).*

The participants continued the discussion on the ideal type of reward, engaging with the opponents individually and then collectively in one group where they had the chance to work with proponents. As mentioned earlier, rewards represent the individual ends or desires that one waits for or needs to complete the actor's journey (Callon, 1984; Nedaei et al., 2022). In the next part, they become a critical input for the device of problematization. In total six identical ideal types of reward have been identified that each represented the main desire of one particular actor. For instance, for Suen Music, one essential reward was a convergence between music lovers and musicians. They highlighted this as follows:

> *"if the majority of opponents came to the understanding that the right to copy is a fair and a feasible approach, this will create more certainty and fairness for all actors within this context (F)"*

In a few cases, the question about ideal rewards revealed even deeper insights, demonstrating that actors' objectives are rooted in their mindset as organizations. For instance, the Music Academy shared many similarities in terms of incidents, making it difficult to discern the underlying causes of the disagreements. Nevertheless, when the facilitator asked about reward items, it became evident that disagreement was mainly related to a mindset of growth within the organization. For the Music Academy, it was crucial to position themselves as the regional hub of the

industry, especially in the educational sector. According to their perspective, scaling up their narratives and disseminating a specific musical culture—such as a high culture—would be the main takeaway for them. Such informative outcomes also prompt other stakeholders to engage further, giving rise to a new underlying narrative. For instance, RinetStudio focuses on increasing financial revenue as a reward. This organization emphasized that by either sustaining rivalry or increasing product sales, they could secure additional monetary resources—an important insight that the facilitator could not identify in the earlier stages. M&N cooperation, had an opposing objective. For them it was essential to see different generations e.g., young adults and new parents becoming more interested in the collective values which they called the value of a family-oriented mindset. The same mentality, albeit with a more justice oriented mindset or a sense of social sustainability had been embedded in the desired objects of Ali&brothers, and the Fairsound organization. They both were actively looking to obtain the benefit of creative arts as a means for a community-centered approach.

> *"For us (Ali&brothers) this is a desire only possible through the training of artists and active collaboration with other companies. In other words, if we could create and disseminate such values in our employees (culture) that would be the best reward (A)"*

Finally, at the end of the session, the facilitator asked the participants to identify potential commonalities between actors. This included exploring systemic items, such as hidden triggers, that motivate one to stay in competition with other actors. Insight into these hidden items was necessary to move toward a shared mindset within the organization and an ideal type of reward that satisfied a greater community of actors. In session three, proper clustering of these items faced some limitations, mainly owing to a shortage of time, hindering the completion of the required task per participant. The answer to the last activity was a prerequisite for the translation phase; therefore, negotiations over

commonalities were postponed until the next session. Figure 22 shows the outcomes of the actor's journey map during the third session.
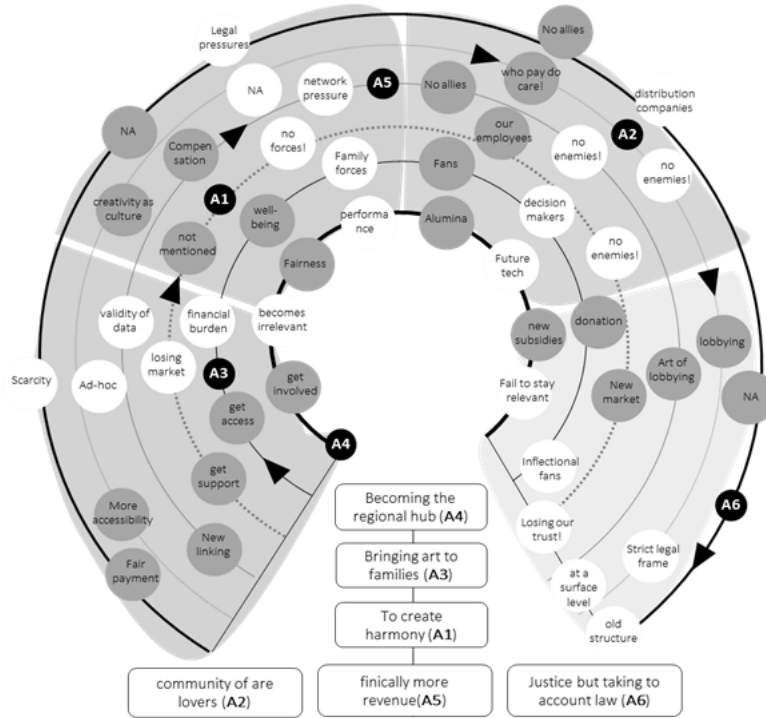
Figure 22 The journey map illustrates how participants shared insights during the collaborative session, with a focus on the knowledge exchange between antagonistic actors

Simulation protocol: This required actors to order information over time, starting with past events such as fears versus hopes and continuing the dialogue about present stimuli by discussing potential forces versus common human senses. Furthermore, during the actor's journey, participants were asked to discuss their existing friends versus enemies who would support them (or not) during a crisis situation, and speculate on various types of objects and elements that would help them survive or cease functioning after the time of adversity. The final phase of the actor's journey, known as the "rewards" stage, required participants to hypothesize the rewards or ideal outcomes they wished to attain by the journey's conclusion. These hypotheses were intended to generate a new rationale based on the individual reward items identified by the participants. We posit that these rewards are crucial inputs for the problematization process addressed in Workshop Four. A complete list of shared reward items is provided in the Supplementary Material.

Problematization workshop

At the beginning of the session, the facilitator asked the participants to present the ideal type of reward and initiate discussions on potential intervention strategies appropriate for the problematic context. The DDC highlights that such places are inherently interrelational, and boundary objects need to be negotiated and discussed between the beneficiaries (Nedaei & Jacoby, 2023). The recommendation was to identify the least possible 'common denominator' between the participants. The common denominator here refers to the least possible object of reward which, if scaled up, appeals the interest of the largest group of people. The functionality of such a denominator is that if one zooms out from the context, others should meet their own benefits and desires. After a short reflection, the participants identified the denominator as follows:

> *"Designing an inclusive-open system, ideal for young actors who can flourish and scale up their talents and desires while maintaining a strong alignment with socially accepted principles that have been co-evolved from the past to the present "(MN).*

By defining the ideal type of reward, the intention was first to empower the young actors, those who can actively challenge the status quo, and second take into account the concerns of the systemic players with regard to the importance of the rituals, symbols, and cultural elements. Based on the DDC guidelines, if the new items satisfy the interests of key stakeholders, including opponents and proponents, i.e., at a higher level than where their disagreement emerged, it would be considered an appropriate response. Thus, during the discussion on what would be a new direction, we encouraged actors to identify the key milestones (means) that a majority of them agreed upon along the way. In this process, using the prompt was very supportive; it encouraged actors to explore new commonalities (means) rather than the ends between them and then start rethinking potential triggers.

The prerequisite for mapping the commonalities is to cluster different types of system's triggers, one by one, based on their similarities in the actors' journey. However, this turned out to be impossible, the first inquiry showed that the time limitation challenged the participants on how to cluster and separate the results of the actors' journey. Thus, working with this prompt started one step earlier and required the participants first to cluster the systemic items and then explore and reidentify the possible commonalities between them. As such, in total, twelve different leverages had been identified, each showing the advantages of the quest for one particular boundary object. This pre-screening processes was essential to drive the discussion between actors toward more exploration of the items, and things that they have (or don't have) in common.

For instance, four actors identified concerns such as 'becoming irrelevant in the age of new technology' or 'lack of a legal framework in the face of modern technology' as a mutual trigger (fear) that might increase the friction. There was an agreement that the redistribution of monetary resources, might lead to a degree of justice and equality, and that it might cause action and reactions for some actors (e.g., the incumbents). Regarding the common sense, most actors mentioned that nurturing a culture of creativity is a mutual interest that can urge collective actions in the face of a mere performative or growth mindset. This was highlighted by one of the actors as follows:

> *"the dominant powers (the system actors), and the decision makers, actively encourage a performative culture […]. This, broadly challenges the creative capacities, particularly between and among young actors, […] I don't know, to us, after all this is about art, about the power of creativity (R)"*

When it comes to the critical elements necessary for increasing resilience (i.e., navigating difficult situations), lobbying with decision-makers and opponents appears to be effective in boosting the chances of continuity. This perspective somewhat aligns with the challenge of avoiding irrelevance amid sudden change. The emergence of new technology (Hich)

and the risk of losing relevance and position within the industry—like no longer being the target of interest or collaboration—were among the criteria that actors highlighted as a 'dead end' condition). However, once the facilitator shifted focus from resilience, these responses indicated a limited level of engagement, with many participants finding it abstract to address this prompt.

In the next part of the workshop, the facilitator invited the participants to identify a number of new boundary objects (Akkerman & Bakker, 2011; Star & Griesemer, 1989). The intention of the boundary objects involves two criteria. First, to empower actors in the face of a problematic situation, such as creating a setting for envisioning a desired outcome. Second, if empowerment is not possible, to disconnect them from the current triggers, enemies, forces, or fears. Despite the previous prompt, which required one to hypothetically engage in discussion, this new inquiry was rather more objective. Hence, by reusing the interactive cards, the facilitator helped participants explore and identify new sets of boundary objects, each contributing to the design of a new direction, order, and structure of the system. They all agreed that it is essential to minimize the degree of current standardization, such as principles or laws, which might hinder the openness of individuals. They highlighted that it is essential for individuals to engage in collective processes, while they can also play their own roles within the system. During the discussion, a new criterion emerged based on modular objects. They mentioned the importance of smart entities e.g., algorithmic systems that can enhance work flexibility. That can provide additional time and resources for systemic actors to better adapt to new situations. Through our exploration, we discovered that generating ideas around boundary objects not only helps individuals fine-tune their insights within a specific context, but also creates a setting for participants to grasp the concepts of time, network, places, and resources within the system. The most important takeaway was the new possibilities for envisioning abstract elements, creating a dialogic situation that helped individuals negotiate around intangible concepts and define new criteria with others.
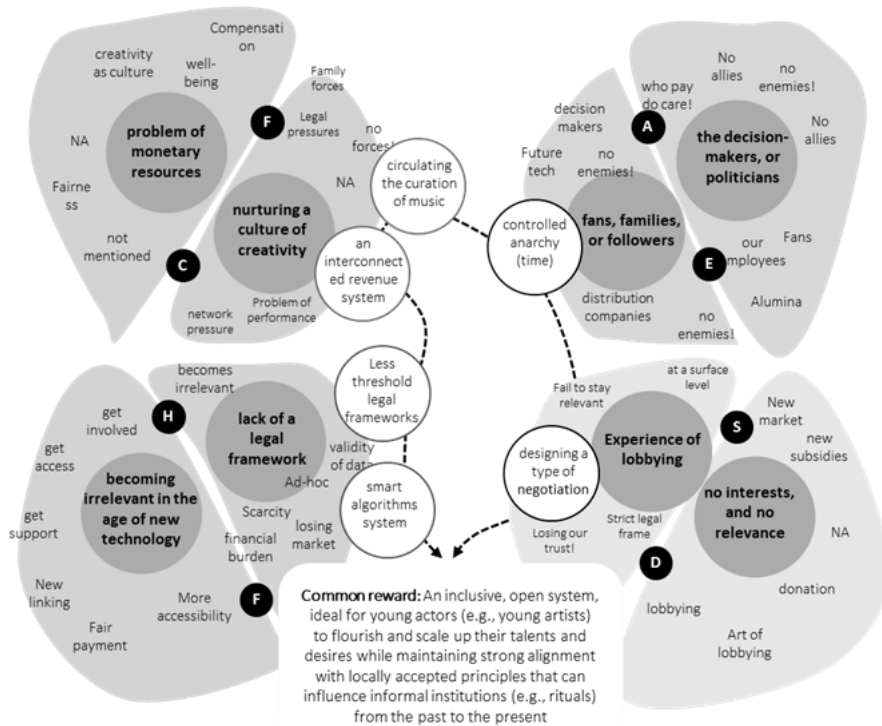
Figure 23 Problematization illustrates the underlying processes and steps that encourage participants to share insights during the collaborative session.

Simulation protocol: On the left side of the map, the first section required participants to find common ground based on the fears and hopes they discussed during the actor's journey. The second section (c,f) displays collective forces versus common sense, highlighting items that the majority of actors agreed to as stimuli for action (or reaction) during times of tension. The green section demonstrates allies versus enemies, showing mutual friends and the common enemies they must consider during crises. In the last part (s,d), actors are discussed from a futuristic lens to identify items that can act as elixirs, helping a greater number of actors survive and maintain functioning after a crisis. According to the DDC method, problematization is neither analysis nor synthesis; it is a translation process. Thus, the items should be the common denominators. If they cannot find exactly similar variables, negotiations between them will define the course of the decisions. Furthermore, the rectangle at the bottom of the map reflects the mutual reward items resulting from multiple discussions between actors. Once the actors defined the commonalities, the use of boundary objects (the six circles in the middle) helped map a new network. In this network, problematization between actors using new boundary objects facilitated convergence based on a common goal that can mobilize a greater community of actors while respecting individual boundaries and aims at the onset of crises.

meaningful connection between the boundary objects (as means) and the core ideal type of reward (end). After a short discussion, some actors stressed the importance of initiating change by revising restrictive measures such as rules or regulations as the starting point for a new journey. The conversation then advanced to the significance of structural change, with a focus on implementing smart co-creative algorithms to actively support new laws in response to evolving conditions. Finally, elements such as establishing a repository network of music products were identified as concluding steps in the new journey. To amplify the results of this session, participants were invited to a new iteration focusing on how to use this content as storylines and drawing a new narrative from the core story of the context. Figure 23 depicts the outcomes of the template during the working session.

5.4.6 Narrative System workshop

At the beginning of the workshop, the facilitator asked participants to bring the boundary objects from the previous section, reorganize these items, adjust the relations between them based on a new coalition, and focus on defining the storyline and the structure of the network of allies. Thus, the exploration began with the use of a set of interactive cards, each corresponding to one type of storyline. The facilitator encouraged actors to discuss and re-identify the most appropriate layout of the story universe. A short negotiation was conducted which resulted in a temporary agreement, on what had to be identified as the most appropriate storyline of the context. The 'rebirth story-line' was selected by the majority of actors as the underlying motivation of the new story which consisted of the rise, climax, and fall of the new story space. Next, a new plot, the starting point, was identified for the new network:

> *"For us, 'Hich' integration, the emergence of new technology, will happen smoothly thanks to collective actions, we ideally decide how to deal with the consequences of the new phenomenon, also the associated changes that the emergence of a void might create (AI)"*

Some actors mentioned that if a co-creative smart legal system is being implemented, such a system will ease the adaptation in relation to the new changes. Hence, for the integration of the new phenomenon, at the rise of the new story, they placed a smart revenue system. They identified the objective of the new revenue system as follows: 'the expenses and incomes will be circulating between incumbents (the resistors) and strategic (challengers) actors. This is expected to ease the adaptation but also should bring more justice and fairness between actors in the context'. Nevertheless, as highlighted by two actors (Music Academy and Fairsound), the new integrations might influence the power relations. The incumbents might negatively respond to the new situation as they might have an issue with the redistribution of resources, hence, at the Climax of the new storyline, they positioned the presence of a 'controlled anarchy'. The controlled anarchy is partly needed to maintain the openness and flexibility of the new system i.e., ideal for the strategic actors to get involved and partly to ease the integration and dealing with the upcoming changes for actors resisting the new changes.

Further, the actors highlighted that if new knowledge emerged from the new relations, this should be part of a new repository, accessible to a broader community of actors. One could utilize such knowledge to ease the curation of the music and activate the community sector such as fans, followers, and families who can play a more active role in scaling up the new narrative of the context. Finally, they highlighted that these new changes e.g., redistribution of resources and destabilization powers might cause certain disagreements. The polarization, the emergence of new conflicts, and disagreements are inevitable, nevertheless, "these new changes are episodic, and they are seeds for new phenomena that continuously emerge from and after new contradictions". The session continued with a discussion on prompt (r), which required actors to identify a strong core story. The new core story must be concentric, support the presence and continuation of the new alliance and create a strong bonding between different parts of the new story sphere. Thus, after a short dialogue, the actors identified the new core story as follows: creativity is

the core value of the context, and members whether incumbents or challengers, family, or art lovers embrace a culture of creativity. In particular, they mentioned this as follows:

> *"we value the emergence of new technology e.g., the voids or other consequences as an opportunity, which can mediate rather than being a threat, and support, or navigate the collective actions, as opposed to the existing mindset, which is performative, dominating the field (by the systemic actors), and causing destructive divergence and polarization between us"*

At the end of the last session, the facilitator invited the participants, to identify the essential elements for the new narrative of the context, i.e., the spaces, objects, creatures, and the ideal discourse of the story universe. Using the interactive cards, actors could highlight several story elements for new story space, such as involving new actors, young artists, those who can play the role of influencers, or student ambassadors who could scale up the new narrative. Furthermore, they also suggested using actants, the non-human actors e.g., Internet, and AI agents who can identify themselves independently of other players. Despite a short elaboration on these prompts, many aspects remained unanswered during the workshop session. Similar to the previous session, the time was a limitation that obstructed the facilitator and participants from further continuing the exploration and finalizing the session according to the research protocol. Figure 24 displays the outcomes of the tool during the Simulation is especially useful when the practical aspects of participatory action research need to be incorporated, such as evaluating the effectiveness of a design method. simulation of narratives enables meaningful results on a smaller community scale compared to more extensive participatory processes that often require greater time and resources. The steps outlined above

demonstrate how these methods were combined in this study to effectively examine the design method. working session.
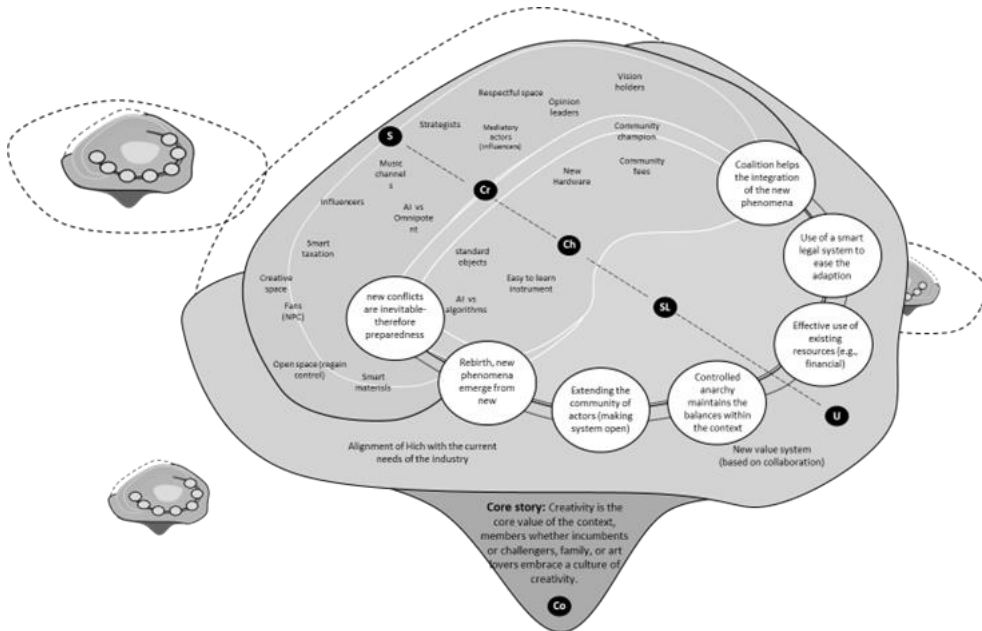
Figure 24 The Narrative Structure demonstrates how participants engaged in dialogue and exchanged insights regarding the future narrative of the context.

Simulation protocol: *the premise is that while the design narrative structure remains at a simulation level, it can extend social experimentation and enhance the creative dimensions of the emerging context. The narrative structure is designed with a gravitational or circular layout, wherein the core story plays a pivotal role in fostering deeper engagement among actors. The central circle represents the core story, where participants are asked to articulate the aim and objectives of the narrative, identifying the most influential elements that can unite all actors. The second layer represents the storyline, prompting participants to incorporate boundary objects from the problematization phase and discuss how these items can be used meaningfully to sustain connections among actors, despite the evolving dynamics of the new narrative. The third section invites participants to identify objects or entities they envision in the new context, while the final section focuses on the spatial aspects of this context. The outer circle, specifically the green section, asks participants to hypothesize about the type of universe or planetary system that would be most suitable for framing and disseminating the new narrative. Through structuring, theming, and linking the various components of the narrative system, the DDC approach aims to enhance the applicability of simulation for future planning and decision-making.*

Method Usability

The participants assessed the feasibility of the current structures using the System Usability Index (SUS). We derived nine qualitative questions from the End-User Satisfaction matrix (EUS), and these questions together with SUS contents were presented to participants in a group setting (online)(Brooke, 1996b; Dianat et al., 2019b). Each individual was required to answer the questions on their own templates separately. The focus was on prompting participants to examine the artifactual quality of their current structures and reflect on their embodied experiences. For instance, in accordance with the usability parameters, questions such as 'how often do individuals tend to use each template' or 'what do individuals think about the complexity of the current structure were asked during the discussion sessions. A few questions were added, focusing on the appropriateness of the texts, the use of questions, and the integration of visual items. The objective of these questions was to identify whether there is any incompatibility between the text and the logical arrangement of the parts, or whether, enough information was provided for the non-designer actors or not. As mentioned earlier, knowledge about these parameters i.e., usability and user satisfaction, is essential for measuring the efficiency of the DDC method. The knowledge about usability has been completed with two additional questions: one with regard to the ambiguity of the current structure and the second with regard to the role and means of conflicts. When a general agreement could not be reached or when actors declared a conflict of opinion, the facilitator encouraged actors to elaborate more on their stances. Throughout this process, the facilitator actively encouraged actors to engage in discussions, placing particular emphasis on addressing questions about how to improve the method or what to keep in the current format to ensure that there are essential inputs for the future iterations.

- Usability of Resource Map

Starting with the Resource Map, most respondents stated that they tend to use the resource map more often to assist in mapping the context or as an

extension to the existing template in system analysis e.g., the actors map. Despite the positive feedback on the tendency to use, one respondent had a slightly different opinion. From her view, the lack of expertise in subject areas such as ethnography or human cultures might limit the usability of the resource map for one with a different background. The informative aspects of the template, the knowledge required, does not allow someone with a background in behavioral sciences (or psychology), to experience the maximum capacity of the template. We asked participants about the level of complexity in the resource map, and no particular issues appeared during the discussion session. In particular, the majority of actors believed that the current structure of the map eased 'exploration in a complex context'. With the exception of a few limitations, participants were able to follow most of the steps. There have been some suggestions for improving the template, including simplifying certain underlying messages and terminologies, with a focus on creating meaningful relationships between resources (e.g., exploring whether they are sequential). Another recommendation was to merge similar categories into one section, such as combining 'cultural resources' and 'artifactual resources'.

In relation to the user interfaces, there was a general agreement that the designed tool, including the text and images and the underlying knowledge had been well integrated and skillfully designed. No specific inconsistencies or design ambiguities were reported during discussion sessions. The only reflection was on the purpose of the symmetrical lines in the template and the free spaces for resources in the middle, which required additional cognitive effort. In addition, during the reflection, a semantic discussion occurred between designers working in social sectors and one with a background in law; the main concern was on the flexibility of the structure, and the steps one must follow as was detailed in the sidebar. While the participant with a non-design background found the current format easy to learn, the respondents with a design background had a slightly opposing opinion: He didn't find the design, and the use of lines, an added value. From his view, the current format had a degree of ambiguity, particularly at the beginning of the session moving from

individual stories to mapping the resources was not very straightforward. When asked how confident he was in using the tool, he elaborated this as follows:

> *"at the start, the facilitator's role was very important, since the template was not self-explanatory and required a lot of instruction [...] some definitions or terminologies also more explanation like what do you mean by "the third sector" [...] maybe one suggestion is to replace the sticky notes with the text boxes, summarizing the key parts of the actors' stories in one box (F)"*

Despite a few concerns on the design of templates, and on how to take steps in the early phases, i.e., moving from the stories to the resources, the majority of participants claimed that the sidebar contents and the prompts provided in the template were completing each other. In other words, once they understood how the structure worked, the remaining steps sounded rather smooth.

- Usability of Power Relation Map

Similar to the previous part, the respondents shared positive experiences working with the power relation map. The majority of actors declared, they were interested to use the tool more often, in order to explore the power relations and dynamics of contexts. When we asked them about the level of complexity, they all claimed that 'they didn't experience any unusual complexity in working with the power relation map. This means 'enough information had been provided either on the sidebar or by means of the facilitator, helping individuals to work with the complexities associated with the dynamic of power. The respondents agreed that the information, text, and images were well integrated, and the existing format helped participants to follow the different structures without the help of a facilitator. Contrary to that, two respondents found the role of a trained facilitator essential and complementary for reducing the level of complexity, as well as explaining the theories that link different parts:

> *"I think the role of the facilitator here is essential […] in my view, we performed better, not necessarily because of the design itself, but rather because of the facilitator who had a constructive involvement, his performances as an organizer created a (positive) experience as well (A)"*

With regard to user satisfaction, the majority of respondents were satisfied with the design. From their view, the structure, images, and templates were easy to fill or work with, and in many cases, they found the design universal, or not difficult to engage with. In addition, no major inconsistencies were reported during the discussion session, except for a few remarks on the design of the shapes, for example: 'it is better to reconsider the purpose of the external rectangle, or 'what would have happened if one combined the external and internal rectangle? Or 'what if we could give actors more autonomy, and they could adjust the structure of tools themselves has been mentioned. In addition, the general agreement was that all participants found themselves quite confident working with the design in the current format, hence no major changes were required from their part:

> *'In my view, the advantage of the power map is that no in-depth knowledge is required for one working with a power relation, the result of the previous part (the resources) helped a lot [...] we found ourselves quite engaged with the use of the sidebar, the information and the interactive cards provided here (F)'*

Nevertheless, despite the positive remarks, when we asked for more elaboration, there were a few suggestions on how to improve the usability of the tool. For instance, they recommended incorporating visuals that could better explain the concept of power relations. In addition, two respondents suggested that the use of metaphors or animated shapes could help actors to explain the abstract concepts e.g., exchanged or distributed power between different social world. There was also a suggestion on

managing the links and sequences of steps, such as questioning why one shouldn't divide the current tool into separate parts.

