Navigating Societal Complexity to Effectively Mitigate Deforestation in the Amazon

Relating Systems Oriented Design to the Approach of Earth Innovation Institute

Executive Master Thesis | Systems Oriented Design

Author: Bjørn Rask Thomsen

The Oslo School of Architecture and Design | Institute of Design

Supervision: Jonathan Romm, professor | Birger Sevaldson, professor

Submission date: 10 June 2024

Keywords

Co-creation. Complexity. Facilitation. Nature-based solutions. Societal transformation. Socio-ecological systems. Systems Oriented Design. The Amazon.

Acronyms

CST   Critical Systems Thinking

GST   General Systems Theory

EII   Earth Innovation Institute

JREDD   Jurisdictional Reduced Emissions from Deforestation and Degradation

LED-R   Low-Emission Development - Regional

OR   Operational Research

PD   Participatory Design

SD   Systemic Design

SOD   Systems Oriented Design

SOFA   Systems Oriented Facilitation Approach

SSM   Soft Systems Methodology

UN   United Nations

Vocabulary

The concepts below capture multiple aspects and meanings. I have chosen to split Management and Leadership in two to make the point that the former, in this context, is more about operations and administration, and the latter more about where individuals are coming from and the collective direction. The concepts do not represent precise definitions. They serve as pragmatic concepts.

Co-creation includes co-design, participatory design, design research, and enabling conditions related to multistakeholder processes, meta-organizations, and other collaborative processes, where organisations come together to solve complex problems. It refers to system dynamics: policy, voluntary action, business logic, nature, human rights, etc.

Leadership is defined as thought leadership and leadership in multistakeholder processes, which includes connecting inner and outer human drivers and stakeholders' sense of belonging to the land, culture, and identity. This is referred to as the *axis of leadership*.

Management is defined as including the coherent phases of design (SOD), implementation, and operations. Moreover, management functions regarding the measurement and evaluation reported to donors and the administration of interventions in complex systems.

Acknowledgements

To Frida

Abstract

In the Amazon Region, systemic intervenors wrestle with massive forces of societal complexity that threaten the world's largest tropical forest - a meta-crisis related to societal management and leadership. On this background and through the lens of Systems Oriented Design (SOD), this thesis studied how Earth Innovation Institute (EII) can enhance its strategic approach to systemic transformation. The study followed a Research by design methodology. The thesis makes three contributions.

Firstly, it identifies gaps in affiliations to management and leadership for the two target audiences, SOD and EII. Both were found to lack management methodologies for measurement, evaluation and reporting designed for complex implementations and operations. However, leading practices can help close the gap. Also, a closer affiliation with fields such as systemic and quantum leadership, the thesis found, could give SOD a strategic edge that would be appealing to managers and can help SOD overcome barriers to implementation in organisations faced with complexity and rapid change. In co-creation, the thesis recommends that EII adds the dimension of participants' inner drivers and self-leadership and connects facilitation to local cultures and indigenous sensing and rituals. Thereby, an axis of leadership emerges, connecting people's inner drivers to collective intent, direction and desired futures.

Secondly, EII can improve co-creation frameworks and their effectiveness by further developing SOD facilitation and adding a participatory design front end. Such improvements could potentially broaden the scope of fundraising for multistakeholder processes.

Thirdly, the thesis connects systemic interventions in the Amazon to the field of Systems Oriented Design. Embedding SOD practices, EII can develop new language to enrich communications and support fundraising. A measurement methodology can be developed with lessons learned, portfolios of interventions and patterns, and pragmatic analysis of system dynamics can be combined with the creative practice of gigamapping.

Finally, the thesis shares a direction for EII to do the testing and experimentation pending from the study to add resilience and effectiveness to its adaptive approach.