> *"I think the power relation is a fascinating tool, no doubt with the novelty, nevertheless why shouldn't we make it a bit simpler, perhaps we could divide it into three parts and then we could have a better conversation on the result of each items (MN)"*

- Usability of Actors Journey

The discussion on the usability of the actors' journey mainly revolved around the novel aspects associated with the paradoxical nature and structure of the template. Introducing paradoxical elements such as enemies and friends in a sequential manner (moving from the past to the future) led to fresh mapping experiences for most participants. For most participants, the use of the design brought up new possibilities for synthesis, also some reflections on the previous stages, the resource maps, and power relations. Except for a few concerns such as how to improve the role of the workshop facilitator, the majority of participants were quite confident in using the various functions associated with the actors' journey. In terms of willingness to use, most respondents mentioned that they would tend to use the actors' journey more often. The combination of spatiotemporal elements, i.e., the incorporation of time and experiences, along with inquiries into individual triggers for conflicts, has opened up new avenues for in-depth discussions among actors. This is particularly beneficial for projects that address systemic issues. No unusual complexity or inconsistency was shared between the participants, instead the majority claimed that in the current format, the content is clear and they could easily use the inputs from the previous part, and if necessary, fill the corresponding parts in the journey map. Despite the high volume of tasks required to be completed, they were quite satisfied using the design or implementing various functions in their own cases:

> *"[…] It is very interesting to see how design helped to have discussions on the deeper layers, […] to me talking about the*

> *deep values, individuals need sounds way easier now [...] many interesting arguments have emerged during the session thanks to the relation between the steps which indeed eased how to move between and from different timeframes, there is a mix of time, needs and desires placed in the different lenses and in a heroic way (F)"*

Despite a consensus on the usability of the template, there were a few remarks on how to improve the shape as well as the role of the facilitator. One specific suggestion was to design the template in a circular format, providing the possibility to work from different angles, particularly for versions meant to be used during offline sessions:

> *"I had to twist my head to read the words, sometimes upside down, it might work in a physical workshop, I can imagine, but not a pleasant option during the online session (R)"*

Another concern raised was regarding the role of the facilitator himself; a few participants claimed that there was a mismanagement issue, making it difficult to respond to all required questions. One respondent noted, "the facilitator, responsible for managing time, progress, and processes, wasn't capable of handling the entire session." The time of the actors' journey workshop exceeded that of the initially stated protocol. A strong suggestion was made to divide the exercise into different sub-sessions, allowing individuals to move between parts, iterate their results, and monitor details of their progress (e.g., in relation to time constraints). One participant explained that during the workshop, some actors were concerned or lost with the direction and dynamics of discussions. While individuals found the depth of talk interesting and necessary, a few were also confused with their progress and gains. For instance, they were unsure of their current position in the process and of how the ongoing conversation was related to the objectives explained in the first session. The structural concerns, issues of information overload, and evaluations of facilitator performance were among the main challenges depicted during the third session.

- Usability of Problematization

The participants' responses to the quality of the problematization varied significantly and, in a few cases, were contradictory. Regarding complexity, four respondents mentioned that the current structure of the template is overly complex and difficult to follow, particularly for participants without background knowledge. One respondent pointed out that working on different steps simultaneously can be overwhelming, especially when participants encounter new terminologies. Conducting the tasks requires a high degree of cognitive effort:

> *"[…] I felt kind of lost somehow, couldn't you make it in smaller parts? It seems as if different tools are integrated into one complex structure […] there are multiple layers here which make following each part in a separate way sometimes difficult (S)"*

When we asked how often participants would like to use this part of the method, the majority of respondents claimed that if the current structure could be simplified, they would probably work with the problematization tool more often. In relation to the usability, one participant highlighted that the rationale and objective of the steps are quite clear. Nevertheless, the links with the previous stages were only visible when the facilitator started to explain them in detail. Further, there were some critical remarks about the way different parts were integrated. One participant mentioned that the 'information and prompts are not self-explanatory'. In the current format, it is unclear how content is related to the steps that must be followed in the DDC structure. In this case, a few participants suggested translating the current content into more common vocabulary and addressing the fact that the facilitator's involvement was essential in different steps. Despite the complexity of the problematization for design practitioners, non-design participants—including one with a background in law and another with a background in behavioral science—expressed a high level of satisfaction with the design of the tool. They found themselves confident using the tool, and in some cases, they were voluntary involved

in the process and tasks, helping out the workshop facilitator explaining the underlying massages associated with some parts in the problematization process. Moreover, they provide suggestions on how to improve the template. For instance, while they found the categories associated with defining the new passage point helpful in starting a dialogue on the mutual objectives of actors, to avoid unwanted confusion, they suggested removing similar headings that were used in the previous part (the actors' journey). From this viewpoint, despite the overarching nature of problematization, no conflict between means and ends was depicted. Structurally, the design of problematization sounds useful and effective; however, to improve, additional adjustments are vital. This can be based on creating new orders, such as dividing the tool into smaller pieces or simplification through the use of more familiar terminology for designers (e.g., what is passage points or what dose new object of rewards mean?). Thus, although no conflicting opinions or practices have arisen, it is imperative to have additional iterations on the usability of problematization as a novel design method.

- Usability of the Narrative System

Similar to the previous tools, the results of the discussion on the usability of the Narrative System Map were not entirely consistent. Most participants were skeptical about the usefulness of the new narrative platform. In particular, certain structural concerns have been shared, partly in relation to the ambiguity of the template, and partly in relation to the difficulties associated with the use of the DDC; moving from the individual level to a group agreement sounds complicated for the actors. When we asked participants to share more insights on this matter, the majority pointed out a structural gap between problematization and the narrative structure of the system: problematization does not necessarily contribute to the dialogic input for the narrative structure. One participant suggested that the outcomes of problematization must be interpreted separately to be used as a desired input for the narrative system. One respondent explained this as follows:

> *"The ending part seems confusing to me, I feel the designer jumped from the problematization to the design story, this is like a sudden change, from a partial agreement that we created based on our specific opinion, to codesigning the parameters of a future. Yes, we are together, we unfolded our commonalities, but I don't see the reason, how these two levels, individual and groups are related here? (A)"*

For a few actors, there were some reported inconsistencies, and ambiguity in the different levels of abstractions, making the use of the template difficult for practical usage. In particular, actors complained about the levels of information provided by the facilitator, i.e., not enough elaboration. The content of the template are still at the surface level; thus, they couldn't help individuals to engage in a meaningful conversation. One respondent claimed that rather than introducing new prompts, many concepts provided in the design narrative could be integrated into the previous session either as an extension or sidebar information. For others, the design of a narrative system sounds irrelevant at the current stage. One respondent stated that while the design sounds relevant and to some extent essential, the use of vague terminology such as "creatures" or abstract concepts has limited the feasibility of the current tool:

> *"we discussed the different leverages and the key elements of a new story, it seems we as a group must agree, obligatory, on some things that are not yet completed in the previous section, the objectives are rather unclear to me. Why should we follow these steps? It seems we are in an oscillation between rational pragmatism and extreme abstraction, otherwise, we need a bridge here? (A)"*

A few remarks on the usability aspects remained inconsistent, on participant stated that the idea of using metaphors could additionally help overcoming the high level of abstraction. One respondent mentioned that "I could feel more confident using cultural metaphors". The exchange of deeper insights and the abstract elements e.g., space, universe, or the

creatures, could be more visible using a figurative language. There was a general remark that if more time was allocated to complete the tasks, as well as additional time for dialogue and discussion, they could complete more unfinished parts of the narrative structure. The closing suggestion was a request for a structural revision, before redesigning the template for a future iteration and take into account the issue of means (the structure) and ends (the objective of the tool) conflicts.

5.5 Discussion

In recent years, the interdisciplinary aspects of design science have gained considerable attention, extending beyond the field of design itself to include insights from the social sciences, arts, and humanities (Boy, 2017; Udoewa, 2022; White et al., 2023). In this research, we sought to contribute to such an interdisciplinary need by framing and proposing the latest iterations of the Design Driven Conflicts method. This research aims to integrate design science with other disciplines as a creative mode of inquiry and apply relevant theories and methods from related fields including systems science with a focus on achieving mindset change. The paper presented here represents the latest iteration of this approach. In the first and second iterations, we explored the rationale for such integration and its implications for process-level mindset changes (Nedaei et al., 2022; Nedaei & Jacoby, 2023). In this recent iteration, our focus shifts to understanding how these changes can be implemented, and assessing their feasibility and repeatability, specifically through co-simulation in a social context.

We investigated the efficiency of the method, based on two criteria: one in relation to the performative aspects of the method, to what extent a higher fidelity version of the method resulted in a meaningful change in the deep narratives, and the second on the usability of the designed objects which refers to the user experiences in working with the creative templates. Prior studies showed that an in-depth analysis of these two variables, usability and performance, helps measure the overall applicability of the method

(Daalhuizen & Cash, 2021). Hence, our objective was to delve deeper into the relationships between several templates and to explore the applicability of the design driven conflicts method from a holistic perspective.

5.5.1 Zooming out from the mess

Controversies are inseparable aspects of human relationships that, if managed creatively, can lead to profound systemic changes in the face of adversity in social systems (Tureta et al., 2021). In this research, we offered a useful and pragmatic lens (the DDC) through which the key stakeholders of a social system not only become able to recognize their potential commonalities, but also utilize them as a means to become empowered as a self-organized system. The former insights into commonalities and connections enabled stakeholders in a problematic system to transition from potential disagreements to collectively envisioning a desired future.

We proposed several dialogic processes, emphasizing that by applying a design method, system components (such as resources) are not simply managed in a process-oriented manner but can also serve as tools for mapping relationships between actors. This approach enables key stakeholders, facilitators, and authors at different levels of understanding to systematically categorize the diverse dependencies that individuals may have in complex situations. Upon analyzing the results of the resources map, we clearly observed that once we asked stakeholders to link the relationships based on shared resources, these essentially triggered some reflective discussions, but also aided individuals to better express their deeper insights about the potential imbalances. Of course, we understand from the literature that uncovering the underlying causes of conflict—namely, spillovers or constraints—should ideally reveal many aspects of power dynamics (Cuppen et al., 2020). However, it was only during the second workshop that we observed how, by mapping these spillovers, the analysis phase changed such processes from merely understanding past events (inactive processes) to comprehending the triggers that motivate behavior in the present (proactive processes). This transition allowed key

stakeholders not only to make sense of hidden elements at an individual level but also to initiate a series of analyses (causal layers), revealing the underlying causes of conflict at a collective level. Hence, it can be asserted that the current version is well suited for uncovering systemic elements, allowing actors to tackle difficult questions such as what rewards they are aiming for or how to redefine their takeaways from a problematic situation.

Furthermore, we realized that the summation of several narratives may not necessarily represent the main narrative of the system, but it can tell a lot about shared characteristics among antagonistic actors. While we depicted the systemic elements in individuals' narratives, it was certainly much easier to move from commonalities—what stakeholders have in common—toward a mutually accepted reality, something that DDC referred to as the common denominator. Hence, unlike the literature, we realized that while stakeholders have successfully revealed hidden aspects of relationships or even negotiated over the commonalities, this does not end with any transformation in their initial objectives (Huybrechts et al., 2017; Nedaei & Jacoby, 2023a). They continue to be antagonistic actors, despite being fully aware of their own and others' deep interests, and objectives.

In other words, a shift in perspective occurred only when the key outcomes of the analysis phase—specifically, the commonalities between antagonistic actors and were subtly reframed as components and instruments for dialogue. These commonalities are most effective when they serve as prerequisites for transformative processes, such as dialogue and discussion, which the DDC refers to as a "device of problematization." This finding aligns with our previous research, in which experts highlighted that various forms of boundary objects, commonalities, and connections can act as vehicles for thought, helping individuals create a conducive environment and explore new directions and perspectives (Nedaei & Jacoby, 2023). Additionally, we observed that the greater the diversity of boundary objects and the more opportunities for collective creativity, the higher the likelihood of multilateral negotiations.

From a broader perspective, it is challenging to determine the extent to which these analyses influence individual thoughts compared with group or community perspectives. However, the DDC guidelines emphasize that problematization is essential for facilitating collective changes in perspective and establishing a foundation for new alliances. Once we moved beyond problematization, a form of empowerment became evident, allowing opponents or antagonistic actors to actively align their new ideas with the goal of building a larger community of actors. Seeing themselves in a situation where they could explicitly discuss on the new directions, something that can increase their motivations and sense of `belonging to the network i.e., small agreements gradually strengthened their new alignments. While the analytical phases (such as power relations and actors' journeys) helped to reveal certain connections, many questions about how to scale up the narrative remained unresolved. The use of boundary objects during the problematization and narrative system phases proved particularly valuable, as they reduced biases and enabled open discussions about the terms and conditions of potential alliances. By integrating a cohesive narrative structure with diverse boundary objects, one can effectively assess the network's situation and identify the key components of a narrative system that will guide the design and planning of a desired future.

During the scaling-up phase, the facilitator employed imaginative cards to encourage participants to share their profound insights. The concentric structure of the tool aided participants in gradually shifting their focus from their individual positions within the network to a collective perspective. This allowed them to discuss new scenarios, characters, spaces, and other elements of the desired future. The envisioning processes evidently increased the sense of self-efficacy and helped actors craft what they wished for, such as the up and down of the narratives; that is defining the main structure of the new story, including the opening, rise, climax, and resolution of the new narrative system. Although at first glance, one might perceive these narratives as merely facilitating future planning, it could be argued that such creative outcomes gradually illuminate new

paradigms within the system. The more profound the messages they convey, the greater the potential for scaling up the system's deeper narrative.

In summary, the key findings of this research were the learning, reflection, and empowerment that emerged from five interactive sessions. Without any additional assistance, participants were able to replace key elements such as passage points, new indicators, and objects. The cumulative prompts revealed several advantages of the method, including the ability to scale up narrative or challenge collective perspectives and mindsets. This has led to a knowledge transition involving changes in the fundamental paradigms of the original context, deep narrative, and power relations. A notable example is how, through the use of narrative components, participants shifted the core problem from a fixed approach, focused solely on the destructive consequences of new technology (viewing it as a threat) toward a more proactive and creative mindset.

5.5.2 Applicability of the DDC Method

The suitability of a design method can be evaluated on the basis of two crucial factors: usability and performance. Both aspects have equal significance, and any discussion regarding the applicability of a design method must carefully consider and balance the interrelation between these two criteria. The former is crucial because design projects require the collective engagement of key stakeholders, and any instruments or strategies employed must be easily accessible to a wide range of actors. Second, the efficiency of a design method should be assessed based on its dialogic aspects: whether it encourages critical discussion and collaboration among stakeholders. Hence, the effectiveness of a design method is not solely determined by its outcomes; rather, it is intricately linked to the depth of communication, discussions, and reflective practices facilitated by all components of the method, such as artifacts, tools, and techniques. In light of this, once we zoomed out, we realized that a crucial advantage of the DDC method is how, as a whole, it creates a dialogic situation—a setting for discussions and reflective practices that evidently

demonstrates its alignment with a broader framework: the dialogic design process. Thus, one can acknowledge that the DDC method fulfills the necessary criteria for creating a dialogic situation. The usability aspects of the components, i.e., templates and prompts, also contributed to the proper execution of these essential processes and the achievement of desired outcomes. For instance, a series of discussions emerged, and actors engaged in high level dialogues, during which boundary objects were utilized both as instruments (in the form of maps) and outputs (as envisioning cards) to facilitate the integration of diverse viewpoints. While the method appears fairly applicable, particularly at the level of processes, a closer examination of the experiment reveals certain limitations that might restrict its potential for future usage. These limitations are associated with the research protocol and design workshop facilitations rather than the content, structure, and design of the method itself, which we discussed previously.

One limitation is that this research was conducted in a simulated situation, meaning that only a few selected participants (actors who were highly educated and familiar with the topic) had the chance of participation. The DDC applicability is primarily limited to a specific (controlled) environment, such as a laboratory, rather than being suitable for broader contexts like a public space or forum for open discussion. In a lab setting, the system's limitations are clearly defined, the number of actors involved is limited, and constraints are already established (based on previous research). Second, in this research, the facilitator served as the designer of the tools, and his expertise and practical experience were indispensable factors in ensuring the effectiveness of the process, e.g., communicating various concepts and information flow. Thus, for non-designers participants, it would be a challenging task to work with DDC. With regards to the predictability of outcomes, for future research, conducting similar workshops and expecting consistent outcomes becomes unknown due to the absence of experienced design facilitators who would effectively manage and communicate the multidisciplinary aspects of the method.

Despite the potential challenges that may arise, several mediating strategies can be considered to address the inherent complexity of the DDC method. One approach is to iterate on the results carefully and with the involvement of the appropriate stakeholders. This entails seeking input from key stakeholders, who can effectively represent marginalized groups within a specific community. Furthermore, while this research highlights that many of the theories and methods underpinning our approach are relatively new (for designers), our premise is that systemic designers' skills in system mapping, complexity sensemaking, and intervention modeling could potentially prove useful in facilitating DDC workshops. The current DDC format is best suited for third-sector organizations, educational systems, and centers that focus on the developmental aspects of the design sciences. This implies that incorporating certain aspects of the DDC method into design education curricula (e.g., systemic design, and strategic design) could be a long-term investment, resulting in a new generation of designers who think and act as interdisciplinary facilitators while still adhering to their pragmatic cultures. In summary, our experience shows that dealing with indeterminate problems in social systems often requires a one-shot operation. However, accepting the risk of testing this design method without multiple iterations can lead to challenges. The DDC method has produced promising results, indicating a novel approach for action research that combines design and systems sciences. It can be argued that the narrative system has proven to be an effective tool for social simulation and serves as a design method for systemic design initiatives. Despite its constraints, our premise is that the DDC method has the potential to make a significant contribution to the interdisciplinary aspect of design sciences, particularly in the subdomain of systemic and strategic design. It presents a new approach for social simulations and offers new possibilities for an iterative design culture.

5.6 Conclusion

Without no question, there is no method advanced enough to present the actual complexity of social systems. Instead, what is needed is the deployment of creative tools, templates and techniques to help the modeling of something simpler, similar, and familiar. The result of the in-depth analyses of the context, multiple syntheses, mapping, and translation processes, before and after the start of the coalition, can clearly justify the advantages of the Design-Driven Conflict method. Under controlled conditions, where boundaries are established, and key stakeholders are already defined, the engagement processes underlying the DDC method have yielded new outcomes—a network of allies that can create the preconditions for a paradigmatic change within the deep narrative of a social system. Therefore, the results of this study can shed light on how to contribute to a novel approach to engaging key stakeholders in complex problematic situations. Although this demonstrates the applicability of the DDC methodology, particularly in dealing with multi-agent and multi-stakeholder problems, further iterations are recommended. One concern in relation to the usability aspects of the method, further clarifications on the structure of the template are required. The second concern is related to the ethical dimensions of the method, which were not investigated in this study. These ethical dimensions can shed light on new questions. For instance, why should one, in the first place, think about the empowerment of other citizens? Who grants designers the mandate to play the role of facilitators in such a sensitive context while they might still be dealing with their own biases? More importantly, why should we consider the risk of mindset change when we know that small interventions might address this issue?

Ch. Six

Chapter 6: **Conclusion**

This PhD research focuses on design, systems, and social transformation through the introduction of a transformative agent. It proposes a critical and creative approach that aims to leverage the analytical competencies of systems thinking for deep interventions in social systems. The process involves creating a new whole from potentially antagonistic parts through the development of a design approach known as design-driven conflicts. This approach encompasses relevant methods and tools tailored in a creative way to foster transformation in social systems.

6.1 The DDC highlights

In every social system, normative variables—such as deep-seated mindsets and opinions—play a critical role in shaping the trajectories of self-organizing systems. By considering these variables, interpersonal relationships can be leveraged as a mechanism for change. This PhD research has shown that conflicts, as a type of social relationship, have a transformative potential. When constructed effectively, controversies and conflicts can lead to meaningful and lasting changes. It has been theorized that conflict between opposing agents can lead to significant transformations if the power generated is effectively harnessed. This requires a creative and strategic approach to identify where interventions should occur and how they should be executed, as exemplified by the design-driven conflict (DDC) method. The DDC method presents a series of holistic and systemic processes that facilitate in-depth analysis of the context and offers new opportunities for interventions in higher-order systems. I deducted that the underlying processes in the design driven conflicts method provided the conditions for critical learning and reflection. The interdisciplinary rationale underlying this systemic design

approach, coupled with the effective use of translational processes, demonstrates the appropriateness of a design-driven conflict approach to drive innovation at higher order systems. Looking at this research from a broader perspective, it can be asserted that the essential elements for action-oriented change—sensitivity, diversity, iterations, and creativity—are integrated throughout various aspects of this method. Section 6.1.1 outlines the research cycles, which gradually developed the steps necessary to achieve the primary objective: creating a design method that promotes mindset and paradigm shifts.

6.1.1 The Quest for Understanding

Conceptualization: A literature review was conducted to develop a model that offers insights into constructing a network of allies and ensuring that conflicts result in meaningful and desirable outcomes. The findings were synthesized to identify the core features of conflict, which were then used to outline the precise steps for a constructive process known as network construction. This exploration extends beyond mere reflection, promoting the exchange of opinions and delving into deeper layers to create an environment conducive to higher-order learning. During the analysis phase, it became clear that before attempting to make sense of a complex environment, it is crucial to uncover the hidden aspects of the system, particularly shared values. This requires delving into social processes such as knowledge transmission to better understand the mechanisms necessary for changes in social systems. The quest for understanding involves revealing underlying values, the narrative of systems, and assumptions at the level of intent. To facilitate these processes, I drew on insights from a critical systems paradigm, emphasizing the importance of marginalized and contradictory voices in fostering dialogue and critical thinking. Next, I realized the necessity of using a holistic lens—zooming out from the context–to identify potential patterns and orders that can support the preconditions for social translation. Therefore, the model shifts its focus from the conventional top-down dissemination of social capital to a more reflexive approach, which is embedded in the core of a network of allies.

This approach emphasizes the importance of construting conflicts in a way that dissolves them rather than simply eliminating them, acknowledging that effective social learning requires overcoming power imbalances and resource limitations to create a truly collaborative and transformative environment.

6.1.2 The Quest for Change

Development: The third chapter provided a theoretical understanding of conflict, which subsequently served as the basis for the first draft of the DDC method, a designerly way of constructing conflict in favor of new alliances (3.2.1). The content and structure were presented to a group of experts who discussed and analyzed the reliability of the DDC i.e., the effectiveness and efficacy (3.3.6). The structure of the DDC was based on five distinctive phases and twelve different methods, such as paradoxical maps, spillover maps, and actors' journey. Each phase aims to connect the input and output of the preceding stages through a series of internal processes. (1) In context mapping, the intention is to depict both the human and non-human actors, focusing on rules and regulations, tasks, and resources that they share within a problematic situation. (2) The analysis, focuses on mapping the antagonistic forms of relationships as well as individual access to the resources. The objective is to map the power dynamics and underlying factors that contribute to conflicts and disagreements within the specified context. (3) The goal of synthesis was to shift the focus from individual components, actors, and incidents to overarching narratives of the context. This involves delving into the individual stories that exist within the context. It aims to shift attention from a mere understanding of the parts to recognizing the possible relationships between them. (4) The aim of translation is to modify the existing pathways, objectives, and strategies employed by individuals to achieve the desired end. Moreover, drawing from the experts' opinion, I realized that a new pathway must be designed to redirect individuals from their current situation (which leads to conflicts) toward a mutually accepted reality. Therefore, at the final phase (5), scaling up provides the

strategies for amplifying the results associated with the translation phase. The underlying rationale is that once the relations between actors turn into new alliances, one must change the core narratives to involve a broader community of actors in sensemaking processes. In sum, one essential aspect of the method is showing the steps needed to leverage the results of translation from the individual level to alliances at the community level. This represents a strategic shift from a mere goal-seeking culture (analytical bias) to a purposeful attempt, signaling a paradigmatic change in how we can manage resources and values in favor of new alliances.

6.1.3 The Quest for Creativity

Iteration: In pursuit of change, it became clear that desniging an actionable version of the DDC method is essential. The primary objective of this study was to evaluate the efficacy of this method, including its outcomes and applicability. To foster creativity, five collaborative tools and techniques were developed to facilitate stakeholder engagement within a dialogic process. During the prototyping phase, which utilized iteration as a research method, the design process was guided by three key criteria: a meaningful rationale grounded in theoretical insights, creative use of visual elements, and a variety of prompts designed to encourage action-oriented discussion. Each collaborative tool was created to address a specific sub-question within the DDC framework (Section 3.4), previously outlined in the quest for change. In Section 4.5.1, I introduced an action-oriented version of the resource map based on the hypothesis that mapping underlying resources can effectively illustrate power dynamics at a broader socio-political level. The goal was to enable stakeholders to identify commonalities and discuss various resources, including cultural, mental, and financial support, available within the context. The next step involved creating a power relations map (Section 4.5.2) to analyze the dynamics and various forms of power relations, with particular attention to the interactions between antagonistic actors. Within the DDC framework, these actors are regarded as strategic players due to their significant agency and potential to act as system triggers. The Actors'

Journey tool (Section 4.5.3) was designed to map underlying incidents that lead to disagreements within a specific context. This tool operates on the premise that understanding the relationships between different systemic triggers can help illustrate shared images and reward items, and define the core narratives of systems. To achieve this, the template employs a circular structure, prompting individuals to map contrasting items such as fears versus hopes and friends versus enemies. We then moved on to the concept of problematization (Section 4.5.4), where a collaborative translation process was introduced, encouraging individuals to engage in dialogical processes that redirect existing focal points toward desired outcomes. In the problematization process, both underlying commonalities and conflict triggers are mapped in a paradoxical order, revealing new dialogical solutions that can be used for higher-order discussions. This approach suggests that translation can leverage design capacities—such as creativity and sensemaking—to unfold the narrative of the context and synthesize commonalities between actors to create new alignments. The final template introduces a collaborative version of a narrative structure (Section 4.5.5), based on the premise that only a deep connection between beneficiaries can amplify the new insights emerging from translation processes. Therefore, as a network of allies is established, actors are encouraged to engage in collective envisioning of a desired future, utilize boundary objects, and gradually construct different parts of a new network. This process focuses on developing a new core story and storyline. This section, focused on the quest for creativity, highlights how design can foster new alignments and harness the power of conflict as a vital aspect of social systems..

6.1.4 The Quest for Simulation

Implication: The quest for creativity concluded with the realization that the mere use of the device of problematization is not sufficient. To scale up the results of the DDC method, one must create a situation similar to a real context, in which the dialogical outcomes of different phases can be utilized as a means for crafting a new narrative. Thus, in addition to a

theoretical and creative approach, the DDC artifacts (tools and templates) were examined during the simulated processes. To facilitate the analysis of the method artifacts, a situation similar to a real context was proposed. The scenario was based on the context of the music industry. A problematic situation, where actors and relations between them were analyzed, and the key elements of the narrative based on four organizational movement archetypes were proposed. These elements were then utilized as inputs for the AI software to generate the background and informative basis for a number of discussion sessions. The applicability of the DDC method, including the degree to which it facilitated the change of narrative elements, was evaluated throughout the collaborative sessions. A key finding was that the creative components of the DDC approach, including templates and cards, promoted extensive and higher order discussions among the key stakeholders while they simultaneously created new possibilities, such as shared characteristics and commonalities. Throughout the sessions, particularly in the translation stage, it became apparent that the facilitator could challenge individuals' assumptions, aligning them with the recommended directions based on the sidebar content of each template. The quest for simulation demonstrates the advantages of a designerly way of doing to leverage the outcomes of (dialogical) processes, providing valuable input for a narrative system structure. In this research, stakeholders in a problematic context are able to shed light on what ought to be the collective image of a desired future and what elements, links, and relations that the desired future should ideally possess (e.g., storyline, core story, characters). Therefore, the DDC artifacts can be considered an appropriate method for harnessing the power of actors with different opinions. Throughout the collaborative sessions, various tools and artifacts facilitated the co-creation of new relational and dialogical solutions, which is crucial for ensuring the applicability of the design method, especially in crafting new narratives. While the outcomes of the DDC processes and steps were effective, the complexity of this approach suggests a need to streamline the content and structure of the

method to address potential challenges, such as involving a larger group of participants.

6.2 Answers to the Research Questions

Q1. What lies at the core of conflict that makes it a potential instrument of change on the mindset and paradigm level? And what does one need to create a network of allies and to deal with problematics at social levels?

Conflict is a form of social relationship that connects humans based on their contradictions, contrary to the ordinary perspective that shared interests are the sole means for bonding between humans. Analysis of the literature reveals that if one views conflict as a social relationship, it can also be a characteristic of the whole system (2.3.1). This finding indicates that controversies share common characteristics; they are active, authentic, and dynamic. In other words, they can emerge, change, and evolve, depending on the situation and context. Moreover, the review revealed that to drive conflict as a social process, it is crucial to consider the underlying causes and flow of controversies within a specific context of interest (2.3.2). This perspective is grounded in organizational change, highlighting the importance of harnessing the power of controversy as a crucial and desirable agent of change. Further the analysis showed that under specific conditions, these agencies can be expanded to create transformative power, potentially reshaping the deep layers or structure of a social system, i.e., encompassing norms, values, and mindsets. In light of this, the complexity theory not only supports these insights, but also sheds light on the idea that to construct conflict, one must go beyond the linearity of a mechanistic mindset. A win-and-lose mentality is ineffective, and there is nothing to be solved or resolved. In social systems, constructing conflict means dissolving, and the way conflicts can be dissolved has been explained by network theory (2.3.3). This theory suggests that to utilize the commonalities between actors, one should create a transformative situation—a method for network construction among diverse actors.

Facilitating such a constructive situation transforms conflicts from destructive entities into effective and informative agents of transformation.

Q2. Based on the initial insights from design research and practice, what are the specific aspects of design inquiry that make it an ideal approach to create a network of allies?

A proper answer to this question lies in the participatory roots of design and the fact that design is a value-sensitive discipline. The complexities of social systems emerge from the interactions among diverse agents, whether at the individual or cultural level. When considering elements that contribute to dependencies in systems, such as bonding or bridging between actors, employing a design approach can lead to action-oriented change. Our review highlights that particular aspects of the translation process can effectively support the framing phase of the design process, and design itself can facilitate translation as a process making it well suited for the creation of new alliances (2.3.4). For instance, designers possess the ability to craft tangible experiences. They are familiar with the value sensitivity approach and can apply these competencies to gain a deeper understanding of complexity, including the ease of mapping and identifying patterns in relations.

A creative use of such competencies is vital for the process of translation. Using such a normative capability, a planned intervention can be more meaningful and ideal for supporting of a paradigm and mindset change. In addition, at the heart of design approaches is a progressive way of reasoning. This means that designers often iterate between the process and the outcomes. They employ progressive reasoning until a desired result emerges from complexity. The review ultimately confirmed that designerly ways of knowing possess the ability to zoom out of a problem and identify patterns and relations within a progressively broader context. This holistic capability is well suited for enhancing sense-making practices in complex situations (2.4). With a creative and holistic mindset, designers can connect various elements and make sense of patterns and structures. Leveraging such a designerly mindset facilitates a more feasible process of

bridging between different realities, proving useful for the desired use of boundary objects to foster multilayered dialogue and discussion.

Q3. How can design as a creative process of thought and planning 'facilitate' the pre-conditions for a mindset and paradigm shift, i.e., aggregating a network of allies?

At the heart of conflicts, there are certain mechanisms that can transcend social paradigms, functioning as normative variables acting as transformative agents. These transformative processes can eventually lead to the ideal of systemic change. To leverage this process and establish the conditions for change, one must foster a situation of social learning, continuous change, and reflection (3.1.2).

Through our research, it becomes evident that controversies are not linear, nor can they unfold instantly at their own pace. The utilization of design competencies, such as sensemaking skills, the ability to zoom in and out, and boundary objects, can contribute to a collective envisioning of a desired future. Such an intervention ideally should utilize the commonalities between diverse realities and ease alignment of different perspectives at the level of intent. Our analysis showed that, despite such theoretical promises to move from an abstract concept (theory) to an action-oriented process known as higher-order dialogue, it is essential to advance a design method that outlines the potential steps toward a desired transformative (3.2.1).

The insights from experts highlight that when designing for higher-order systems, designers require to have relevant methods to uncover the components of the context, encompassing actors and resources. Understanding how these resources can potentially bridge between two social entities is crucial. The results of our synthesis also confirmed this realization, indicating that if designers explore possible connections and imbalances within a problematic context, they can shed light on places with higher possibilities for friction (3.3.1).

Furthermore, in design for social systems, it is important to analyze the historical roots. A design method should help to explore the dynamic of past events, unfolding the spillovers of the past event and rendering out a historical image of the system. No matter how fragmented the components of a social system are, there are always some properties of the situation that actors of a social system can find in common. If a design method eases the synthesis of diverse narratives, this can help to identify the new means of alignment essential for the ideal of dialogue and discussion (3.3.2).

The critical part of the design method for systemic design projects is not about how to analyze nor is it related to the synthesis of insights, but rather is about how to translate diverse realities and purposefully converge the different perspectives. The exploration in part (3.3.4) revealed that design abilities, analysis, and synthesis can provide the inputs of the translation process. The most challenging part is intervening when translation is an ongoing process and where in-depth reflections of opinions must be included.

In light of the translation process, to design means to create boundary objects, to bridge between different realities, and to explore the fears, threats, or enemies that a greater community of people are faced with. In other words, while translation is important, one must take into account the limitations of translation. Merely relying on the results of a problematization can only result in a temporary agreement. Thus, translation can result in alliances when actors (or their representatives) create a deep connection based on greater (possible) commonality. If the more aspirational and creative one can design the narrative of a system, there would be more possibilities to scale up the new narrative of the context into a broader community of people (3.36).

Q 4. What does one need to disseminate the results of a dialogic design process so that the community can gradually build the preconditions for a mindset shift?

Q 5. To what extent can the use of a design method change the deep narrative of a problematic context?

Based on a discussion in section (3.4) it becomes evident to answer these questions, it is essential to determine whether employing the method has resulted in a meaningful change in the deep narrative of the context and whether it contributed to altering the internal code of conduct, such as shared images. In a real situation, designing a new narrative is a challenging and longitudinal process. It will take many years to restructure the narrative of a problematic context (Milojević & Inayatullah, 2015b; Quick, 2021), let alone create the situation of change on the paradigmatic aspects. It is essential to use an alternative approach to measure a new narrative. The analysis revealed that examining the method's efficiency in a more controlled environment is possible by employing simulated images, characters, and elements, rather than relying on a real situation (5.1). In a situation of social simulation, if a design method, the tools, and templates provide a condition of reflection, this allows actors to have an in-depth understanding of the problem, resulting in less uncertainty, and vagueness. It eases the challenging task of exploration and helps the participants to create a new order (5.4).

In section 5.4.1 it becomes evident that using social simulation, defining the boundaries of a system is easier compared to an actual situation. It is more feasible to navigate the performances and capture the feasibility of a design method. From the part 2.3.1 it is evident that the nature of conflicts is episodic; they are ever-changing and occur within different value systems. Thus, using a simulated context, a designer can assemble and disassemble a problem into different parts and create meaningful relationships between the components and the storylines.

Additional exploration revealed that, to measure the performative aspects of a method, using a familiar narrative (e.g., the emergence of the Internet as a game changer) can facilitate the simulation processes. This was later justified through the simulation phase, where the narrative platform made it easier for key actors to engage and apply the different parts of the methods in a proper way (5.3.6). Social simulation supports designers in systematically comparing the key elements of the new context with the

early stages of the narrative. It also empowers actors to gradually construct the storylines of these collective narratives. Through the use of design-driven conflicts, it is evident that the ideal of envisioning a desired future is more probable. The method supported key stakeholders in collectively shaping the core narrative of the context. For example, actors were actively engaged in different discussions; they created their own views while collectively designing a new narrative of the context.

DDC as whole is an appropriate method for bringing the desired change in the deep narrative of a problematic context. On one side, the simulation process (as a research method) and, on the other side, the way this method made a complex problem familiar, helped individuals link their insights with the hidden variables underlying of the problem situation e.g., fears, hopes, the positive and negative stimulus (5.4.1). These advantages, along with the possibility of harnessing actors' creative power and imagination in designing a new narrative of the context, ensure that a degree of change can occur, not only at the level of intent but also in how individuals are linked and related to one another.

6.3 limitations

Through the course of this research, it was evident that there were still some necessary exclusion criteria that could better support the framing aspects of the research, such as the school of thought or intellectual background of the researchers. One vivid example is the way I defined culture was very similar to Hofstede's definition – a structural viewpoint, something that ties the people of a community together. (Hofstede et al., 2010). However, the quest for change revealed that culture does not exist as a fixed entity. From a systemic point of view, to study culture, one must examine it through the criteria similar to the evolutionary theory. Likewise, prior to opening the discussion on network theory, it would be more feasible to delve into its foundational notion, social capital theory. Considering the multidisciplinary aspects of this research, a limitation at the current stage is the lack of a zooming-out of the proposed theories (e.g.,

systems dynamics, complexities, and network theory) to in-depth arguments on the so-called parental notions, where the insights from the original theories could provide more constructive results for the review process.

In addition when I zoom out from this research, the majority of inputs, e.g., literature, frameworks, models, and knowledge obtained from the experts and participants could be classified under the category of Western intellectual traditions. The key elements of the problem narrative that I synthesized during the third research cycle, i.e., the emergence of the internet in the music industry, also come from a prior story in a Western system. Without any doubt, that helped in providing a rich picture of the analysis and synthesis phases as an input for translation where I attempted to take advantage of the first insights of design interventions to facilitate a more action-oriented discussion (Dépelteau, 2015; Verschueren, 2008b). Nevertheless, for a systemic design approach, I should argue that an in-depth reflection should particularly serve the objectives of a critical systems heuristics. In critical systems heuristics, it is crucial to broaden boundaries and to explore the paradigmatic shift in neighboring (different) realities and value systems. I must emphasize that by applying the narrative structure, one should also display the situations of an unfamiliar value system. This means employing the narratives from Western systems, in order to examine the applicability of DDC is not enough. Both on the processes and content, different value systems provide varying forms of narratives. Therefore, using a counterintuitive method, such as poetry or mythology could facilitate a different and in-depth exchange of information.

Furthermore, in this research, I did not elaborate on some moral aspects of this research. That was partly due to the divergent objectives of the research questions and partly due to the scope of this research, which has changed a few times in different directions during my research. For instance, I did not delve into the possible role of the designer in social systems, such as addressing the question of to whom responsibilities about

changes in the (deep) narrative of a social system are attributed. I would recommend that, prior to any intervention in social systems, one must take into account the ethical dimensions of the method. Even after the ethical approval, still, the result of this method should be navigated. Changes in mindset and paradigm are not straightforward and that can lead to some unintended outcomes. To reduce the risk of unwanted consequences and to deal with ethical limitations, a suggestion is to have iterations, tests, and implementation of a narrative in a simulated environment. A simulation can create a safe environment and lower the risk of tensions without threatening the individual ethical concerns.

6.4 Contribution to science

The cumulative results of this research build upon the work and perspectives of others at the nexus of design, complexity, and systems sciences. This PhD research makes significant contributions to the interdisciplinary aspects of design sciences through four cycles of research—understanding, change, creativity and simulation—by focusing on continues refinement of a design-driven conflicts approach. These contributions involve the novel application of design methods, the development and evaluation of an interdisciplinary approach that aligns with recent advancements in systems thinking, the adaptation of critical systems thinking to meet the specific needs of design science: fostering innovation in higher-order systems (see section 1.2, 6.4.1). Figure 25 shows the final version of the DDC approach and a schematic overview of its contribution to a broader spectrum of science. Earlier in the introduction, two distinct models were presented: one addressing the underlying epistemic aspects of this research (see figure 24), and the other using an analogy comparing the practice of rug crafting to the complexities related to advancing a design method (see figure 6). Here, I complete the framework by presenting it as a finished artifact or designed carpet. In the new framework, key aspects of the third iteration of systems science—including systems dynamics, complexity theory, and critical systems

heuristics—have been incorporated (see D, E, Z). As previously discussed, system dynamics identifies the optimal points for intervention (mindset), while complexity theory and critical heuristics focus on how to implement these interventions and what actions are necessary to induce structural change (relationships between antagonistic actors). In line with this rationale, elements from the third phase of systems science, such as the need for mindset change, conflict construction, and dialogical mechanisms, have been included to frame the system structure of this research (see M, Y, H). Furthermore, to address the specific needs of design science, these components are connected to objectives in design science, such as prerequisites for value co-creation, public innovation, and the requirements for structural change, all of which are rooted in the third phase of design science (see V, R, X). I then positioned translation as a mediating element at the center of the model to emphasize its significance not only as a bridging process between the two domains but also as a pragmatic tool for fostering effective engagement among different interlocutors. While the primary goal of integrating these disciplinary perspectives was to enhance the applicability of the design method and gradually build an evidence-based approach to measure its usefulness, particularly in achieving structural change (refer to section 1.4.2), further analysis revealed that the DDC approach offers contributions that extend beyond the epistemic aspects of this research. Therefore, the outer layer of the rug model highlights these broader contributions across four essential dimensions: (1) the advancement of an interdisciplinary culture; (2) increased effectiveness in facilitating public formation; (3) contributions to the discourse on social intelligence; and (4) the epistemic benefits of the method for approaches that examine social systems from a networked rather than layered perspective.. In the following section, drawing from both classic and contemporary scholars, I further explore how and where this contribution can be effectively applied within a broader scientific framework.

An interdisciplinary culture: Communication and interaction, as outlined in Section 1.5, constitute the third fundamental aspect of social systems.

Social systems primarily sustain and renew themselves through internal adjustments and changes in relational modes, rather than through exerting control over external resources (Luhmann, 1995). The development of complex systems is intricately tied to their ability to respond effectively to constraints, thereby creating opportunities for justice and progress. Research suggests a strong correlation between the quality of interactions among various components within a system and its capacity for self-organization (Heylighen, 2002; Jantsch, 1980); a process that facilitates the equitable distribution of values across communities and cultures.

Jonas (2014), drawing on earlier research, argues that design practice can be viewed as a "practice of not-knowing," which serves as a means to bridge communities and facilitate translation across diverse realities. Expanding on Simeone's (2016) concept of 'modes of translation,' I myself frame that translation is fundamental to design cultures and constitutes a pivotal element in the contribution of design to social innovation. A device of translation can be employed as a powerful agent to empower those that are most affected by hierarchical power imbalances, particularly in contexts marked by adversarial dynamics. Therefore, contributing meaningfully to the self-organizing capacity of systems requires the facilitation of communication mechanisms, dialogue, questioning, and critical discussion across varying levels of abstraction (Carey, 2024). A translation device can be seen as a pragmatic approach; as Dewey articulated, 'dialogue involves a richer quality of modalities than vision alone; vision serves as a spectator, whereas hearing functions as a practitioner's experience' (p. 234-235). In other words, while meaning may originate from visual inputs, it must be shaped and refined through the reflective situations akin to dialogical spaces (Dewey, 1946). The effective use of translational tools within visual culture should manifest in the connections between auditory experiences and the vital outward expressions of others' thoughts (and emotions). Consequently, if a design method accurately reflects the translational strengths inherent in design culture—such as mapping, constructing, and prototyping future images—

it can effectively reinforce the concepts and messages of those engaged in justice-related practices.

In this PhD research, various translational processes have been adapted to serve as practical guidelines for researchers operating at the intersection of design, community engagement, and public innovation (see Section 1.4.2). The use of creative artifacts, mediatory tools, and mechanisms has been instrumental in facilitating dialogue between diverse actors. Notably, experts from disciplines such as law, systems sciences, and behavioral sciences collaborated in the co-design of a new narrative. This co-creative and open context, enabled by the design method, facilitates negotiations across various levels of abstraction, highlighting the effectiveness of maps and templates in fostering new alignments. Previous studies have demonstrated that constructing spaces for simulation—such as devising translational mechanisms that bridge the gap between constituted publics and institutions—can be considered a constructive approach (Dixon, 2020; Grogan, 2021). This PhD research contributes to this latter by implementing dialogical solutions and, more specifically, by adopting a common interdisciplinary language that is verbal, visual, interactive, and co-creative (see Section 1.4.2).

Formation of publics: Prior research suggests that from a pragmatic perspective, the development of new methods necessitates sensitivity toward context, which is an essential precondition for meaningful intervention (Ulrich & Reynolds, 2010). Thus, regardless of its procedural level, the appropriateness of an idea can be effectively assessed through a context (Tureta et al., 2021). Latour, in his exploration of how social entities form associations and publics, argues that "collective experiments in social systems" extend beyond traditional laboratory settings, requiring the cultivation of positive affect to establish robust connections, particularly among conflicting agents (DiSalvo 2009; Latour 1990). In other words, the pursuit of positive effects, cohesion, and cooperation must be explored through experimentation as a prerequisite for reconciling diverse perspectives. Research has shown that such positive change can drive

social innovation by establishing the necessary conditions for engagement, bonding, and network construction (Dixon, 2020). This approach positions the notion of "community" and "network" as essential components of the system, thereby calling for the design process to conceptualize and enhance the constituent elements of network construction.

In design science Jonas, in his review of design and systems literature, argues that "problem framing in design science" is not about merely speculating on future outcomes. Instead, it involves deliberately constructing the "components" of a desirable future within a scenario-based framework. This perspective closely aligns with Dewey's vision of democracy, where he contends that a realistic image of a democratic system arises not from the idealization of utopian models, but from intentional efforts to design and implement a new order (Dewey, 1946). This process requires the integration of design and systems thinking to develop narrative-based scenarios that organize elements into a coherent and purposeful vision of the future. Efforts in meaning-making, such as problematization and interessement, are pivotal in the formation of new institutions, particularly when narratives are employed to effectively delineate strategies for constructing, bridging, and linking diverse social realities. By doing so, these narratives facilitate the creation of a shared understanding that is essential for the establishment and maintenance of institutional frameworks. Such processes enable the development of a collective reality, which can be instrumentalized for the construction of networks.

In this PhD, through four iterative cycles—encompassing theory, method, iteration, and simulation—I aimed to demonstrate the effectiveness of design-driven conflicts in facilitating meaningful connections, narrative building, and ultimately, structural change at a higher order. To substantiate this contribution, I argue that the concept of a paradigm shift becomes more attainable through simulation within a social context where, although the existing reality remains static (i.e., no immediate transformation occurs), the cumulative results of reflective practices play a

crucial role in the formation of new alliances. These new alliances are essential in reframing actors' situations, thereby creating a space for experimentation (Grogan, 2021). The value of the DDC method extends beyond framing dialogical solutions and creating connections between epistemic concepts. It can act as a method for the formation of public—or, as Dewey might say, an instrument—for forming new institutions, thereby facilitating the creation of new communities and orders (Dewey, 1946). While this does not eliminate the need for further iteration- which is fundamental to pragmatism, the results of this study contribute significantly to Latour's idea of the power of association, the concept of networks as a mode of experimentation and Dewey's vision of democracy, the purposeful effort to shape the image of future. The impact of this study offers valuable contributions to a broader range of fields, including design, community engagement, and critical systems culture.

Systems intelligence: According to Dewey's perspective on democracy, the effectiveness of an idea is determined by the situation in which it becomes operative (Dewey, 1946). In other words, a method is meaningful if it establishes satisfactory connections with various aspects of an individual's experience, particularly those involving creativity and intelligence. A method is valid, regardless of its abstraction level, if it enables the transformation of one's experience of an event through its representation—whether as a narrative or an account of event. This suggests that the formation of higher-order constructs, such as public opinion, institutions, and mindsets, requires the enhancement of public imagination, often referred to as social intelligence.

There is a broad consensus among scholars at the intersection of design, politics, and systems science regarding the importance of social engagement and its effectiveness in shaping collective intelligence (Dixon, 2020). Engagement and intelligence are frequently considered fundamental elements to achieving a balance between justice and progress within societies (Hensmans, 2000). Extensive literature supports the notion that "co-constructing the organizations we inhabit" necessitates significant

contributions to both the narratives of past events and the exploration of future possibilities (Carey, 2024; Hensmans, 2000; Ligtvoet et al., 2016). One can argue that such changes alone are insufficient; a prerequisite for the effectiveness of intervention is its relevance for social empowerment. Dixon, drawing on Dewey's vision of democracy, contends that modifications in rules, and regulations—such as freedom of speech—are inadequate by themselves to foster creative democracy. Envisioning a desired future becomes more pragmatic when one accounts for the expectations and feasibility of achieving that future (Dewey, 1946). It is essential for researchers to examine processes that enhance efficacy and higher-order empowerment, particularly those that facilitate the widespread adoption of experimental actions, critical reflection, and articulation, which can be actualized through collective intelligence.

One potential contribution of integrating design and systems thinking is its effectiveness as a powerful discursive inquiry tool this includes its appropriateness for critical thinking. Jonas conceptualized this approach as a process of negotiating options and evaluating the utility of design inquiry in generating knowledge about possible and desirable future states (Jonas, 2018). He emphasized that design thinking is not solely about setting goals, but also about maintaining flexibility and keeping options open. Theoretically, the integration of design and systems competencies offers significant advantages in advancing the concept of social intelligence, extending beyond the mere framing of narrative structures to the facilitation of dialogue and discussions with key stakeholders.

The design methodology, when applied with its higher fidelity, effectively establishes the prerequisites for collective intelligence, continuous learning, and empowerment. The integration of innovative methods and processes—those that have not been previously validated and, therefore, demand further empirical testing—plays a pivotal role in fostering systemic adaptation (Jones, 2014). The creation of communal spaces, albeit within simulated environments, progressively advanced the adoption of method, facilitated the construction of dialogue, and catalyzed the

emergence of critical discourse. With humility, I posit that, in alignment with a pragmatic vision of democracy, the prerequisites for collective intelligence have been effectively embodied in the core components of the DDC method: creativity, interaction, diversity, and sensitivity (for the principle of action, see 1.5). Through this research it becomes evident that engaging with conflicting actors is vital for forming more sustainable alliances (1.5). I contend that the mediatory framework, along with action-oriented tools, demonstrates the applicability of the DDC method, theory, and applications for social experimentation.

Context: free of association: There is considerable variation in the perception of constitutive elements and characteristics of complex systems. Callon, example, observed that sociologists often interpret the complexity of social systems using concepts such as norms, classes, and structures (Callon, 1984). For many, both deductive (analyzing society through divisions) and inductive approaches (adhering to norms) are considered primary methods for constructing and understanding these inherent complexities (Jonas, 2018). This recognition is also evident in design and systems literature, particularly when examining systems in transition across various levels of abstraction (micro, meso, and macro). For example, the development of transition design by Tonkinwise and Irwin (2015) introduces the concept of holarchy in the natural world and its application to various levels within real-life systems, referred to as "domains of everyday life." Similarly, Geels and Schot's (2010) model proposes a transition approach using a layered structure to explain the "socio-technical systems multilevel perspective," which encompasses niche (micro), regime (meso), and landscape (macro) levels. While employing a hierarchical approach—from niche to regime and landscape, and ultimately to broader system-level cooperation—appears essential for scaling processes and implementing bottom-up interventions, such models alone are insufficient for fully capturing the complexity of social systems.

This consideration is particularly crucial when addressing questions such as "where (in terms of culture) does this transition occur?" and "For whom

(in terms of individuals) must it be adapted, given the specific context of power? In other words, when pursuing interdisciplinary research, it is crucial to move beyond static notions of power structures, legitimacy, and relationships, as these concepts are inadequate for capturing the fluidity of social dynamics, especially in times of high uncertainty and crises (DiSalvo, 2009). Scholars engaged in Actor-Network Theory (ANT) suggest that dependencies and networks provide foundational frameworks for understanding systems (Tureta et al., 2021). ANT scholars argue that much like other complex systems in the natural world, human societies are inherently complex and uncertain (Callon, 1984). Thus, complex systems must be examined through the lens of contextual factors, wherein both human and non-human entities—whether social, natural, or technological—are interconnected within a temporal, dynamic, or relational context.

In this PhD, I demonstrated that understanding systems in a contextual and relational manner is crucial and fundamentally distinct from symmetrical approaches. While many studies concentrate on addressing the consequences of issues or the linear dynamics within systems—such as those explored in transition studies (Geels, 2011; Kossoff et al., 2015)—a pragmatic approach to social systems requires a deeper commitment to uncovering and understanding the root causes of public issues.

To address these challenges, it is important to not only focus on outcomes but also mobilize resources to investigate their underlying causes (Avelino & Wittmayer, 2016). This PhD research contributes by emphasizing the dynamic interplay between power, discourse, and the positionality of those involved. While no model, tool, or framework can completely capture the complexities of social systems, creating opportunities for intervention within and among communities can greatly enhance the potential for achieving planned change (Dewey, 1946; Dixon, 2020). The key insight here is that while forming networks of allies may not, and perhaps should not, eliminate conflicts, it can foster conditions for engagement and action by uncovering the barriers and fears associated

with conflicts between agents. As Dewey suggests in his vision of democracy, the aim should not be to isolate individuals from conflict, but rather to minimize rigid divisions and reduce sources of separation, allowing the community to function as a connected network.
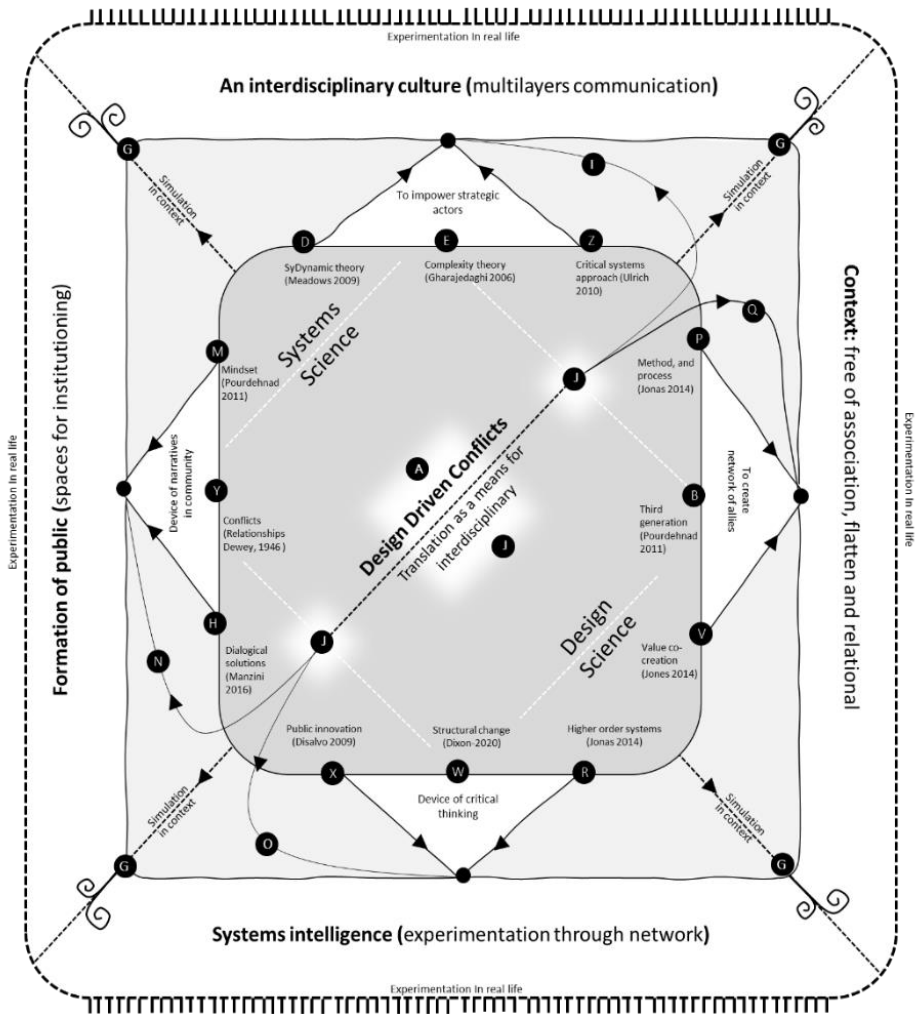
Figure 25 weaves a 'carpet' of contributions from the key elements of Design Driven Conflicts. This framework exemplifies the contribution of this research at the intersection of design and systems science. The internal components of the framework have been adapted from the introduction phase to connect the initial elements of this research with its four overarching contributions to science: the practical usefulness of this research for the formation of publics, the development of systems intelligence, the facilitation of free association, and the introduction of an interdisciplinary language.

In this research, conceptualizing community as a network—and vice versa—highlights the benefits of alliances and the importance of a pragmatic approach to public engagement. By reframing the negative aspects of conflict, such as ideologies, jealousy, fear, and suspicion, the 'public and its issues' can be turned into opportunities for progress and justice. The design-driven conflicts model demonstrates how progressive values can be scaled up through creative mechanisms, as well as intellectual and artistic contributions. To effectively bridge the disciplines of design and systems science, it is essential to move beyond traditional approaches that merely address complexity from the observer's perspective, or by reducing it to a rational order.

6.4.1 Contribution to Systemic Design

Recent advancements in design science, commonly referred to as the third generation (Pourdehnad et al., 2011), have witnessed a significant shift from viewing stakeholders solely as end users to acknowledging their active role in different phases of design projects. This evolution, coupled with the growing need to devise strategies for addressing complex problems, necessitates methodological contribution within a greater culture of design thinking and research (Jonas, 2018; Papalambros, 2015). A methodological shift requires new advancements in the narrative of design science, moving from a human-centered paradigm to a broader focus on innovation within and across multi-actor and multi-agent systems (Bijl-Brouwer & Malcolm, 2020). The introductory section of this thesis emphasized that a systemic design framework can ideally facilitate this transition by introducing novel approaches, methods, and tools for stakeholder engagement. A new approach must address both the specific requirements of design processes and critical system narratives to enhance competencies and optimize the relevance of design innovation in public and societal contexts (Bijl-brouwer, 2022). This requires research to engage key stakeholders, understand power dynamics, and amplify the voices of marginalized actors to create strategic spaces for innovation and action (Ulrich & Reynolds, 2010). Evidence from the literature (3.4), design

practice (4.2), and applications suggests (5.4) that engagement and network construction are essential prerequisites for effective action (Dixon, 2020). A systemic design framework should facilitate effective collaboration between designers and diverse stakeholders to create a situation for deeper analyze, and thus level the likelihood of successful network construction (Venturini et al., 2015). A primary contribution of this research is the development of methods and processes for the strategic framing of boundary objects, which serve to align diverse interests among actors and harmonize experiences. Additionally, it aligns with the foundational interests of practitioners who employ design and systems thinking to address complex contemporary challenges (see Section 3.4). Thus, in contrast to human-centric design approaches, which typically concentrate solely on either the designers or users of the system, the Design-Driven Change (DDC) framework significantly broadens the range and diversity of stakeholders involved in the design process. Furthermore, consistent with recent advancements in science and technology, this research incorporated a recent iteration of an artificial intelligence chatbot (ChatGPT) as a co-creative agent tailored to the specific needs of design process workshops. This integration proved particularly advantageous for validating design methods and generating narrative ideas, thereby facilitating dialogical processes within a simulated social context. These narratives served as a valuable and streamlined foundation during the design process, playing a crucial role in assessing the effectiveness of dialogical solutions and mechanisms. In summary, this PhD research, along with its primary contribution—the Design-Driven Change (DDC) method—can be conceptualized as a boundary object ecology. This approach incorporates a diverse array of artifacts, action verbs, and questions, which function as rational elements operating at various levels of abstraction, change, and continuity. These elements collectively constitute a knowledge exchange system that facilitates targeted dialogue and communication among stakeholders in systemic design projects. The depth of interactions observed during collaborative sessions, in conjunction with insights from the literature and expert analysis,

underscores the potential of this approach to create actionable scenarios where new values sets emerge through strategic alliances i.e., see section 1.2, the challenge of applicability. This approach meets the theoretical needs of design science by harnessing the informative aspects of interdisciplinary culture, particularly through a systemic design framework. Concurrently, it provides practical solutions by facilitating broader and more accessible stakeholder engagement in design processes. This contribution addresses the pragmatic needs of those who view design as a 'journey' toward achieving specific experiences and actions.

6.4.2 Contribution to Product Development

Designing a product in isolation, without considering its surrounding environment and culture, is neither feasible nor desirable. Jonas, in his research on systems thinking and design, argued that designerly approaches are crucial for future development, not because designers have superior intelligence, knowledge, or creativity, but because they are trained to act as synthesists. Design culture traditionally adopted a relational mindset that contrasts with linear decision-making processes typically observed in engineering cultures (Gharajedaghi & Ackoff, 1984; P. Jones, 2014). Given the inherent complexity of systems and uncertainties associated with future developments, designers encounter significant challenges. Instead of focusing solely on sequential processes, a design culture requires a progressive and relational approach (Costa et al., 2019). This perspective highlights the importance of integrating deeper systemic aspects into the development of new products and services (Bijl-Brouwer, 2019). Such insights are essential to ensure that designs are appropriately situated within a broader contextual framework, thereby bridging the gap between the theoretical potency of design and its practical usefulness in real-world scenarios (Dorst, 2011). Thus, systemic processes and methods must be integrated across various design disciplines and cultural contexts including the tradition of product design (Mager et al., 2023). Research has consistently demonstrated that systems thinking and scenario building are essential for effective design intervention (Zaidi, 2019). A key contribution

of this study is its methodological suitability for designing higher order systems (P. Jones, 2014, 2018). This research introduces processes and methods that are well suited for analyzing the complexities inherent in real-world situations and systems. Rather than concentrating solely on solution outcomes, the Design-Driven Conflicts (DDC) framework emphasizes the integration of processes that promote synthesis and engagement as a means for enhancing experience and action. This alignment is crucial for developing solutions that are not only outcome-based but also dialogical and process oriented (Christakis, 2014; Manzini, 2016; Ulrich & Reynolds, 2010). No single or one-dimensional approach can adequately address the growing complexities that designers face when intervening in today's world (J. C. Jones, 1992; P. H. Jones, 2013). Therefore, effectively engaging with the systemic matters require a new approach that pragmatically incorporates diverse perspectives and techniques from multiple disciplines. This PhD study represents a significant shift from focusing exclusively on individual product design to emphasizing the development of processes and methods that facilitate collective engagement and network-based interactions. Given this understanding, it can be inferred that the design-driven conflict approach, along with its associated methods and tools, contributes to the design of products and systems not only at a tokenistic level—where there is often a reliance on one-dimensional framing of systems and situations—but also by introducing novel methodologies and approaches. These methodologies, though originating from other disciplinary systems of knowledge, offer synthetic and systemic benefits for design interventions in more complex, multi-agent, and multi-stakeholder systems.

6.5 Originality of DDC

To advance a new design culture, it is essential to conduct research across interdisciplinary domains, drawing insights from the formal, applied, and human sciences (Galle, 2000). No single discipline can fully encompass the scope and diversity of a new design culture. This complexity demands a

high level of abstraction in order to develop advanced theories and methods within the broader context of design science (Kroes, 2002). Previous research has demonstrated that establishing a new culture requires thorough investigation to identify and address specific gaps or missing elements (Dorst, 2011). This process often starts with a concrete problem or specific uncertainty within the design culture (Kroes, 2002). As discussed in Section 1.2, examining the foundational principles of critical systems heuristics is crucial for fostering innovation within higher-order systems (Costa et al. 2019; Jackson 2010; Ulrich and Reynolds 2010). From a holistic perspective, the originality of this PhD research is evident in its contributions to methodological approaches and theoretical frameworks (Nedaei et al., 2022; Nedaei & Jacoby, 2023). This research has adapted the normative aspects of critical systems heuristics to address the specific needs of design science, focusing on a process-oriented culture and innovation in the realm of public systems (see Section 6.5.2).

6.5.1 Theory

In the domain of systems science, certain studies have investigated paradigmatic shifts and utilized the concept of leverage points as a guiding principle for both research and practice (Abson et al., 2017). These studies generally approach systems and problems from two primary perspectives: one that views systems as unified wholes, and another that emphasizes the importance of understanding systems through the lens of epistemological contributions (Abson et al., 2017; Ackoff, 1981). One perspective considers the system as a 'real-world phenomenon,' which can be objectively comprehended as a unified whole. Proponents of this perspective often employ an ontological lens, positing the existence of a singular, unified system, with other components considered as sub-entities or elements of this overarching whole. From this perspective, problems should be analyzed across and between different levels rather than being confined to specific contexts. In contrast, the epistemological perspective emphasizes the importance of understanding knowledge construction, challenging the concept of a unified whole, and instead focusing on strategies tailored to

specific problems (Luhmann, 1995). Advocates of this view argue that planetary systems are fundamentally comprised of various interacting subsystems. Hence, it is more feasible to determine appropriate strategies to foster a desired change rather than merely considering the whole or the multilayer interventions. From this view, to address a problem effectively, one must specifically focus on 'The' appropriate leverage point for intervention. Despite their advantages, both perspectives encounter substantial challenges in producing actionable outcomes, particularly when addressing complex problems in higher-order systems i.e., multiple actors, resources and constrains. As I briefly mentioned in the contributions part, this limitation is evident in fields such as design for sustainability or transition design (Section 6.4), where researchers in sustainability and transition studies often face limitation regarding the framing the key drivers of change and the necessary actions required for deep transformation (Buchel et al., 2022; Loorbach, 2022). These challenges involve determining the appropriate system attributes and their applications, including debates on where and how to devise strategies for maintaining the status quo (vs change it) and the challenge of balancing resilience versus transformability (Walker et al., 2004; Walker & Westley, 2011). Effective stakeholder engagement is crucial for those who advocate for an epistemological perspective. This involves determining how to meaningfully involve key stakeholders and define boundaries to support a bottom-up transition. Theoretically, achieving this requires a nuanced understanding of systemic factors, such as resource allocation, power dynamics, and contextual issues, particularly concerning the situation of marginalized or less visible groups (Kossoff et al., 2015).

Therefore, I propose that in addition to the existing dualities, there is a third perspective (at least) that illuminates the deeper aspects of change and the effective engagement of key actors. By integrating the theoretical framework of the "third culture of inquiry," as proposed by Cross (2011) and Dorst (2015), the concept of design abduction provides an alternative way to understand, and frame the complexity of multi-agent systems. According to Dorst, design abduction seeks to provide insights by offering

the most plausible explanations of complex systems; regardless of their inherent complexity. In the contribution part, focusing on Dewey's pragmatism, I argue that in such a approach—the duality between experience and action—can facilitate a contextual understanding of complex systems. This involves studying phenomena as they naturally unfold and developing frameworks that accurately capture these dynamics. Theoretically, this approach aligns with Dewey vison of pragmatism, which suggests that understanding social systems is best achieved through meaningful experiences and active engagement with the communities that shape complex systems (Dewey, 1946).

Accordingly, drawing from design abduction and supported by systems thinking principles, this approach can create new opportunities for developing methods, planning strategies, and interventions for complex systems. Although this third culture of inquiry does not completely disregard the first and second perspectives, it introduces new possibilities for integrating various theories and methods tailored specifically to the needs of complex systems; actors, relations and institutions. As Dewey once said, "Any idea that helps us move effectively from one part of our experience to another—connecting things satisfactorily, working securely, simplifying, and saving effort—is true for that purpose." Therefore, in this third culture, if one employs the concept of leverage points as a guiding principle, or network construction to enable actionable change—despite potential debates over its epistemic origins—integrating these perspectives, even with structural incompatibilities, can be appropriate as long as it facilitates meaningful and action-oriented interventions. This insight highlights that, from a theoretical standpoint, the main contribution of this research—the DDC approach—can promote effective interventions and collaborative practices (network) among various stakeholders, which in turn deepens the understanding of the system.

6.5.2 Method

Throughout this research, it became evident that the participation of a broader community of actors in the processes of problem framing,

evaluation, and synthesis is essential for effectively assessing progress and informing future scenarios (see narrative structure 5.5.6). The division between action (network) and reflection (dialogue) must be mirrored in the relation to various interlocutors to facilitate problematization and strategic decision-making. By providing a common arena for negotiating understanding of purpose, roles, and positions, stakeholders are empowered to take collective action as a network, create trust through translation, and establish a framework for shaping future scenarios (5.6). From a methodological standpoint, the originality of the DDC method lies in its transformative approach, which introduces a translational framework for establishing preconditions for normative change in self-organized systems. By enabling a more precise examination of system components, power relations, resources, and imbalances, the DDC method facilitates the translation of conflicting interests among key actors, thereby creating a communal environment akin to a collaborative network. At a higher level of abstraction, this approach challenges the conventional mindset common in popular versions of design science, which often relies on the polarization of relationships and views diversity merely as a byproduct of designing for complexity. This perspective is further supported by pragmatist scholars, who contend that the ability to transform deeply ingrained assumptions is rooted in interactions and relationships between social agents (Dewey, 1946; Dixon, 2020; Venturini et al., 2015). Unlike other methods that conceptualize the organizational, social, and political dimensions of social conflicts, this systemic design approach focuses primarily on enhancing design skills, tools, and process development (see 1.5). The originality of this approach lies in the use of antagonistic actors as a key drivers of a design instrument for navigating the complex and challenging processes of deep structural change. In this context, 'design-driven design' can be seen as an alternative to 'conflict-driven design,' emphasizing that design creativity should be the primary catalyst for a paradigmatic shift (Chapter Four) rather than destructive aspects of conflicts (Venturini et al., 2015).

Moreover, a key originality of this research at the methodological level lies in the integration of generative AI as a central tool that plays a crucial role in fostering a progressive space for advancing and implementing justice-related initiatives. This generative approach introduces a novel yet methodologically rigorous framework that prioritizes the "how"—understanding conflict as an integral part of social processes—over the "what," which examines conflict within specific social contexts. This method ensures that biases are minimized before the interventions are undertaken. The premise is that, by strategically leveraging AI, the DDC method enhances both the applicability and ethical dimensions of systemic design. This approach enables simulation, change, and adaptation while accounting for limitations, such as varying literacy levels, access to resources, and the diverse roles of actors within decision-making structures. A clear example from recent experiments demonstrated that participants from diverse cultural and geographical backgrounds—including two from Belgium, one from South Africa, one from Nigeria, one from Iran, and one from Lithuania—were able to engage in meaningful discussions despite their varying levels of experience, expertise, and familiarity with the subject matter (5.6). The use of AI to integrate these diverse perspectives not only enriched the conversation, but also made the systemic design method more accessible.

Accordingly, the integration of generative AI with creative methods, such as narrative structures, provides a comprehensive framework for understanding and analyzing the complexities, relationships, and dependencies within complex social contexts, especially in relation to power dynamics. While the latter was examined within a simulated context, this research demonstrated that, from a methodological perspective, a more familiar image of systems can be modeled and visualized through the use of scripts, scenarios and narratives. This latter, narrative structure allows individuals with a lay understanding of network processes to discern relationships, including both positive and negative feedback loops (Grogan, 2021). The emerging methods, tools, and practices developed through this research—particularly the introduction of a novel

approach to simulations—hold significant potential for advancing both design methodologies and design research.

6.6 Future Directions

6.6.1 Theoretical Level

- Plus Conflicts

During the exploration phase, it became evident that conflicts in social systems act as normative catalysts, but they are not the sole determinants. The creation of alternative realities independent of contradictory voices requires internal and external motives, opening positive avenues for exploration. In other words, additional factors likely play a role in mindset changes. Future research should examine other mechanisms, such as individual curiosity, defined as the ability to ask questions, self-efficacy, and other triggers that may positively affect social empowerment (Desmond et al., 2019). In this research, conflict is introduced as a necessary stimulus for changes in resource distribution, reflective practices, and ideally, mindset transformation. Theoretically speaking, alternative triggers and system attributes may also foster social learning and mindset changes within systems (behaviors and social practices). These triggers can modulate the exertion of positive (versus negative) energy or effort necessary for change, which we have explored based on controversies.

- Translation

The integration of design and a translation approach is essential for aligning design methods with the fundamental principles of critical systems thinking such as dialogical processes. One could argue that the formidable task of envisioning the future demands both a creative mindset (design) and systemic approach. As discussed in this research, the role of the design process as a translational approach has been investigated in previous studies (Seravalli & Witmer, 2021; Simeone, 2016). The primary motivation behind this integration is to leverage the creative capabilities of

design to establish new connections among key stakeholders. In this research, I introduced a different role for translation, emphasizing its function as a mediator in creating dialogical solutions. Diverse forms of boundary objects require structured approaches to bridge different realities. This study explores how these items are utilized as tools and what is necessary for them to facilitate higher-order dialogue. While this exploration was based on Callon's idea of the sociology of translation, it focused only on one iteration: problematization. However, an in-depth analysis of the enrollment and mobilization steps within the translation framework is also necessary. Such analysis could reveal new possibilities for scaling up processes and experimentation.

6.6.2 Design Method

- Coalition vs alliance

In the third iteration of the method, it became evident that the outcomes of problematization including temporary agreement between actors to experience a situation detour, may only result in temporary alignments or coalitions. To enhance the outcomes of the translation process, similar to the need to scale up, it is crucial to understand how to leverage coalition agreements to form lasting alliances. This presents a methodological challenge, requiring a shift from reflective to reflexive practices and the creation of contexts for deeper dialogue and discussion. In the Quest for Simulation, I sought to address these issues by focusing on scaling up the narrative of the context. However, further investigation is needed, particularly in establishing durable networks (strengthening new relationships) and exploring the role of facilitators in fostering these alliances. One suggestion for future research is to examine how design research and practice can support the implementation of dialogical processes and solutions, including opportunities for engagement through creative processes in communal spaces.

- Design oriented vs Systems oriented

To highlight the advantages of DDC as a systemic design method, I previously compared its usefulness with approaches that have ontological (single system) or epistemic (subsystems) biases. The DDC may differ from conventional systems and transition studies, which often require considering multiple layers and structures in a predefined order. This classification is open to debate and can offer valuable insights for future research and education. Earlier, I discussed how deploying a design method in relation to the contextual elements of systems can enhance its pragmatic aspects, particularly when it comes to interventions at the public level. This requires an exploration of positionalities, power relations, and institutions that go beyond any fixed models or frames of reference (DiSalvo, 2009; Dixon, 2020; Tureta et al., 2021). This network-oriented approach is arguably still in the process of being fully established within the evolving design culture, such as systemic design. While contextual framing is crucial in the 'understanding' phase of design inquiry, particularly in product-service systems design, examining context through the lenses of power relations and normative aspects can create more structural opportunities for driving (or better to say institution) higher order innovation. This approach helps avoid the pitfalls of a tokenistic culture, which is often seen in practices that adopt a synthetic lens i.e., without addressing the root causes of problems (Mager et al., 2023). Researchers, such as Jonas (2018), argue that while the designer's mindset is inherently systemic, it has not yet been fully realized in practice. In the introduction, I also raised a similar concern about the ambiguity that young designers may face when using appropriate methods to address the normative aspects of a context.

A potential solution is to integrate the procedural aspects of the DDC approach into education's subsystems or through informal practices for young designers, such as hubs, communities, design competitions, talks and campaigns. Drawing from Dewey's vision of education, Dixon emphasizes the importance of incorporating higher-order thinking (e.g., critical or reflective) into the fabric of design education, fostering a 'voluntary disposition and interest,' such as engaging design students in

political discussions or articulation (see p. 140, Making Things Better). Similarly, I argue that adapting the DDC method as a pedagogical tool—regardless of its level of abstraction—could facilitate the integration of unfamiliar yet pertinent narratives into the daily discourse of a design culture. This integration would be most effective if supported by relevant design systems and associations willing to include these elements in the core narrative of the institution. However, a more practical solution might involve embedding such a culture within the closed-design curriculum, rather than treating it as a separate course or module. One way to achieve this is by integrating it into existing projects and events, allowing students to engage with relevant concepts in practice, such as power dynamics, or by incorporating it into the co-creation phase of systemic design projects.

- Translation in action

In the quest for simulation, it was evident that employing the design method prompted participants to make effective changes to key elements of a problematic context such as relationships. Despite the limited time available for collaborative sessions, especially during the translation phase, participants were able to identify key elements for setting a new direction, often centering on rewarding aspects, common denominators, and boundary objects. However, it is crucial to note that DDC is still in its developmental stage. it is necessary to have further iterations to facilitate experimentation and thereby receive more rigorous evaluation in action. Improvements are needed in the areas of mobilization and enrollment during the translation phase. Furthermore, certain components, such as boundary objects, must be more process-oriented, as they remain complex and require further refinement. One crucial future direction could be the introduction of an intermediate step between the translation phase and the narrative structure, or between the actors' journey and translation. Currently, this process is relatively lengthy, even without the inclusion of device enrollment and mobilization. Thus, it is highly recommended to

subdivide a certain phase of this approach into more manageable parts to enhance efficiency and effectiveness.

6.6.3 Application

- Places, situations and scales

The current use of the Design-Driven Conflicts (DDC) method is largely confined to simulations. To achieve broader adoption and experimentation, it is essential to expand the dialogical aspects of the DDC method to include larger-scale communities in the design process. The analysis indicates that problematization is particularly effective for design research and innovation in a smaller scale social system. Nonetheless, it is imperative to refine the user-friendliness of this method, particularly its interactive aspects, to enhance its applicability to policymakers and social practitioners (e.g., activities or community care givers). Moreover, these improvements could make the method more accessible to design facilitators and students. Further advancements in aesthetic and usability aspects as well as efforts to simplify complex content could broaden the user base and foster the development of a larger community of practice. This, in turn, encourages ongoing reflection and continual enhancement in subsequent iterations of the method.

- The neighbors, others and strangers

Furthermore, enhancing the method's applicability across various value systems is crucial. This enhancement can be achieved by employing historical, cultural, or social lenses in societies and systems where concepts such as time, relationships, institutions, and power hold distinct meanings and structures. A thorough understanding of how historical events have influenced the emergence of current problems and reshaped relational patterns, especially in smaller societies such as indigenous and nomadic communities, is essential. This deeper insight can inform the design process, ensuring that solutions are culturally sensitive and contextually

appropriate. The adaptive strategies employed by various cultures, shaped by geographical factors, provide critical insights into crafting new narratives and enhancing simulation processes in systemic design. Referencing John Dewey's discourse on democracy, his emphasis on the role of cross-cultural exchanges is pertinent. Dewey articulates, "It is said, and truly, that for the world's peace, it is necessary to understand the peoples of foreign lands. How well do we understand our next-door neighbors? It has also been said that if a man loves not his fellow man whom he has seen, he cannot love the God whom he has not seen." This statement reinforces the need for a comprehensive understanding of diverse culture, systems and realities to effectively navigate both global and localized challenges. I emphasize the importance of integrating this understanding into the design of inclusive and responsive systems, methods, and strategies, including the Design-Driven Conflicts (DDC) approach. This integration is crucial for ensuring that social systems are effectively tailored to the diverse needs of the communities they serve. Applying the DDC approach to policy frameworks at a broader international level—not just in forming publics and institutions—requires deep cultural sensitivity to different value systems. Although such cultural sensitivity is often rare (as it depends on the facilitator's awareness of diverse contexts), I believe these challenges can be addressed by focusing on community level interventions. Therefore, it is essential to conduct additional iterations of the method under various settings, particularly during the early stages of exploration.

- Ideology, Bias, and Prejudice

In the context of framing dialogical solutions for conflict construction, the central challenge lies in managing the dynamics between oppressors and challengers, which requires significant effort to create conditions conducive to negotiation and the establishment of new interaction pathways (or points of passage). However, as highlighted in Section 5.3.6, despite the narrative structure's intention to generate content and sustain

these coalitions, a persistent challenge remains: individuals may overlook the underlying causes of dissonance and lose sight of the core purpose of network construction i.e., which is experiencing a situation of wholeness. When the meaning or rationale behind a network weakens and the commitment to community building declines, individual alliances may face significant challenges. One approach is to design a communal space that encourages actors to find common ground for interaction. Evidence from the literature suggests that real-life situations inherently carry the risk of dissonance, allowing shifts that could enable oppressive powers to regain dominance (or previously oppressed groups to rise to power) (Avelino & Rotmans, 2009; Hensmans, 2000). Therefore, when constructing networks, it is crucial to reinforce the ongoing process of adjustment among different institutions, realities, and mindsets, while maintaining a broad and inclusive perspective. A network should not reinforce any particular ideology, nor should it become a mechanism for cultivating a rigid mindset. Instead, it should facilitate dynamic interactions and adaptability, ensuring that it remains open to diverse perspectives and is responsive to evolving circumstances. This approach helps prevent the entrenchment of any single viewpoint, thereby promoting a more flexible and resilient approach toward network construction. Failure to maintain a dynamic approach in network construction can result in significant issues, such as secrecy, prejudice, bias, and misrepresentation, which may ultimately precipitate the collapse of these networks.

In recent decades, developments in other disciplines, particularly the social sciences, have significantly influenced the design sciences, leading to the increased prominence of emancipatory discourses such as sustainability, marginalized narratives, decolonization, gender equality, and intersectionality within the field (Carey, 2024; Ceschin, 2014; Forlano, 2017; Gertz & Ozkaramanli, 2024). While the pragmatic and epistemic contributions of narratives and practices associated with these discourses are undoubtedly valuable, there is a risk that systems and organizations utilizing these cultural frameworks (as ideological tools) may unintentionally perpetuate another cycle of rigid mindsets. Even those

with emancipatory or progressive intentions may end up reproducing the very issues they seek to address. Here, I will refer to Öcalan's critique within the context of the "truth revolution" discourse. He expressed concern that many emancipatory ideologies, despite gaining popularity within positivist academic systems, failed to genuinely oppose capitalist modernity. Instead, they often function as both victims and enforcers of this system. According to Öcalan, if leftist, feminist, ecological, and cultural movements are sincere in opposition to capitalist modernity, they must approach the quest for truth from a critical lens. Hence, this struggle must be comprehensive, addressing all areas of life, including municipal, environmental, and economic spheres, and extending across the local, regional, national, and transnational levels. He argues that without a thorough comprehension of the lived experiences and struggles of the early followers of these ideologies, the search for truth cannot be effectively realized. Based on my analysis of the literature, I conclude that failing to recognize the interconnected and context-specific nature of any narrative risks perpetuating the original problems like exclusion, dominance, and oppression—issues these discourses aim to counteract. Hence, as long as ideology persists—regardless of its inherent validity—it cannot provide a foundation for the sustainable construction of a network. Therefore, to sustain alliances over time, it is crucial to cultivate—or even replace—critical thinking within these systems and to continuously monitor progress and learning outcomes. This approach should be prioritized over the mobilization of resources and efforts that serve only a single dimension or interest. Only individuals equipped with the ability to critically analyze and "zoom out" to reflect on their own perspectives can effectively navigate these complexities and address the actual root of problems. As John Dewey observed, the belief that intelligence is solely a personal endowment or achievement represents a significant conceit among intellectuals, much like the commercial class, which often perceives wealth as something personally produced and possessed. This rigid mindset, which may inadvertently position individuals within hierarchical structures, can obscure broader societal forces that profoundly shape one's situation and

outcomes. Thus, it is essential to invest in strategies that reinforce and popularize critical thinking, thereby immunizing systems and communities against the dangers of one-dimensional thinking, ideological rigidity, and the potential entrenchment of miss use of power dynamics.

6.7 Elephant model: 'research in the dark room'

A deeper understanding of any entity or event requires an integrated systems approach that considers the whole—the environment in which the system operates. If we frame this research as a system, the world in which it operates consists of a complex web of hypotheses, questions, and events, each presented at different levels of abstraction. In this final chapter, my aim is to present the core findings of this research and reflect on what has been discussed earlier, emphasizing the significance of this work and exploring its potential applications in the design and related disciplines. Despite this final cycle of iteration and my sincere efforts to demonstrate the applicability of the DDC as a pragmatic approach, two things became clear: first, the limitations of using a single, one-dimensional lens to fully grasp the intricacies of a complex event, including the gap I sought to address; and second, the necessity of viewing the cumulative results of this research as an integrated whole, rather than focusing on individual parts or chapters in isolation. Rumi, in his Masnavi-ye-Ma'navi, illustrates this idea through the story of the blind men trying to understand an object in a dark room: the elephant. Each man perceives only a part of the object, which leads to incomplete conclusions and eventual disagreement, all due to their inability to grasp the whole. This parable highlights an ontological challenge that can arise in longitudinal research such as a PhD study. Despite the use of various methods and practices, including purely epistemic yet systemic approaches, there are inherent limitations in fully understanding the root causes of complex issues. Any inquiry, including design research, is subject to individual interpretation, which limits one's ability to fully consider other perspectives. In other words, evaluating the truth of a complex inquiry requires a twofold effort: the researcher must

connect the parts to reveal the whole, while the observer must understand this truth within a broader context and its relevance. The parable of the dark room offers valuable insights into the limitations of one dimensional dialect; nature of truth, and need for a deeper understanding that embraces broader perspectives of the same object. Rumi used this story to emphasize the importance of recognizing the limits of one's own perception and the necessity of viewing the full context to avoid missing other truths or overlooking the bigger picture. He famously said, 'If each had a candle and they went in together, the differences would disappear.' In this research, the genuine effort was to design that candle—or illustrate the process of weaving the rug—to help peers in interdisciplinary fields such as design and systems science equip themselves with the tools needed to perceive the object in a dark room: design and systems science. During each cycle of this research, I aimed to illuminate a specific corner of the dark room. The

Figure 26 Research in the Dark Room

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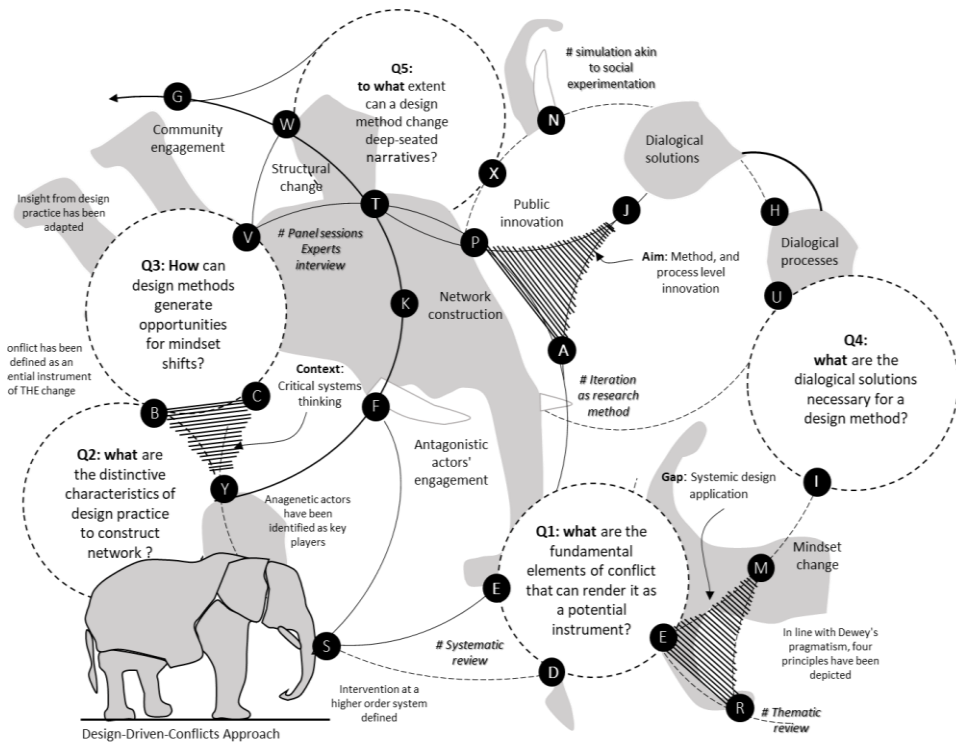
goal was to advance the method, and therefore, the elements that contributed to the development of this 'candle' should be understood beyond the confines of individual interpretation. A more meaningful conclusion would move beyond a singular experience of the dark room, adopting a relational understanding that views the entire outcome—the candle and its light—as the culmination of the research process, reflecting the power that enabled this progressive change, and the ability to see the whole picture: the elephant (see figure 26, research in the dark room).

6.8 Personal Reflection

The initial focus of this research was on a different topic than its current format. In its early stages, it was more aligned with the duality of design and cultural sensitivity, such as how to create a situation for sustainability-related awareness or how to design culture-sensitive products that can increase sustainability-related practices at a local level. In spite of these objectives, my first review slightly changed the focus of the research. Soon, I realized that there is a positive loop of sustainability in mainstream sustainability research, which ironically results in the design of products and services that are even less sustainable than in the past. A type of tendency for incremental change related to the issue of path dependency has dominated the field of sustainability and resulted in the design of things to either facilitate or hinder sustainability-related practices.

During this period, the word sustainability (not the culture), had been spread everywhere as a buzzword, and many institutions, researchers, and practitioners intentionally even 'misused' that to support their personal, institutional, commercial, or even political interests. Arguably, one consequence of this superficiality was that the things that were intended to create sustainability in one place often ended with unsustainability in other places. In fact, there was much focus on the individual or institutional aspects of sustainability and less focus on sustainability at the level of society and systems. The former, a change at the level of persons, was not something that I aimed for. I was more interested in creating a new culture

of sustainability, something to change the underlying narratives that I could use for framing a new mindset.

Therefore, soon, I decided to turn the focus of the research from mere research on the duality of design and sustainability at a horizontal level to the use of design for creating a vertical and deep intervention at the level of mindset and the paradigm of systems. Once I delved further into the challenging topic of paradigm shifts, I realized that research on such a topic is not that easy, particularly without a background in such a complex topic. That was exactly the time that some unwritten motivation encouraged me to take that big shot and to keep this research going even on its ultimate abstraction. Besides that, I was also very lucky as this period coincided with the time of the pandemic, which gave me a unique opportunity for an in-depth review of the topic and plenty of time for reflection and elaboration.

Not surprisingly, that period of understanding and reflection helped me to come across a new topic. I was introduced to the notion of conflict and the ideal of the transformation in social systems. That was the moment that I realized how the topic of conflict can complete the puzzle of design for social systems, the triangle of design, systems, and transformation. Hence, this new awareness motivated me to dig further into the topic of conflict and to explore how a designerly intervention could change or utilize the flow of controversies. However, at the beginning of this new inquiry, I experienced again many fluctuations and uncertainties on my way. It was like from every direction that I tried to learn something, it went through even more complexities: a desert and its endless path.

One difficulty I encountered was the fundamental question of how to situate the notion of conflict in my research. For example, should I focus on social conflict or conflict at an organizational scale? So, I struggled a lot with these types of questions and difficulties associated with semantic discussions, new terminologies, and the link to many other research disciplines which all made the framing of design and conflict a challenging task in my research journey. This period of uncertainty continued until the

end of the second year when I had the chance to participate in a research symposium related to systemic design (RSD). That was an opportunity, a (temporary) relief from the uncertainty that I was immersed in. Thanks to the participation in the workshops, dialogues, and lectures, new possibilities opened. That led to the desire to reposition my research within a new culture of designing: systemic design.

Gradually, the scope of the research has changed; it was now more focused toward the intersection of design and systems sciences. In particular, I delved further into the field of systemic design and tried to situate the central aspects of this research, the role of design in social transformation, aligned with this culture of systemic design. I did not limit my exploration to the mere use of literature-based research; I also included experts' opinions and insights, which later led to a more in-depth understanding of my research topic. During that period, I realized that there is a general agreement. While a systemic design approach has been well elaborated at the level of theory, there are still more opportunities for improvement at the method and application levels.

At the beginning of the third year, I tried to synthesize some of my findings to establish a meaningful rationale and to create a clear contribution at the level of design methods. Soon, I realized this also needs to be iterated through dialogue and discussion. I needed to find a community of practice, a group of like-minded people who were capable of offering insights into my early-stage research. This led me to explore an alternative possibility: participating in a systemic design course that offered me those opportunities. Over the course of four months, engaging in reflective discussions, I had the opportunity to gradually build the first draft of the methodology and to disseminate the results in different research environments. These attempts resulted in more in-depth questions and critiques concerning the potential results of the design method, its value, and more importantly, its application potential.

Therefore, while there was a general agreement that the method was appropriate (at least content-wise), I was asked to conduct additional

iterations. For this, I tried to apply a higher-fidelity version of the method in a simpler problematic context, which was indeed a new challenge. At first glance, the ideal of implementing a design method that basically attempts to change the mindset and paradigm of a social system was quite provocative. Luckily, during this time, I was recommended to work on ongoing technological changes, the emergence of artificial intelligence, and the popularization of its recent chatbot. The use of the chatbot as a non-human actor, i.e., someone who was always available to participate, enabled me to generate diverse narratives of the context. The results were very promising, which enabled me to frame an entire 'research' methodology (not the design method) based on it and use this possibility for co-creative sessions and a validation method at the end.

Overall, during the lifetime of this research, in every cycle of reflection, there was also a learning opportunity for me as a researcher. In design for social systems, I realized that the challenging task of creating new alliances and crafting new order out of chaos requires the design of a new culture. A learning paradigm suggests that one should not remain in a duality between form and function. Instead, in design for social systems, both form and function must follow the relations. Therefore, in dealing with crises that encompass contemporary societies, rather than a mere investment in the outcomes, one must invest in the design of the processes creating the possibilities for new connections and relations. Only then, a new order can emerge and a desired future that benefits of a greater community of people. In the last four years, through four research cycles (the quest for understanding, change, creativity and simulation), I tried to accumulate these insights and to implement a design-oriented method with the hope of creating new connectivity and new alliances.

6.9 Journal publications

- **Published papers**

1. *Nedaei M, Jacoby A, Bois, E.D, Design-Driven Conflicts: Exploring the Contribution of Design for Constructing Social Controversies from a Theoretical Standpoint. Societies 2022, 12, 137.*
   https://doi.org/10.3390/soc12050137
2. *Nedaei M, Jacoby A, Design-Driven Conflicts: A Design-Oriented Methodology for Mindset and Paradigm Shifts in Human Social Systems. Systems 2023, 11; 226.*
   https://doi.org/10.3390/systems11050226

- **Submitted papers**

3. *Nedaei M, Jacoby A, Design Driven Conflicts: A Dialogical Toolkit for Systemic Design Projects. Co-Design. Submission date: September 2024.*

4. *Nedaei M, Jacoby A, Design-Driven Conflicts: Measuring the Applicability of a Systemic Design Method. Systemic Practice and Action Research. Submission date September 2024.*

- **Prospective paper**

5. *Nedaei M, Jacoby A, Design Driven Conflicts: An Introduction to Four Principles of a Systemic Design Approach. The Systemic Design Journal. date: December 2024.*

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Succeeding on this challenging, yet rewarding journey would have been impossible without the encouragement and positive advice I frequently received from the outset of this research to its final phase. From the early days, when I was uncertain about how to pursue a PhD, to the challenging yet transformative decisions I faced during and after my time in Canada, I want to first thank **Prof. Dr. Iman Dianat.** His guidance was instrumental in shaping my mindset as an independent researcher, and he emphasized the importance of hard work as a key attribute of a successful design researcher. I also wish to extend my heartfelt gratitude to my former supervisor and mentor, **Prof. Dr. Saeed Mansour**, and **Dr. Morteza Pourmohammadi**, whose continuous guidance has been invaluable and has greatly impacted the final stages of this research. Additionally, I am deeply thankful to my teaching and research advisors in Canada, including **Dr. Jill Urbanic** and **Prof. Dr. Waguih ElMaraghy**, for their open discussions and guidance, which were essential in helping me make well-informed decisions during key moments.

Among the various departments I have visited over the past few years, I believe my trip to Malmö, Sweden, stands out as the most interesting and productive place. During my time there, I had the opportunity to share my research, connect with others, and gain valuable insights. I am especially grateful to **Prof. Dr. Anna Seravalli** and the researchers at Malmö University's K3 Department for their hospitality, guidance, and the chance to present my work, collaborate, and be inspired by like-minded individuals.

Furthermore, I would like to express my heartfelt gratitude to my colleagues at the University of Utrecht, where I had the privilege of meeting remarkable individuals in both interdisciplinary Social Sciences and Psychology departments. Throughout my transition to a new organizational culture within this truly interdisciplinary environment, my colleagues provided immense support, helping me navigate the challenges of uncertainty, as I awaited the final stages of my PhD. I am particularly grateful to my supervisors, **Prof. Dr. John de Wit, Prof. Dr. Denise de Ridder, and Prof. Dr. Marleen Gillebaart,** and **Prof. Dr. Marijn Stok** for their patience, trust, and guidance. Collaborating with such a brilliant team of scholars has been one of the most invaluable experiences of my academic journey, and I am deeply grateful for the opportunities they offered me, despite the differences in our backgrounds,

methods, and approaches. I am also grateful to my wonderful peers in the department—**Meike, Esmee, Yonn, Sarwesh, Mandy, Lena, Reinoud, and Amarnis**—for their inclusive mindset, and positive attitudes. Although we have not known each other for a long time, I have had many enriching and enjoyable interactions with these exceptional individuals.

It is often said that a person's reality and achievements are deeply connected to those closest to them—family, friends, and loved ones. With this in mind, I wish to express my sincere gratitude to my family, friends, and relatives. To **Arvin, Sina, and Amer**—my cousins and best friends—although often from a distance, thank you for your unwavering support and positive influence. I am especially grateful to my wonderful cousin, **Yassaman**, for her incredible support during challenging times. I truly could not have mustered the resources and values necessary to start and complete this journey without her instrumental help. Also, I want to thank my friends **Borna and Nazanin** for cheering me on, and **Amir, Fardokht, Hammed and Aria** for their support, knowledge, and expertise in improving and finalizing the last stages of this research. Additionally, I would like to express my deep gratitude to my closest friends in Canada, especially to those who now exist only in my dreams and imagination. Special thanks go to **Hamidreza** and his wonderful partner, **Samira**, as well as my amazing roommate and best friend, **Pedram**. You have been the center of many narratives I have crafted over the years, and your influence is undeniable in shaping the core aspects of this research. I wish you all peace and prosperity in your story and universe.

Finally, I extend my deepest gratitude to my family—my **mother**, **grandmothers**, **father**, and **brother**—for their unwavering support, constant love, and kindness.

امیدوارم بتوانم از محبت شما قدردانی کنم و از شما تشکر می‌کنم که همیشه در کنارم هستید.

Thank you for believing in me, encouraging me in every step, and motivating me throughout the various stages of my research. Your support has been invaluable, and I hope to repay at least a small portion of your kindness in one day.

The Dénouement'

<div dir="rtl">

از کفر و ز اسلام برون صحرائیست

ما را به میان آن فضا سودائیست

عارف چو بدان رسید سر را بنهد

نه کفر و نه اسلام و نه آنجا جائیست

</div>

"On the other side of wrongdoing and
right-doing, there is a 'context' where
we can meet"

Divan-i Shams-i Tabrizi- number 157

List of Items

List of tables

List of images

In the following section, I present a variety of co-creative materials and boundary objects—such as cards, models, and templates—used throughout the different phases of this research. Each item corresponds to a specific chapter of the thesis and serves as a foundation for future iterations of the method and practical applications. This includes a collection of creative cards developed in alignment with the objectives outlined in Chapters One, Two, and Three (Creativity). Additionally, the original materials shared with participants during collaborative sessions are provided. This appendix aims to document the content and structure of the tools used in the usability tests. Additionally, I present the original structure of the DDC method, which was shared with the experts during the interviews. Finally, creative items, rich pictures, and visual elements produced during thematic sections from March to September 2020, are included.

Appendix

Appendix
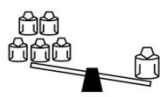
9 — Power Over

Actor with a higher hierarchical status, including control over resources, and the authority to make decisions on behalf of others.

10 — Power More

One with more social, physical, or structural power mobilizes resources better or easier than others.

Power Dimensions

Discourse	
Progress	Justice

Intention	
Differentiate	Equivalence

Capabilities	
Constructive	Destructive

Strategies	
Constitutive	Transformative
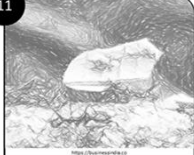
Tactics	
Retrospective	Innovative

11 — Power Different
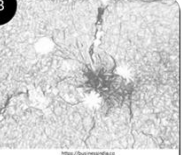
One actor can mobilize one (or more) types of resources differently, giving them a strategic advantage over others.
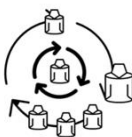
13 — Hopes

Optimistic state of mind, an expectation of positive outcomes looking forward to favorable result
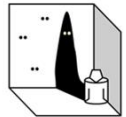
14 — Common sense
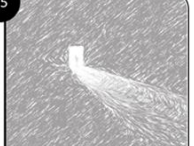
A type of common feeling (desire) for a particular opportunity, or event.

15 — Fears

A form of danger, threat, or attack that one might feel, unsafe, unsure, and insecure about a future.

Forces

Any form of pressure, force, or trigger that pushes one to cross socially defined values such as norms, and ethics.
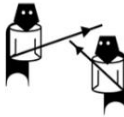
Allies

Actors who offer assistance, advice, protection or any form of friendship including sharing time and resources
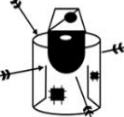
Enemies

Someone (or things) who seeks to injure, overthrow, or confound others, resulting in harmful or deadly action.
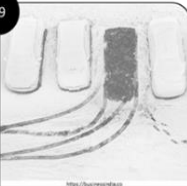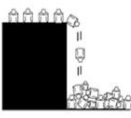
Survival

To live longer or exist after, especially when danger, tension, or any form of hardship occurred.
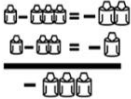
Dead-end

Events, situations, or any form of phenomenon lead to a lack of hope, advancement, and progress.
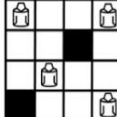
Common Deficiencies

The common shortage or lack of a substance, knowledge, or experience needed to obtain one aims.
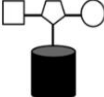
Common Repositories

A place where things are or might be stored valuable for more actors to share.
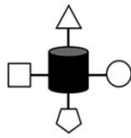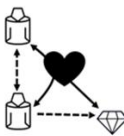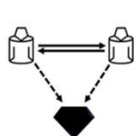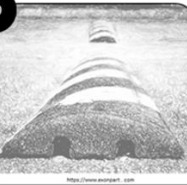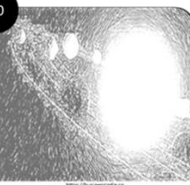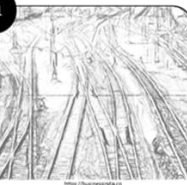
Standardized forms

Something used as a measure, norm, or model, a shared structure, form, or principle (e.g., Language)

Modular objects

Units, forms and objects constructed based on standard elements

Maps

A map, chart, and graph are visual representations used to depict one or more items on a shared visual platform.

Seductive

A compelling stimulus is necessary to guide individuals through the new passage points.

Transaction

Consensus on new passage points can be achieved through the exchange of goods, services, or any form of assets.

Consent

Permission is granted, and one is already inclined to embrace the new passage points with enthusiasm.

Physical

Permission is granted. However, the presence of physical items may alter the route.

The Core Story

The core story has an anchoring system that must be gravitational enugh to attract more audience.

The Storyline

A storyline is based on certain elements, plots, subplots, or genres. Often, a storyline consists of more than a singular story to add depth and perspective.

32 Facing the monster

It refers to a story in which the hero recounts the conflict and triumph.
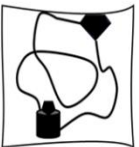
33 Rags to Riches

It refers to a story where the main actor overcomes the obstacles to rise in social status or quality of life.

34 The Quest

The Quest is a narrative archetype in which the hero embarks on a journey to obtain or rescue a treasured object.

35 The Voyage and Return

A story where the hero leaves their ordinary surroundings and experiences a foreign place, prior to returning.

36 Comedy Story

It typically revolves around humorous situations, misunderstandings, or amusing characters, aiming to entertain and evoke laughter from the audience.
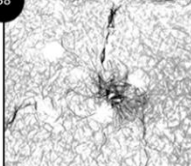
37 Tragedy

A narrative where the main character(s) undergo suffering or negative experiences i.e., downward storyline.
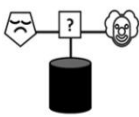
38 Rebirth

Refers to a story where the main character(s) has a physical or metaphorical death or rebirth.
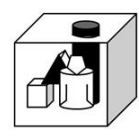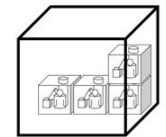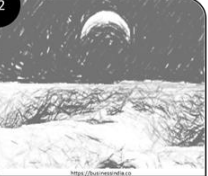
39 The Characters

It serve as relatable connections, linking the audience(s) to the story through enduring emotions e.g., hero, friend, helper, or lover.

The Creatures

40

Creatures-inhabitants are the essential part of each story (animals, mythical, magical, or any beings) without the same level of intelligence compare with the main character.

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The Objects

41

Objects can have a variety of functions from being part of the environment to changing the course of the storyline. They can be a simple prop or stone to a practical object.

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The Space

42

The surroundings environment where the immediate story scene takes place. It can be inside or outside, and it can be vast or confined. The space is closely connected to the storyline.

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The Universe

43

It refers to the universal roles of a story, the framework, or the theme, such as what defines the possibilities in one story (e.g., a magical effect only is possible in a fantasy realm)

https://businessindia.co

1. Template One includes the content of the Resource Cards.

   (1) The Sector Card is an interactive card divided into four sections illustrating the differences between profit and non-profit organizations. Participants are allowed to use this card to distinguish between private and non-profit, as well as community and third-sector organization.

   (2) The Resource Card 'culture' is an interactive card that provides details about diverse forms of cultural resources, including rituals, customs, symbols, historical events, and all elements of material culture that can represent a group of people.

   (3) The Resource Card 'mental' is an interactive card designed to demonstrate various forms of mental resources and their influence on an individual's reasoning, encompassing aspects such as the perception of truth, knowledge, and interpretation of reports or informational objects.

   (4) The Resource Card 'humans' refers to diverse individuals with distinct characteristics inside an organization, such as personnel, members, voters, clients, and fans who actively play a role and influence relationships.

   (5) The Resource Card 'nature' refers to the dominant type of materials or substances that are found in one particular context and that can be utilized by actors for various purposes, from the renewable to non-renewable items.

   (6) The Resource Card 'artifacts' refers to diverse types of devices, infrastructure, tools, or products that have been built, designed, or invented by humans for a particular purpose. These resources are often available for use in any context.

   (7) Resource Card 'monetary': This card pertains to financial assets or wealth that can be readily converted into a medium of exchange, such as cash or other forms of currency. Such resources are essential for maintaining an individual's or an organization's financial well-being and capacity to conduct economic activities..

2- *Template Two includes the content of power relation cards.*

(8) *Power Over is a type of interactive card that displays a situation in which one has a higher hierarchical status than others, which can be manifested in ways of controlling resources or making decisions on behalf of others.*

(9) *Power More refers to the physical, technical, or mental representation of power. For instance, Individuals with greater physical strength can easily mobilize objects than ones with less amount, thus that power can increasing their ability to utilize resources.*

(10) *Power Difference implies a type of power that provides a better strategy: one can operate resources with more efficiency. This can involve access to rare materials, unique synthetics, or technology that place one party ahead of others.*

(11) *Power Dimension used as an interactive card shows diverse elements that influence power dynamics in a problematic situation. In the DDC, these elements include Willingness (progress vs justice), access (differentiation vs equivalence), Capabilities (Constructive vs Destructive), Strategies (constitutive vs transformative), and Tactics (Retrospective vs Futuristic).*

3. *Template Three Includes the content of the Actors' Journey cards.*

(12) *Hope is an interactive card designed to simplify abstract concepts related to hopes, or a particular set of feelings, desires, or expectations that initially encouraged one to play the role of an antagonistic actor.*

(13) *Fear is an interactive card that implies the negative feelings one might experience in contrast to others' desires. These types of fears can include danger, threats, or any situation that causes an unsafe environment.*

(14) *Common sense refers to practical judgment, sound reasoning, and the ability to make sensible decisions. This card is designed to display everyday experiences and the reasoning underlying individuals' judgments, which are widely shared within a broader community of people.*

(15) *Normative Forces refer to the incidents that push individuals to cross their defined boundaries, posing a potential threat to basic values, norms, or desires that can impact one's identity and archetypes: a catalyst for decisive action.*

(16) *Allies is an interactive card designed to showcase diverse forms of friendship and alliances between actors involved in a problematic situation. These alliances may involve people who are unified to protect each other, assist one another, or share diverse forms of resources and competencies in support of their alliances.*

(17) *The Enemies card displays a form of relationship in contrast to alliances, involving actors who pose threats, seek to overthrow, or are in confrontation with others.*

(18) *The Survival card displays a situation or thing that enables one to endure or live longer, especially in a situation where danger, tension, or any form of hardship occurs.*

(19) *The Dead-End card helps actors to depict an event, situation, or phenomenon that causes a lack of hope, power outage, or progress.*

4- Template Four Includes the content of the Problematization cards.

(20) *Maps refer to a specific type of boundary object that effectively describes a situation, creating a common space. A map can provide detailed information about physical features or highlight specific themes in a structured format.*

(21) *Modular Objects display a type of boundary object that can project universal interfaces, connections, or dimensions, enabling items to be easily integrated into different systems or structures.*

(22) *Standard Forms are a type of interactive card that provides possibilities for sharing insights based on widely accepted documents or templates: these can be a common language.*

(23) *The Repository Card displays diverse forms of locations or situations where actors' data, information, or knowledge can be stored or managed: knowledge repositories such as libraries or online locations for storing and managing data.*

(24) *Consent is a form of agreement or permission given by participants to approve a specific direction, behavior, or situation discussed during the translation process. This can involve a voluntary choice, communication, or an informed decision.*

(25) *A physical item represents a type of tangible stimulus, something that can motivate a group of actors to adapt to a new situation. This is closely tied to tangible or observable items, such as competitions or physical challenges.*

(26) *Rewards present types of stimulus that are based on the expectation of receiving a reward or (avoiding punishment). Based on transactional motivation, individuals are driven by the idea of exchange to follow new circumstances.*

(27) *(28) Seductive items represents a type of seductive stimulus, something with a strong pull, possibly appealing to motivations or deep desires, tempting individuals to take action—a temptation that strongly motivates one to embark on the new passage point.*

5- *Template Five displays the content of narrative cards.*

(29) Space Card displays diverse types of environments where the events of a story can take place. This can include physical settings, emotional space, or narrative space, encompassing the timing, and arrangement of events in a particular story.

(30) Universe Card ideally shows the entire fictional world of a story narrative; It encompasses the environment, characters, rules, and all essential elements.

(31) Storyline Card can ideally provide a framework for the narrative structure, guiding the actors through a different parts, creating a meaningful sequence of events: Introduction, Rising Action, Climax, Falling Action, and Resolution (34-40).

(32) Core Story aims to depict the critical elements, items that includes the fundamental plot, themes, and characters; It distinguishes one narrative from another and often leaves a lasting impact on the audience

- Contents Created During Collaborative Sessions

Resource Map- System analysis

Resources	Actors	Dualities
Cultural resources	Fairsound (community rituals), SuenMusic: (feature icons, national symbols, tribal songs, chants), Ali&Brothers (co-worker nurturing culture), MN(tribal dance, community rituals), RientStudio (co-worker support culture, gift-giving culture) MusicAcademy (nurturing culture, monthly rituals)	(1) Ali&Brothers vs RinetStudio, vs Music Academy (employee nurturing culture) (2) MN vs Suen (traditional symbolic elements)
Mental resources	Fairsound (legal framework, data-driven), SuenMusic: (data-driven compensation system, music blogs, technical support to artists), Ali&Brothers (analytical behavioral data, bank of ideas from fans, more than community knowledge), MN(historical driven knowledge, access to traditional rhythms and scripts), RientStudio (music knowledge repository) MusicAcademy (extensive music database)	(3) Music Academy vs MN, vs Ali&Brothers (community-based music database) (4) Fairsound vs Suen (data-driven compensation system e.g. legal framework) (5) Suen vs Rinetstudio (repository of knowledge e.g. technical blogs)
Human resources	Fairsound (community of local artists), SuenMusic: (multiple fans associations, local artists), Ali&Brothers (educated human resources), RientStudio (non-human actors-chatbots and AI supports) MusicAcademy (family community, teacher community, young talents, and students)	(6) Music Academy vs Ali&Brothers vs MN vs Rinet (human or non-human resources e.g., teachers, AI, art students) (7) SuenMusic vs Fairsound (local artists)
Natural resources	Fairsound (strong systemic orientation toward green energy), RientStudio (Use of solar energy in the offices), MN (access to stable weather conditions-summer festivals)	(8) Rinetstudio vs Fairsound (Green energy usage)
Artifacts resources	Fairsound (decentralized app-user experience), SuenMusic: (access to movable cultural heritage-art museum, audiovisual works), RientStudio (rich physical library-archive), MusicAcademy (classic music equipment), MN (vary traditional instruments)	(10) Rinetstudio vs Seun (repository-artifacts to keep it safe) (11) Music Academy vs MN (internally made music instruments)
Monetary resources	Fairsound (revenue from the app, community-fan support), SuenMusic (community-public funds), Ali&Brothers (donation from the community), RientStudio (International donations) MusicAcademy (State budget, family alumni support, revenue from sales), MN (state subsidies, revenue from sales)	(12) MN vs Music Academy (governmental money) (13) Ali&brothers vs RientStudio vs SuenMusic (community-funded) (14) MusicAcademy vs Fairsound vs Suen (community funded)

Power relation map- System analysis

Power relations	Antagonistic Power relations		Forces & Drivers
Power over X over Y	-	Music Academy over MN (govern lobbying)	Covering the expenses, investing on values, nurturing creativity, educating fans and employees, fair payment, limitation of public funds, risk of investment, losing loyalty, legal limitations, fear of being irrelevant, loss of attractiveness, no customer, loss of market share, fans and followers, lobbying, performance-driven mindset, benefit-driven mindset, competitive market, parental forces, alumni, unreliability of political actors, lack of trust, undefined fairness, strict principles and standards, lack of transparency, failure in positive revenue
	-	Fairsound over Suen (data-driven compensation e.g. legal framework)	
	-	Ali&Brothers over Rinetstudio (employee-centered culture)	
	-	Rinetstudio over Ali&Brothers (use of non-human agents)	
Power more X more than Y	-	Music Academy more MN (govern budget)	
	-	MusicAcademy more MN (human resources)	
	-	Fairsound more Ali&Brothers (community funds).	
	-	Ali&Brothers more Rinetstudio (monetary resources)	
Power different X different from Y	-	Music Academy different MN (Classic vs traditional instruments)	
	-	RientStudio different Ali&brothers (human vs non-human)	
	-	Ali&brothers different MN (more than community vs within the community)	

The actors' journey

Actors	Triggers	Rewards objects
Music Academy	**Hope vs fears** : (to share access and progress within the community), (Students become rivals, and we become irrelevant with the emergence of new technology) **Common sense vs forces**: (nurturing a culture of creativity),(the prevalence of a performance-driven culture) **Allies vs Enemies:** (Others can be allies e.g., the industry- alumni), (prospective technologies might be the enemies) **Survival vs dead-end:** (knowledge of lobbying), (If we fail to stay relevant, or If the system collapses)	Becoming the regional hub of the creative industry with a focus on education and knowledge diffusion

MN corporation	**Hope vs fears:** (to involve the community sectors e.g., fans and followers) (the financial uncertainties, moral consequences of new technologies) **Common sense vs forces:** (fair prices) (families are pushing us) **Allies vs Enemies:** (family, fans, and friends) (politicians are not reliable) **Survival vs dead-end:** (subsidies can sometimes help) (losing the loyalty of fans)	Use art to shape a family-oriented culture
Ali&Brothers	**Hope vs fears**: (to cover a portion of the expenses) (losing the market share, losing the validity of data) **Common sense vs forces:** (support the well-being of employees) **Allies vs Enemies:** (our own employee) (no enemies!) **Survival vs dead-end:** (success in the donation) (losing the trust or hope in the community)	Creating social harmony (sustainability culture) through the media of music
Rinetstudio	**Hope vs fears:** (change in money distribution, achieve multichannel relations)(losing the market share, losing the validity of data) **Common sense vs forces (**If one stumbles across a similar network) **Allies vs Enemies: (n**o allies but no Enemies!) **Survival vs dead-end:** (more market share) (some values are only in the surface level)	More market share and more revenue
Fairsound	**Hope vs fears:** (to achieve a "more just system", fair payment) (If the government forces its plan) **Common sense vs forces:** (fair compensation, connecting the fans and artists) **Allies vs Enemies: (t**hose who donate are our allies) (no enemies!) **Survival vs dead-end**: (lobbying on the legal framework) (no change in the legal landscape, Fail to establish a positive revenue)	More fairness and justice but taking to account legal conditions
SuenMuisc	**Hope vs fears**: (monies are limited resources, Legal access for excluded actors) **Common sense vs forces:** (hope to nurture the creativity) (legal frameworks are a threat to creativity) **Allies vs Enemies (d**istribution companies, pirates) **Survival vs dead-end: (**openness when it is needed) (bad laws can end everything)	Bringing fairness to the community between musicians and art lovers

Problematization- Translation phase
(the common denominators)

The common Rewards		The common Triggers	The relational objects
An inclusive-open system, ideal for young actors who can flourish and scale up their talents and desires while maintaining a	**Hope vs fears**: - becoming irrelevant in the age of new technologies - lack of a legal framework when new technologies emerge **Common sense vs forces**:		- designing a type of levy system - an interconnected revenue syste circulating the revenues -expens - mitigating the complexity of leg frameworks, easing the principl standards, and laws.

strong alignment with socially accepted principles that have co-evolved from the past to the present.	- redistribution of the monetary resources - nurturing a culture of creativity **Allies vs enemies:** - the decision-makers, or politicians who are in the power - Fans, families, or followers can be allies **Survival vs dead-end:** - knowledge of lobbying and negotiation - losses of the positions, interests, and relevance	- use of the smart algorithms syst making the current legal framew flexible and context-dependent - advocating controlled anarchy-adjustment in the time to access resources - circulating the curation of musi new learning platform for creati culture.

Narrative platform (a rebirth story)

The layout (storylines)		The core story
- the starting plot - Rise of the storyline - climax of the storyline - fall of the storyline	1. A collective action helps the integration of the new phenomena 2. Use of a co-creative (smart) legal system to ease the adaptation (after the integration) 3. The resources e.g., expenses and incomes become circulated within the new context 4. A controlled anarchy maintains the balances within the context 5. Thanks to the repository of music, a broader community of actors has access to knowledge resources 6. Polarization and the emergence of new conflicts are inevitable 7. Rebirth, new phenomena emerge from new disagreements	- Creativity is the value of the con members wheth incumbents or challengers, fan or art lovers em a culture of creativity.

- The usability tests
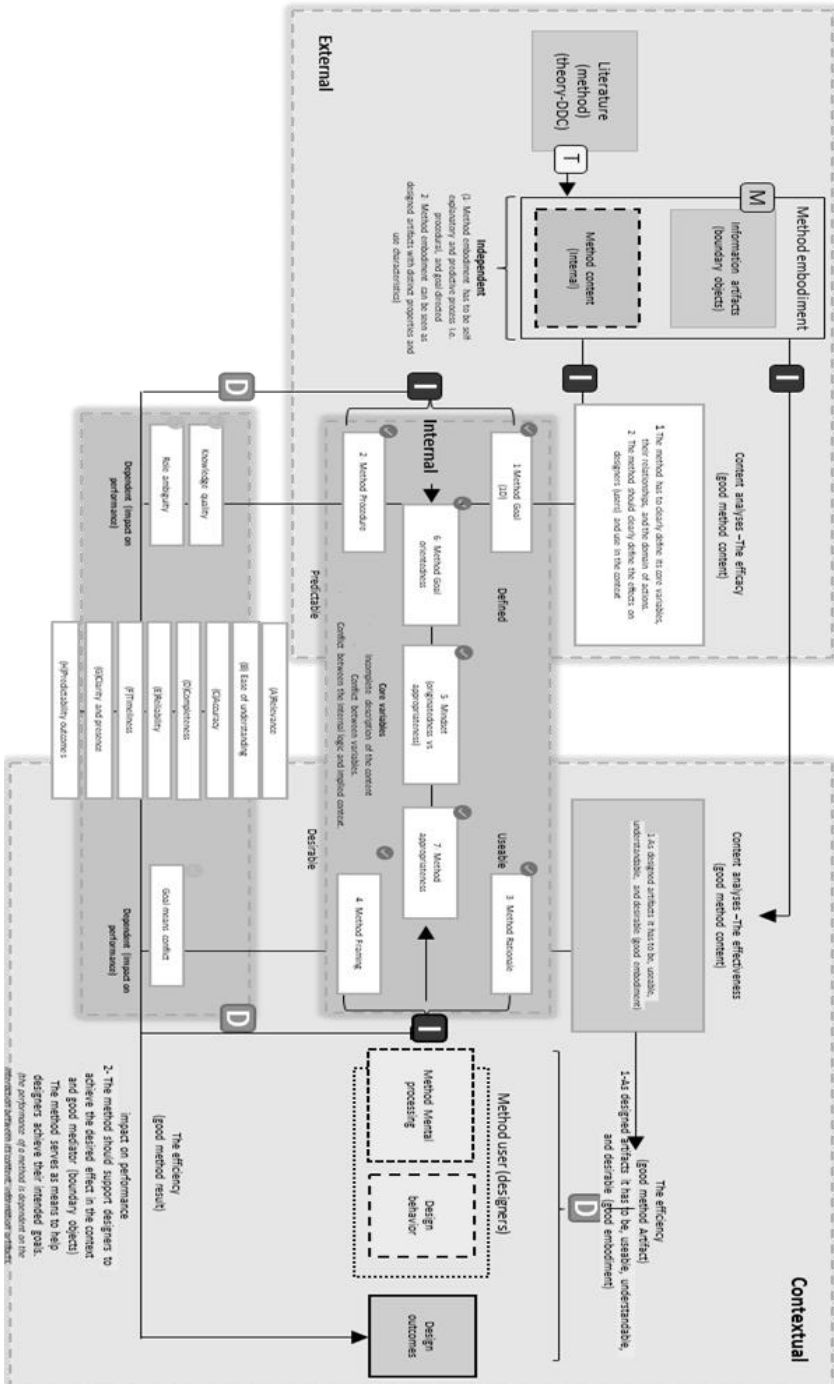
- The design method validation
- Semi-structured interview

Tested item

Usability (SUS)

Refers to the quality of the tool including its appropriateness in relation to the predefined objective of the tool.

Tested item	Relevance						
1. I think that I would like to use this tool frequently	Strongly Disagree	1	2	3	4	5	Strongly Agree
2. I found the tool unnecessarily complex	Strongly Disagree	1	2	3	4	5	Strongly Agree
3. I thought the tool was easy to use	Strongly Disagree	1	2	3	4	5	Strongly Agree
4. I think that I would need the support of a trained designer to be able to use this tool	Strongly Disagree	1	2	3	4	5	Strongly Agree
5. I found the various functions in this tool were well integrated	Strongly Disagree	1	2	3	4	5	Strongly Agree
6. I thought there was too much inconsistency in this tool	Strongly Disagree	1	2	3	4	5	Strongly Agree
7. I would imagine that most of the designers would learn to use this tool very quickly	Strongly Disagree	1	2	3	4	5	Strongly Agree
8. I felt very confident using the tool	Strongly Disagree	1	2	3	4	5	Strongly Agree
9. I needed to learn a lot of things before I could get going with this tool	Strongly Disagree	1	2	3	4	5	Strongly Agree

The survey   Domain: Method Performance

Tested item

Performance (SES)

The tool serves the artifactual quality essential for a design means to help designers achieve their intended goals.

Tested item	Relevance						
1. The goal was communicated properly, and I didn't see the goal and means (tool) conflict.	Strongly Disagree	1	2	3	4	5	Strongly Agree
2. I didn't experience any role ambiguity during and after working with the tool.	Strongly Disagree	1	2	3	4	5	Strongly Agree

To Keep	To get ride of	To improve

- Design Driven Conflicts; the processes and steps

(0) The problem
The process begins with defining actors and actants as well as resources within the context.

The Problem context

Actors

Resources

(1) The analysis phase
The objective is to (a) find the main actors and actants as well as (b) the power relation between them and (c) the way that underlying forces lead to the current situation.

Analyses

Drivers

Antagonistic

(2) The synthesis phase
The objective is to unfold the current narrative of the context and define the commonalities by using the concept of boundary objects ecology.

Synthesis

Commonalities

Core stories

(3) A multilateral translation process
The objective is to create an interactive context to facilitate the translation processes (problematization, interessment, enrolment, mobilization).

Translation

Social learning

Adaptation

(4) The scale-up process
Redefining the narrative of context to facilitate the scaling-up processes in a real-life context.

Scale up

New Value Set

New Paradigm

ANALYSIS

MULTI-ACTOR MAP
(1) actors — (3)actor's sectors

POWER-RELATION MAP
(3) & (2) resources — (4)shared resources / (5)dual Relations

RESOURCE MAP
(4)shared resources / (5)dual Relations — (6)power vacuums / (7)imbalances

POWER-DYNAMIC MAP
(6)power vacuums / (7)imbalances — (8)Antagonistic Relations

POWER-SPILLOVER MAP
(8)Antagonistic Relations — (9) external& internal drivers

(1) actors
(2) resources

(0) Stubborn social problems
such as poverty, crime & violence, unemployment, overpopulation, racism

(8)Antagonistic power relation (APR) map
(9)External and Internal drivers

SYNTHESIS

SYNTHESIS

ACTOR JOURNEY
(9) External and internal drivers — (10) Actors' narratives / (11) The unique core story

BOUNDARY OBJECTS
(10) Actros' narratives
(a) Maps
(b) Modular objects
(c) Standardized forms
(d) Repositories
(e) Common deficiencies
— (12) actors' commonalities

(9)External and Internal drivers
(8)Antagonistic power relation (APR) map

ANALYSIS

(11)The core of stories
(12)Antagonistic actors' Commonalities

TRANSLATION

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- Semi-structured interview

In | Tested item | Relevance

The method contains a steps-wise structure

Predictability

Note: The method structure shows how a method's prescribed procedure can contribute to reaching the design goal.

de | Tested item | Relevance

role ambiguity

(a) The **completeness:** The steps that need to be taken are in complete order.

(b) The **ease of understanding:** the steps are easy to follow.

(c) The **accuracy:** The connection between steps is in an accurate, brief, and concise order.

(d) The **timeliness:** The structure is ordered in a timely way.

(e) The **reliability:** The structure is consistent and trustworthy.

(f) The **predictability:** The sequential relation between each makes the whole process predictable.

The experiment overview | Domain: Method procedure

In | **Tested item** | **Relevance**

The method contains a specific mindset

Note: Method mindset refers to the beliefs and knowledge that method users need to possess in order to use the method effectively.

| Definable | Useable |

de | **Tested item** | **Relevance**

(a) The **completeness:** The method mindset has been explained completely.

(b) The **ease of understanding:** The mindset of the method is not over-complicated.

(c) The **reliability:** The method has a reliable and trustworthy mindset.

(d) The **predictability:** The outcomes are predictable due to the objectives of the mindset.

(e) The **accuracy:** The information about mindset are in an accurate order.

| Goal-means conflict | role ambiguity |

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In Tested item

Relevance

Usable

The method has a clear (underlying) motivation

Note: The objective is to provide justification for the method goal. The reasoning behind the method has a certain logic that supports certain variables within the context.

de Tested item

Relevance

Goal-means conflict

The experiment overview | Domain: Method goal

In Tested item

Relevance

Definable

The method contains a clear goal

Note: Method goal corresponds to how a method can contribute to achieving a (design) goal. The goals can be rather "implicit, precise, explicit, concrete, or something in between".

de Tested item

Relevance

Knowledge quality

In

Tested item

Relevance

The method is applicable in different contexts

Desirable

Note: Method framing refers to the flexibility of the method in relation to the context of usage.
Note: A method has to illuminate which type of situation is ideal to implement. This includes the domain it can be used, the kind of problems/challenges that might occur during the implementation.

de

Tested item

Relevance

Goal-means conflict

(a) The **completeness**: the content clearly explains where and how to place the method in a different context.

(a)The **ease of understanding**: it is easy to understand where and how to use the method.

(b) The **reliability**: independent of the context, the method contents are trustworthy.

(c) The **predictability**: the places, time, and ways to intervene are predictable.

(d) The **timeliness**: independent of the context, this timely to use the method.

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Domain: method orientedness

Tested item | Relevance | Orientedness

A trade-off between the procedure and the prescribed goal.

Note: The orientedness refers to the level of information and the complexity of structure compared with the complexity of prescribed goal.

Domain: method appropriateness

Tested item | Relevance | Appropriateness

A trade-off between frame-flexibility and rationale-consistency.

Note: The appropriateness refers to the flexibility of the method in order to be adjusted in a broader context while the rationale is robust enough to maintain the essential logic.

Domain: discussion

Tested item | Relevance | User-method interaction | The performance

11- (appropriateness and orientedness) discussion on user interaction within the content.

12- (appropriateness and orientedness) user performance within the context.

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- The simulation procedure

(d) To engage in actionable processes that facilitates the transformation of deep assumptions

It acts as an interpretative foundation to aid actors in discussing the pros and cons of an envisioned future. ⟩ DDC facilitates the design of a suitable scenario in which ones can experience a high degree of change: co-creating a new narrative.

(c) To leverage individuals' choices and align their mind-sets with the archetypes they choose to play

Establish a safe, open, and creative environment where actors can openly explore different alternatives, and experiences with minimal risk of confrontation. ⟩ Co-creative materials should enrich the creative atmosphere of a session, promote dialogue by engaging key actors, and empower diverse perspectives.

(b) To provides a clearer understanding of temporal aspects: mapping the dynamics of stories.

A sorting and relational mindset based on normative elements which includes individual stories and collective narratives. ⟩ Using stories as instrument (or input) for collaborative processes enhances the feasibility of potential relationships between actors.

(a) To simulate effectively the problem system and accelerate the participatory sessions.

Preliminary data collection, such as surveys or literature reviews, can provide informative input for identifying the component of the problem system. ⟩ Mapping the actors, scenarios, and resources enhances the sense-making process and allows for focused envisioning of the problematic context.

After the sessions | During the sessions | Before the participatory sessions

Simulation objectives   Participatory process objectives

- The Actors and Archetypes

INDIVIDUAL NARRATIVES

Actor 1 (A1) is a publicly funded company in the music industry. This organization consistently places customer interests at the core of its operations. The primary focus is to provide products and services at a fair price to ensure that a broader community of customers can access the offerings. Additionally, the organization prioritizes human resources, believing that satisfied employees contribute to higher-quality products and increase the chances of producing items at a more affordable price. Maintaining positive relationships with other actors within the market is crucial for this organization, regardless of whether others are considered friends or opponents. However, despite the critical importance of this value for A1, other actors may not find it interesting and, in many cases, see it as a challenge to their growth and success. A1 is actively working to moderate the situation and avoid the risk of unwanted conflicts within the market. It actively seeks new partners and are pleased when it finds new possibilities to bridge with its counterparts. In customer relationships, A1 consistently prioritizes the rights of its customers, ensuring that everyone has equal access to high-quality services. However, challenges arise in interactions with governmental actors because of their frustrating roles and regulations. These challenges make it difficult for A1 to continue receiving funding from open sources, as the government is uncertain about the sources of these resources. Despite these challenges, Actor 1 continues to expand its production and services while considering how to cooperate within the industry, with both proponents and opponents, including governmental bodies.
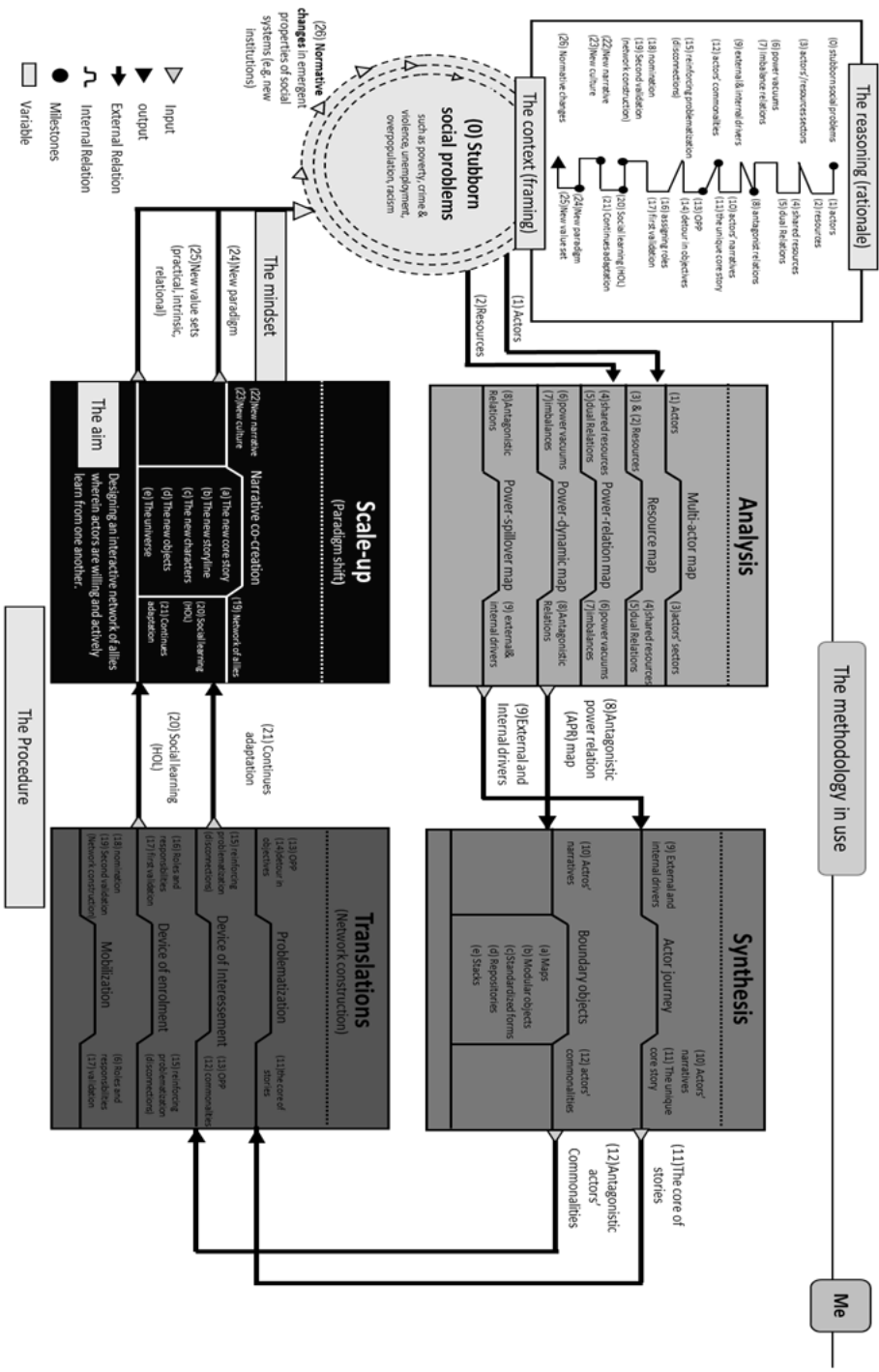
Actor 2 (A2) is a privately funded organization that shares similarities with A1 in its approach towards customers, prioritizing customers as a top consideration. A2 actively invests in products at affordable prices, believing that this fosters an inclusive and accessible marketplace. With a specific mission to cultivate a strong connection between artists and fans by actively creating new media, A2 recognizes the importance of investing in the development of new products, high-tech technologies, and cutting-edge services. It believes that utilizing technological advancements, particularly in providing new services, can create a safe and secure environment for artists and fans. Despite this, A2 remains cautious about the ethical consequences of the new market, such as copyright issues. It understands the need to safeguard the rights of all stakeholders and are committed to devising a robust legal framework that ensures fair and just treatment of artists. Furthermore, A2 adjusts its relationships with other companies realistically, recognizing that the industry comprises both collaborative allies and competitors with differing values. While A2 acknowledges that its strategies may fall short of the desired level of innovation, it responds to these challenges with motivation by learning from the past. A1 aware that not only focusing on technological progress may present limitations but also building an extensive network of actors is a challenging process. If it cannot take advantage of these priorities, it soon faces financial instability. Hence, A2 recognizes the importance of overcoming this hurdle to avoid reaching a dead end and actively seeks strategic partnerships with different parties to secure sustainable financial support

Actor 3 (A3) guided by a significant commitment to serving customers, A3's core values are firmly rooted in the belief that fair prices should form the cornerstones of its organization. As a state-funded entity, A3 is a relatively large corporation that places great importance on cultural resources, recognizing its significance in preserving heritage. A3 invests in these resources, focusing on music products that uphold traditional values, rhythms, and styles. The goal is to bridge the generational gap by bringing together the young and the old through the power of music. In such a competitive landscape, A3 tries to maintain a neutral relationship with the other parties. Throughout these processes, they adhere to its principles and understand that customer loyalty is built on trust. Furthermore, driven by an unwavering belief in progress and success, A3 consistently sought to improve its standing. They measure progress through financial growth and recognize its role in attracting more customers. To do so, maintaining a strong link with governmental bodies is crucial. However, the path ahead is not without challenges, as such corporations often face the risk of losing customers due to its sole focus on sociocultural values. For A3, any increase in subsidies from the government would fuel its progress and provide a situation for significant improvement in its market share. By staying true to its cultural values, A3 inspired young adults and future generations, fostering a sense of identity and connection to its roots. As A3 navigate the path ahead, it also strive to strike a delicate balance between the value progresses and traditions.
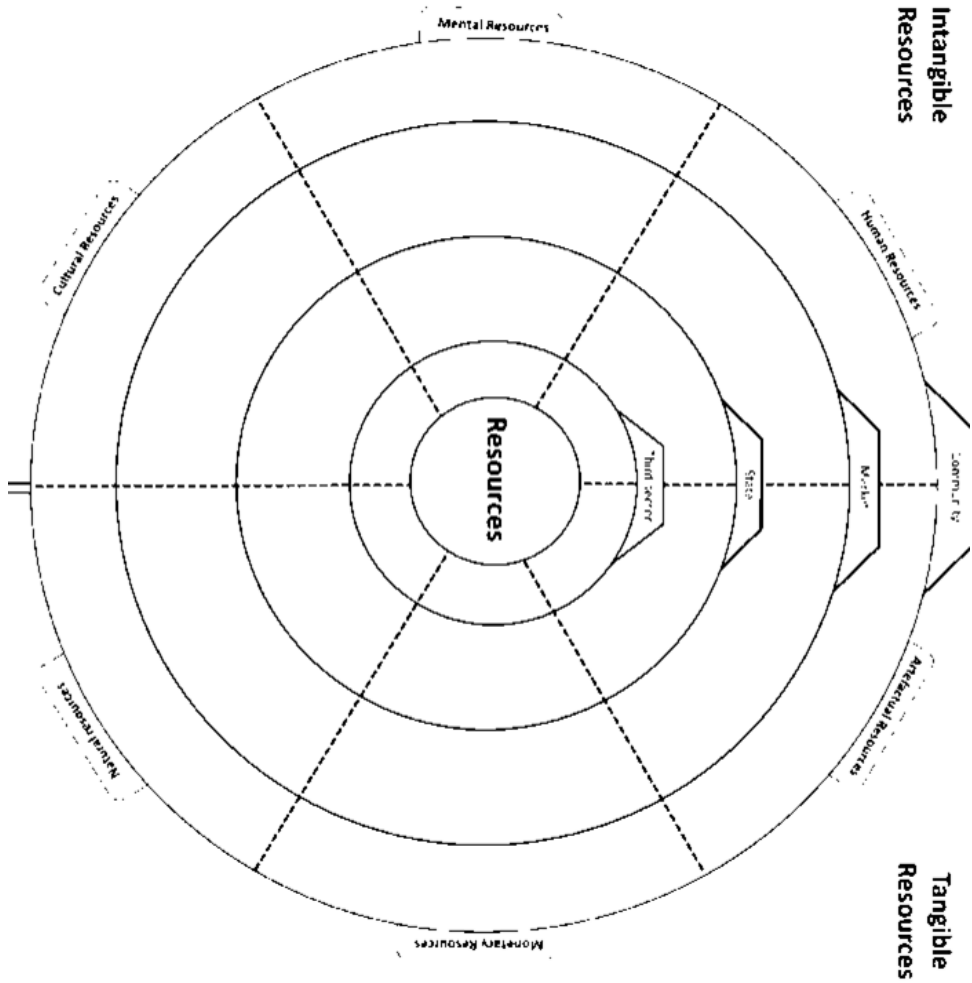
Actor 4 (A4), a public-funded organization deeply committed to technological advancement, operates with a strong belief in the importance of continuous learning and capacity building for both artists and employees. Organizations recognize that investing in knowledge resources and creating a conducive learning environment are crucial for driving technological innovation. A4's mission is to establish a safe and secure marketplace that brings artists and fans closer together. To achieve this, the organization places significant emphasis on resources, such as knowledge and social learning platforms. By fostering a learning environment, A4 aims to encourage collaboration and growth among artists and employees, recognizing that technological advancement cannot be achieved without continuous learning. In the dynamic music industry, A4 faces diverse challenges and encounters opponents. However, the organization is committed to working with all parties and seeks partnerships with allies, adopting a win-win strategy aligned with its central goal of progress while avoiding unnecessary tension and conflict. Despite its commitment, A4 acknowledged the limitations imposed by financial resources, primarily from the government. Recognizing that their current approaches may not be sufficiently innovative, A4 strives to learn new skills and strategies to remain informed about emerging technologies. However, a recent challenge arises, as the government has limited A4's access to cutting-edge information, posing a risk to the organization's market share and potentially leading to a dead end if not adequately addressed. This situation highlights the importance of addressing restrictions on access to information to ensure A4's continued success in its mission.
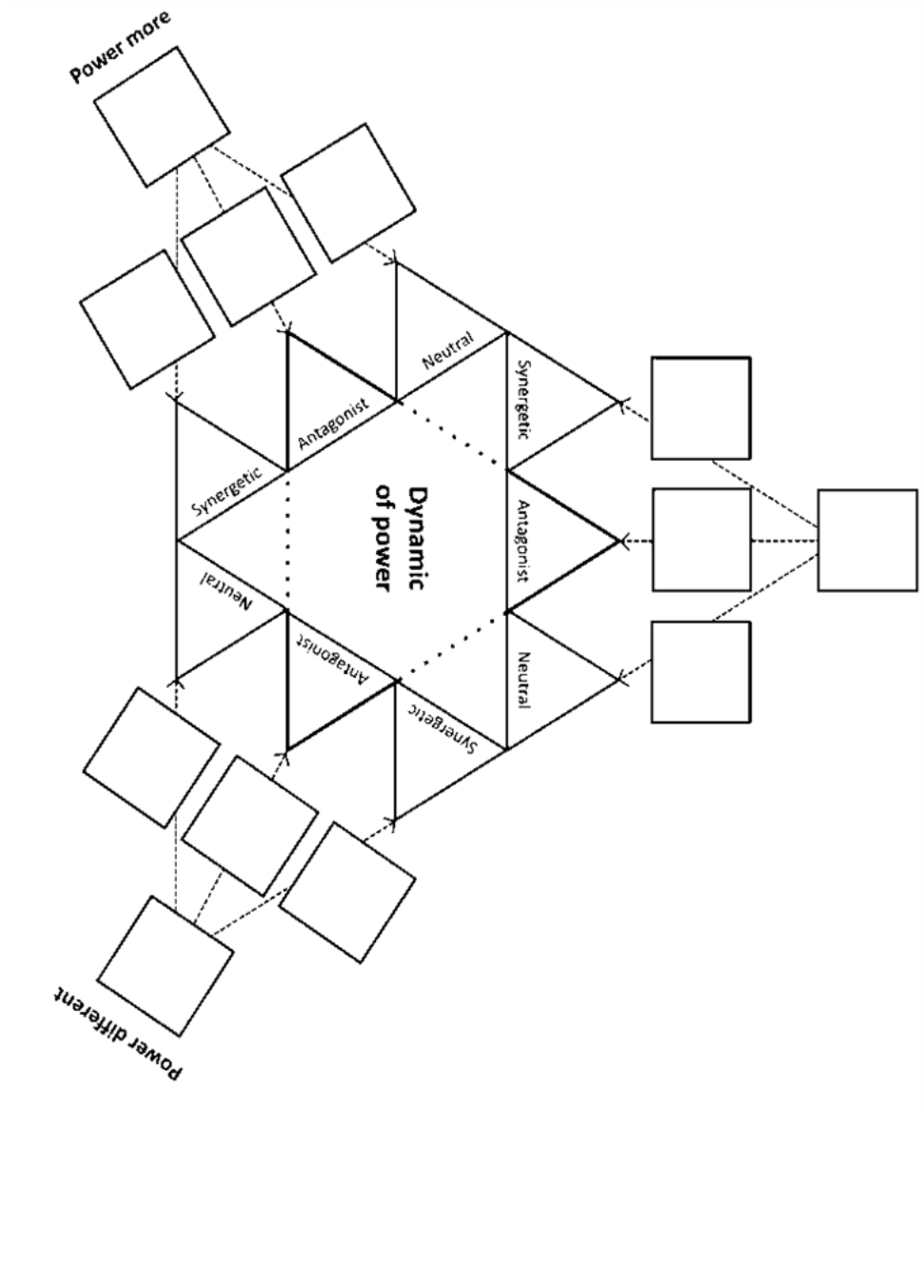
Actor 5 (A5) is a publicly funded organization in the music industry, places a creative culture related to music at the core of its operations. The organization is committed to delivering high-quality services while maintaining accessible prices, with the aim of enabling more people to purchase music products legally. A5 recognized the importance of investing in knowledge and educational resources to achieve its goals and stay updated on new services and techniques for producing affordable music products. To implement this vision, A5 emphasizes the recruitment of experienced employees who can provide affordable services and possess a deep understanding of pricing strategies. The organization also maintains safe and positive relationships with other actors in the marketplace, irrespective of whether they are perceived as antagonistic or supportive. However, A5 faces challenges, as some companies consistently perceive it as a threat to their own success because of their commitment to protecting customer rights. In the music industry, A5 observes a monopolistic trend in which only a few artists actively shape their mindsets and destinies. Thus, A5 believes that it is essential for customers and fans to be aware of underlying changes. A key factor that can greatly assist A5 in its journey is commitment to learning and technology. Organizations actively seek new ways of using resources and remain open to innovation. This commitment to continuous learning positions A5 to adapt to evolving challenges and find innovative solutions reinforces its dedication to providing high-quality, affordable music products while navigating a complex and competitive industry landscape.
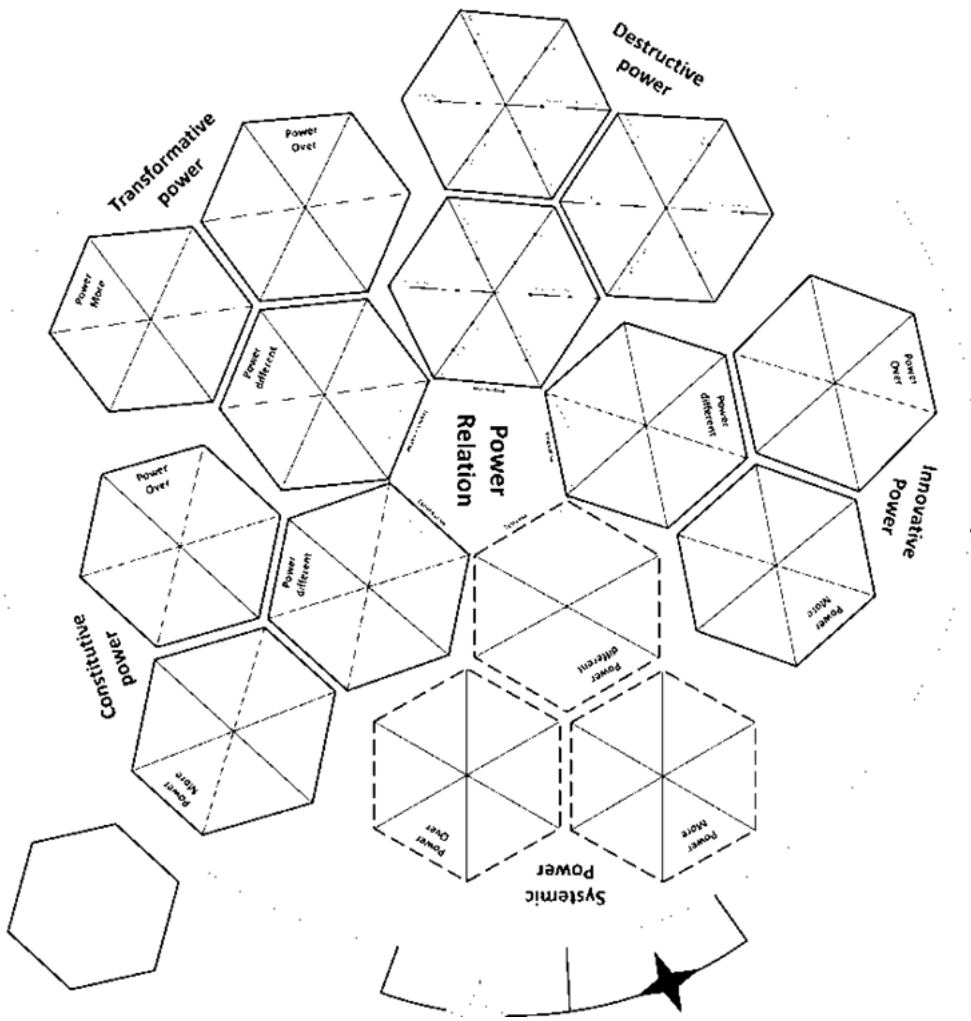
Actor 6 (A6), a publicly funded company in the music industry, is deeply committed to justice, and strives to establish a secure and safe marketplace that benefits both artists and fans. A6 emphasizes ensuring legal access to products in the market while maintaining a focus on providing accessible products to customers. The organization recognizes the critical importance of investing in human resources and understands that fostering a creative environment for artists, along with expanding their fan base, is integral to achieving its progressive vision. A6 places high value on maintaining positive and safe relationships with other actors in the market, regardless of whether they are perceived as antagonistic or supportive. Despite facing challenges from companies that view A6 as a threat to their own success and growth, the organization responds by actively fostering connections with other actors and seeking innovative ways to improve the current situation. As a publicly funded organization, A6 encounters skepticism from some companies, questioning whether its actions genuinely serve the rights of others. Nevertheless, A6 remains highly motivated to create a safe and legally protected environment for all stakeholders through various legal protection measures. However, commitment to legal structures and protection introduces challenges, such as potential limitations on artists' ability to fully express their creativity. Despite these challenges, A6 remains steady in its dedication to advancing justice in the music industry. The organization actively seeks innovative solutions to overcome obstacles, reflecting a continuous commitment to balancing legal considerations with the promotion of creativity and justice within the industry. A6's resilience in the face of challenges underscores its unwavering commitment to core values and mission
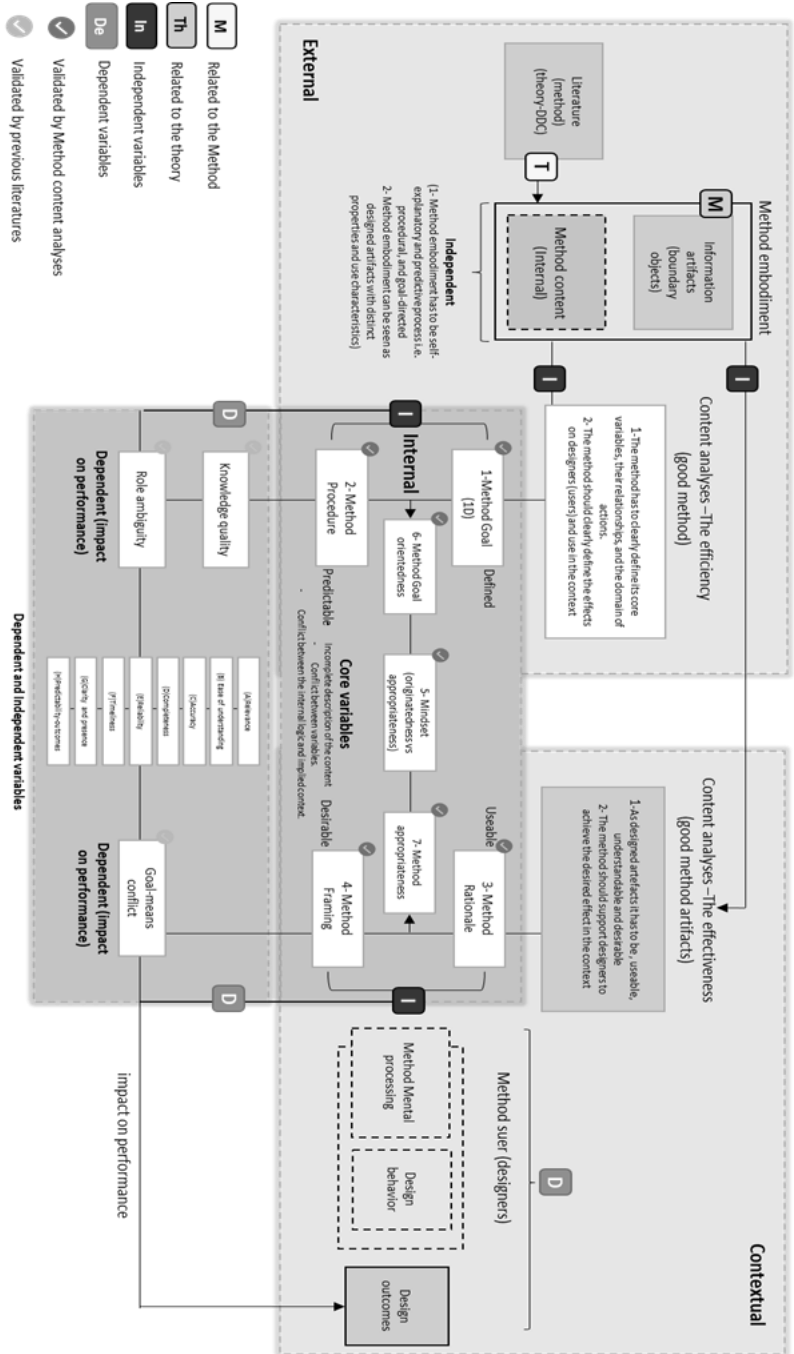
The reasoning (rationale)

(0) stubborn social problems
(1) actors
(2) resources
(3) actors'/resources sectors
(4) shared resources
(5) dual Relations
(6) power vacuums
(7) imbalance relations
(8) antagonist relations
(9) external & internal drivers
(10) actors' narratives
(11) the unique core story
(12) actors' commonalities
(13) DPP
(14) detour in objectives
(15) reinforcing problematisation (disconnection)
(16) assigning roles
(17) First validation
(18) nomination
(19) Second validation (network construction)
(20) Social learning (HOL)
(21) Continues adaptation
(22) New narrative
(23) New culture
(24) New paradigm
(25) New value set
(26) Normative changes

The context (framing)

(0) Stubborn social problems
such as poverty, crime & violence, unemployment, overpopulation, racism

(1) Actors
(2) Resources

The mindset

(24) New paradigm
(25) New value sets (practical, intrinsic, relational)

(26) Normative changes in emergent properties of social systems (e.g. new institutions)

The aim

Designing an interactive network of allies wherein actors are willing and actively learn from one another.

Scale-up
(Paradigm shift)

(22) New narrative
(23) New culture

Narrative co-creation
(a) The new core story
(b) The new storyline
(c) The new characters
(d) The new objects
(e) The universe

(20) Social learning (HOL)
(21) Continues adaptation
(19) Network of allies

The Procedure

Analysis

(1) Actors
(3) & (2) Resources
(4) shared resources
(5) dual Relations
(6) power vacuums
(7) imbalances
(8) Antagonistic Relations
(3) actors' sectors

Multi-actor map
Resource map
Power-relation map
Power-dynamic map
Power-spillover map

(9) external & internal drivers
(7) imbalances
(5) dual Relations
(8) Antagonistic Relations

(8) Antagonistic power relation (APR) map

(9) External and internal drivers

Synthesis

(9) External and internal drivers
(10) Actors' narratives
(11) The unique core story
(10) Actors' narratives
(12) actors' commonalities

Actor journey

Boundary objects
(a) Maps
(b) Modular objects
(c) Standardised forms
(d) Repositories
(e) Stacks

(11) The core of stories
(12) Antagonistic actors' Commonalities

Translations
(Network construction)

(13) DPP
(14) detour in objectives
(15) reinforcing problematisation (disconnection)
(16) Roles and responsibilities
(17) First validation
(18) nomination
(19) Second validation (network construction)

Problematization
Device of interessement
Device of enrolment
Mobilization

(1) the core of stories
(13) DPP
(12) commonalities
(15) reinforcing problematisation (disconnection)
(16) Roles and responsibilities
(17) validation

The methodology in use

Me

Variable
Milestones
Internal Relation
External Relation
output
Input

- Prototyping processes

Destructive power

Transformative power

Power Over

Power More

Power different

Power Relation

Power different

Innovative Power

Power Over

Power More

Power Over

Constitutive power

Power different

Power More

Power different

Power different

Systemic Power

Power Over

Power More

- Third iteration protocol

RESOURCE MAP
Analysis

Discussion:
Zoom in on your story, and discuss the roles or responsibilities of actors, this can be done based on their duties, missions, or functions in one sector. For example, are they part of the state, private, community, or third sector?

Prompt:
Read the story one more time. Highlight the underlying resources and map the individuals' access to the resources. You can use the following card to ease the mapping process.

Prompt:
Zoom out the story and find meaningful relationships, links, or connections based on **shared** resources, capitals, or commonalities between actors.

Discussion:
Discuss how different access to resources is, and who has the power **'more'** to utilize these resources or who has the power **'over'** to utilize resources?

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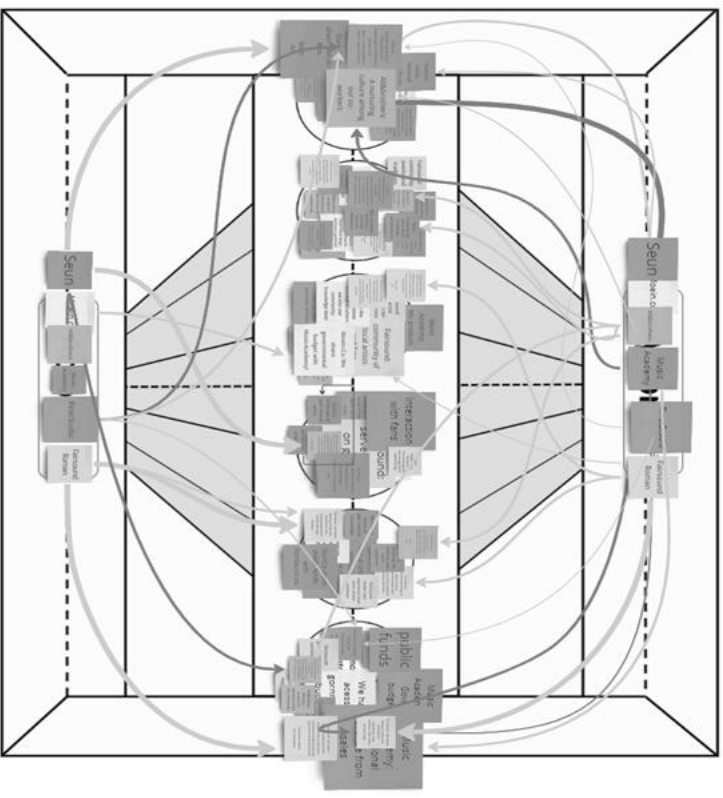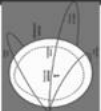
Prompt:
Look at the resources map again. Identify actors who exchange one or more types of resources based on their **power(s) relations** including power over, power more, or different.

Discussion:
Now discuss the **power dimensions**: How different actors' capabilities are in mobilizing the resources, are they using an innovative power, or is it constitutive, or transformative? Who wants to maintain the status quo (synergetic) and who doesn't (antagonistic)?

Power Dimension

Prompt:
Zoom out and explore the power relations again. This time with the intention to see more than dual relations. Find out additional connections between actors and highlight the **antagonistic** loops within the context.

Discussion:
Now discuss the commonalities between actors with the most problematic conflict or disagreement (the antagonistic loop).

A —+— B   Synergetic

C —–— D   Antagonistic

E —0— F   Neutral/Mixed

Power Different

Symmetric

Antagonist

Synergetic

Power over

Antagonist

Synergetic

Neutral

Antagonist

Synergy

Power more

Music,

once a decision is made

They are part of the government in higher position then

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THE ACTOR'S JOURNEY

Synthesis
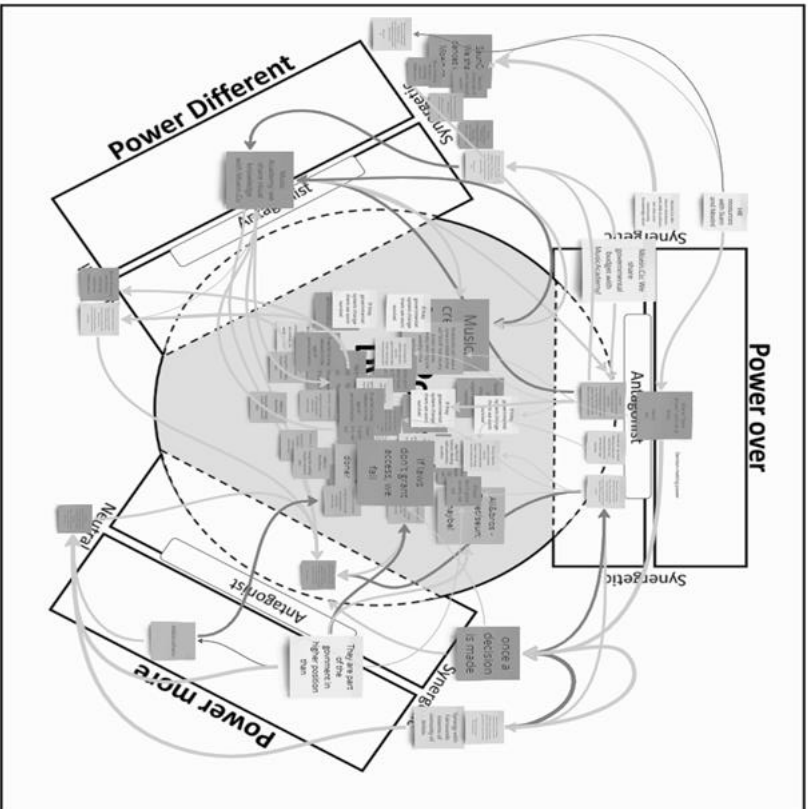
Prompt:

Start mapping the journey and identify the individuals' **hopes or desires**, asking specific questions like **what** they want to achieve along the way.

Continue the mapping process by defining the **fears**, or any form of dangers that one might experience along the way. This has to be completed by highlighting the fundamental values (e.g. **common sense**) which have been undermined (or oppressed) by one or a group of actors. If one experienced a particular force (e.g., mental or physical pressure) this has to be included as well.

Continue the mapping by identifying **Allies** such as existing friends' fans or supporters. Do it in the same way with opposing actors: if the antagonistic sees someone as **Enemies**, they must be mapped as well. Finish the journey by mapping the essential elements or substances that one needed to **survive** or the **dead-end** experience.
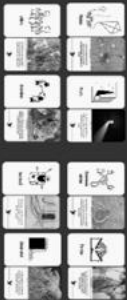
Discussion:

Discuss the **ideal type** of reward asking the following question:

- What does one want to achieve, fulfill, or experience after experiencing such a long journey?
- What kind of substance, object, or reward is there (in the future) that one tries to obtain?
- Can you turn the reward item into a feasible metaphor or archetype? Discuss what would be the best representation of an ideal type.
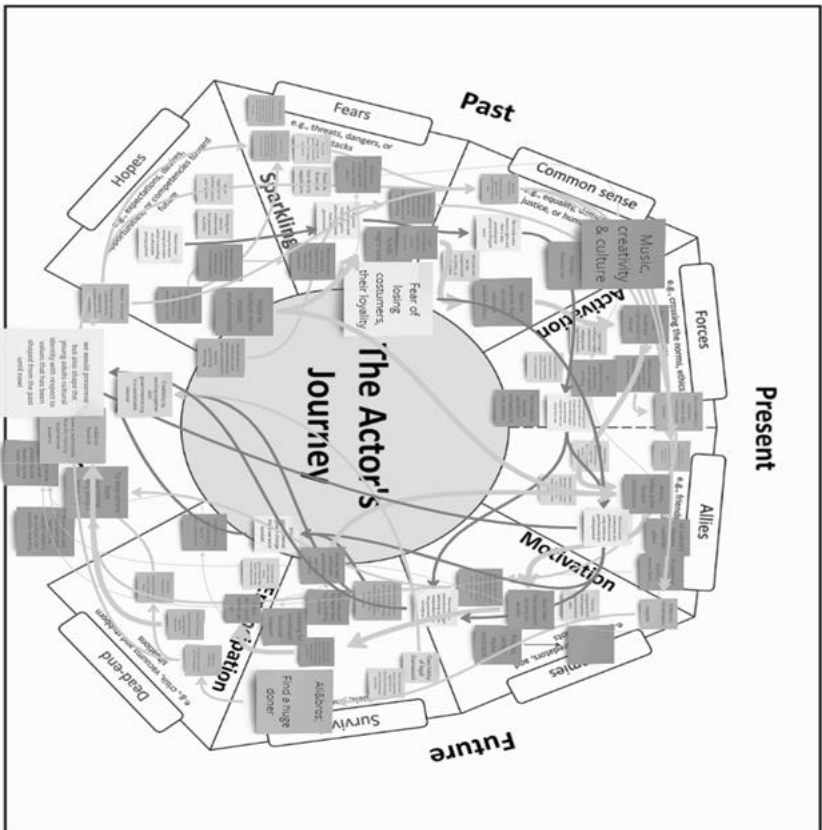
Discussion:

Zoom out the map and discuss the commonalities or shared boundaries among actors. This time, focus on their journey experience. Are there any similarities between their sparkling times? Are there any items that they can share based on the activation moments? How similar are the motivating items are? The same discussion should be applied to the Emancipation of their desires.

The Actor's Journey — circular map with sections: Past, Present, Future; Hopes, Fears, Common sense, Sparkling, Activation, Forces, Allies, Motivation, Emancipation, Survival, Dead-end.

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Prompt:

- List the individual **core stories** and the **ideal type** of rewards one needs along the way.
- Highlight the common denominator: the most agreed ideal type of reward.
- **Zoom in** on the actors' journey and map the commonalities, this time in relation to the four essential elements of the actors' journey (the common problem):

The sparkling moments (hope vs fears), activation incentives (common sense vs forces), objects of motivation (enemies vs allies), and product of emancipation (survival vs dead ends).

Discussion:

Discuss the new **relational objects** (new commonalities) that if we replace them, allow actors to (re)connect or empower one another in the face of problems in the actors' journey.

Prompt:

- Now, replace the potential international objects. This can be in the form of common deficiencies, standardized forms, maps, common repositories, or modular objects.

Discussion:

- Find a meaningful relation between different **(passage) points** (relational objects) showing how one can create a new way of approaching the ideal type based on international devices.
- Turn the relations between the points into the hypothesis. Asking conditional questions about how to make a feasible connection between new points.
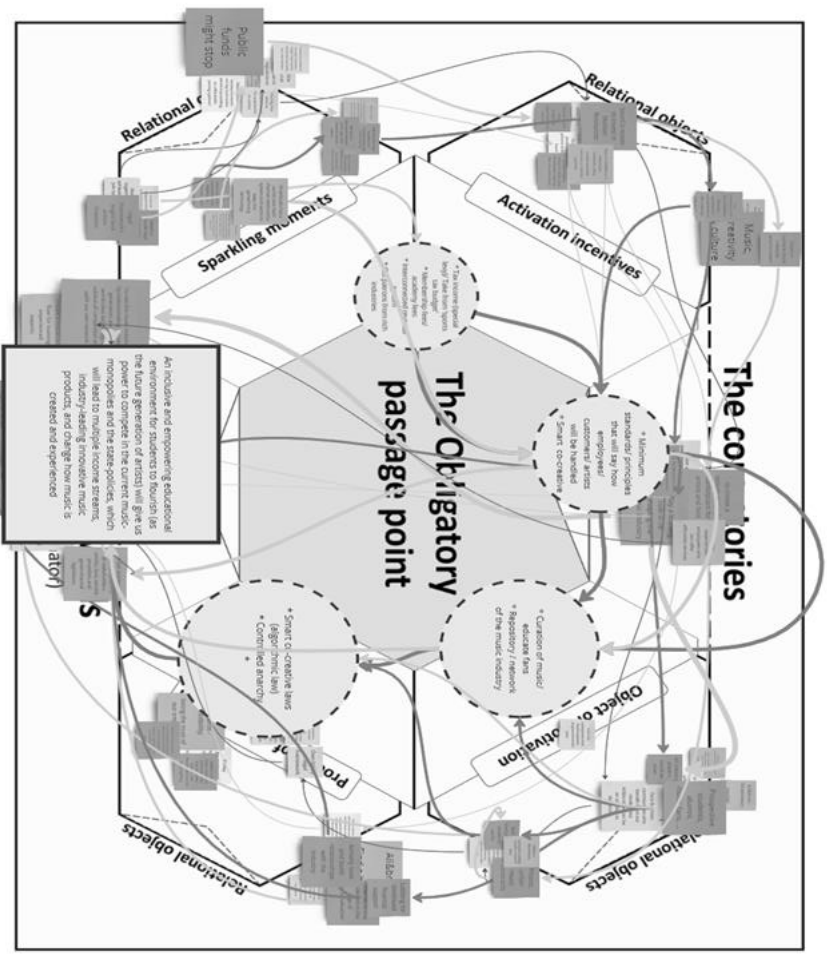
Discussion:

Start negotiations over the obligatory passage point. Change it from a mix of (simple) devices into (design) statements, making sure the **enrolment** is granted either by means of stimulus or triggers like physical, seductive, or exchange and transaction between different items.
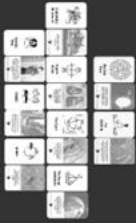

The Obligatory passage point

The core stories

Public funds might stop

Relational objects

Sparkling moments

Activation incentives

Music industry culture

Object of motivation

Relational objects

An inclusive and empowering educational environment for students to flourish (as the future generation of artists) will give us power to compete in the current music-monopolies and the state-policies, which will lead to multiple income streams, industry-leading innovative music products, and change how music is created and experienced

NARRATIVE SYSTEM
Scaling up

Discussion:

Once again check the new passage point(s). Try to see the passage points in a narrative format. Find a meaningful relationship between them, and discuss the **rise, fall, or climax** of the new passage point.

Prompt:

Define the new **core story**. This must be negotiated and then accepted by all members. In a case, there is not a solid agreement, use a simple voting system to choose the most popular one meeting everyone's needs and desires. Continue the mapping by identifying the storyline (based on the passage point). This again can be easier by choosing one of the following criteria (storyline cards) that have been previously defined:

Storylines

Discussion:

Discuss the new roles or responsibilities, and the potential needs and desires of actors. They should be based on the new passage point (fall, rise, or climax) of the new storyline.

Prompt:

Identify the entire **universe-space** including any essential characters, creatures, or objects along the way this has to be based on the new passage points, new roles, or responsibilities. Then identify the potential environment for the story space wherein certain phenomena are possible and few are not.
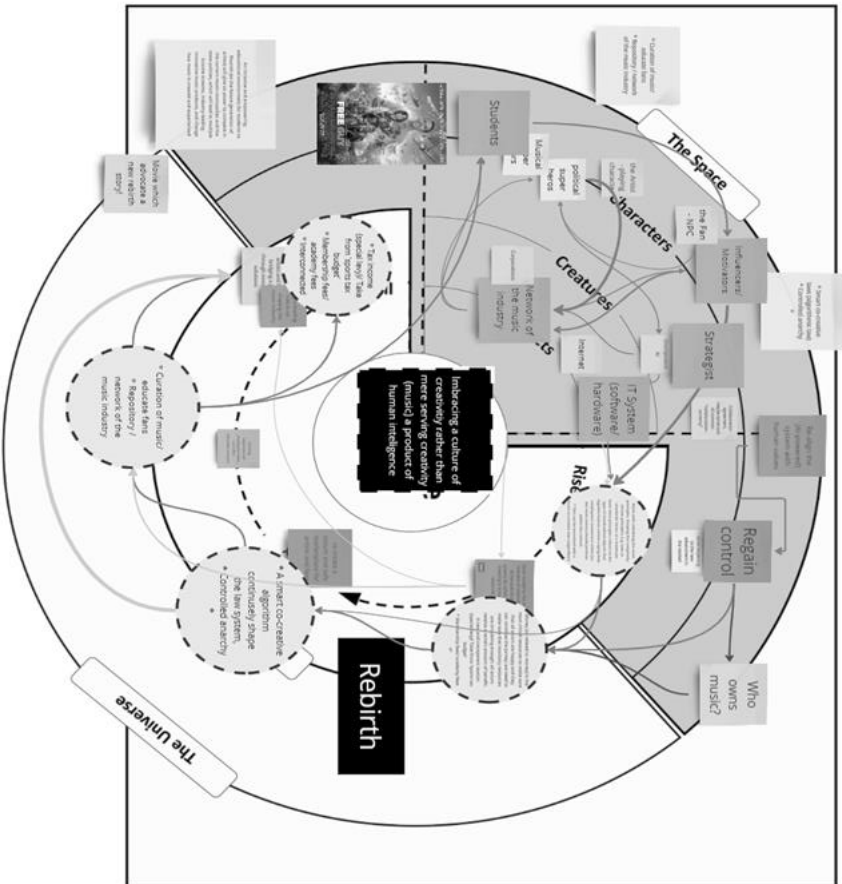
Discussion:

Discuss the potential media, context, or environment for spreading the new story. Should it be in the form of a documentary, a novel, or a movie? Who is the best candidate for scaling up the main message of the new story?

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Short Abstract: In times of crisis, creating a system's capacity for structural change, including shifts in mindset and paradigm, is crucial. Changing mindsets is a complex and time-consuming process, as beliefs and opinions significantly influence deeper aspects of human progress. According to complexity science, changing mindsets require the integration of relational and reflective mechanisms. This integration allows individuals and organizations to transcend their entrenched beliefs, facilitating changes across various levels of systems and organizations. In this PhD research, conflict is introduced as a relational and normative agent of change with the potential to transform deep-seated mindsets. However, without meaningful engagement from stakeholders with conflicting interests, achieving a paradigm shift may be impossible—or, if it does occur, it could lead to destructive consequences. This research explores the processes necessary to construct controversies from both design and systems perspectives. The aim is to provide a methodological framework for systemic design projects, empowering designers as facilitators and stakeholders as key actors in challenging and transforming organizations' dominant mindsets. The main research objectives are to understand conflict as a form of social relationship, to identify the steps and processes necessary for network construction, to iterate on dialogical processes, and, finally, to evaluate the extent to which a design method can foster mindset change. The primary research methodology is based on qualitative studies, which include semi-structured interviews, panel discussions, co-simulation, and participatory action research. A key aspect of this research is the use of generative AI as a non-human agent in co-creative sessions. This study highlights the effectiveness of Design-Driven Conflicts (DDC) in transforming individual narratives within a simulated social context. The empirical section includes a historical review of the music industry, demonstrating how the Internet, as a "destabilizer," has transformed relationships and power dynamics. This method was employed as a mediatory step to analyze imbalances in a social system, focusing on the relationships among antagonistic actors. These insights were then synthesized into the creative boundary objects. By utilizing a "translational mechanism" that incorporates problematization as a bridging step, a communal situation was established. In the final phase, the narrative structure reshapes the core story to enhance collective creativity. After examining the applicability of the dialogical solutions, participants engaged in open discussions to evaluate the usability of the method. Future research should focus on testing the fourth iteration, which includes social experimentation and community engagement. By employing the concept of translation as a bridging tool and adopting a dialogical approach, this doctoral study contributes to the development of creative processes necessary for public and social innovation.

Framing of Conflicts, Designing for Systems:
A Pragmatic Approach

Thesis submitted for the degree of doctor in product development at the University of Antwerp to be defended by **Moein Nedaei**

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