Table of Contents

Figures

Introduction

Humanity faces a poly-crisis, a global problematique (Ison, 2023; Jones, 2022b)—and a meta-crisis that relates to human behaviour and management and, hence, to how societies are led and governed. Over the centuries, layers of human-made design and cultures have accumulated hitherto unseen degrees of complexity of human constructs and beliefs. The inertia and vested interests of prevailing systems are immense.

In recent years, international bodies, governments, and numerous other international organisations have stressed the necessity of systemic approaches (Jackson, 2019). However, converting such statements into management practices and organising for systemic change still needs to catch up.

It is up to humans to transform the systems of civilisation and adapt to massive changes, such as climate change, which impacts all life on Earth. To do so, people need to come together and have conversations to coordinate. To transform societal systems, we need direction. Humanity needs to find intent in envisioning desired futures that connect people to drive change.

Within the framework of the United Nations, most countries have signed declarations and multilateral treaties that are telling examples of what desired futures sound like, e.g.: "- a world of living in harmony with nature" where "by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people." (Kunming Declaration, 2020)

The 2023 'COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action', also known as the 'Food Declaration', signed by 159 countries, captures the significance of coming together within the framework of the world's largest meta-organization, the United Nations. The declaration defines "the United Nations Framework Convention on Climate Change and the Paris Agreement as the primary international, intergovernmental forums for negotiating the global response to climate change" (UN COP 28, 2023).

The urgency of the poly-crisis is at odds with the scale and complexity of the systems that must change. Since the Rio Convention in 1992, and not until COP26 in 2021, 'forests' were mentioned for the first time in a COP declaration text, The Glasgow Climate Pact (UNFCCC, 2021). Only at COP28 did the theme of phasing out fossil fuels enter the text.

The irony is that humans need to slow down in these collaborative processes to allow deep sensing and complexity awareness, which is more likely to produce real systemic change. We must question our management frameworks and leadership thinking to deal more effectively with vested interests and opposition to the transitioning of prevailing societal systems.

Converting the signatures on UN commitments into action may require more political will and courage at a national level. Still, they articulate desired futures for the Earth's climate and nature on behalf of more people than any other forum.

The thesis examines how a small team of systemic intervenors engaged in accelerating the transition to nature-positive, thriving Amazon societies can adapt to strengthen their influence and impact. It also examines how they can refine systemic design research and embed Systems Oriented Design in their approach to management, organisation, and leadership—be it thought leadership or any dimension of leadership.

The world community must transform. A recent comprehensive economic study suggested that transforming the global food system could yield up to $10 trillion in annual benefits, improve health, and significantly mitigate the climate crisis (Watts, 2024). However, it is held back by the power of vested interests and an economic growth mindset that is challenged by Limits to Growth reports (Meadows et al., 1972) and the Earth for All report (Dixson-Decleve et al., 2022), including the planetary boundary work by Johan Rockström and Kate Raworth's Doughnut Economics (Raworth, 2017).

The thesis applies a Research by design methodology.

Personal motivation

World society has lost its way in the broken systems that we created. Along the way, humanity has collectively weakened or lost much of its ancient wisdom and respect for nature and other life forms.

However, I hope we can do better as a society. About 80% of the native Amazon tropical forest remains intact. At the very least, I want to team up with other dedicated people who fight for this vital biome to survive. I find it meaningful, therefore, to apply my executive master's program in

Systems-Oriented Design to the work of Earth Innovation Institute and to understand how it interacts with management and leadership.

It is also meaningful because leaders worldwide are dawning on the need for paradigm shifts to heal the Earth's nature and climate and adapt societies to the changes. Our children and many more generations will live in a time of transition. I am striving to understand precisely what holds back the systemic transition from gaining momentum and what connections and insights we can identify to accelerate progress.

This is my journey and synthesis—from a life in food systems to nature and climate and my explorations of leadership—that have all retrospectively proven to be interconnected and systemic.

Target Audience

The executive master's thesis's primary audience is the Systems-Oriented Design community at the Institute of Design at the Oslo School of Architecture and Design, which includes the supervisors and censors of the thesis.

The secondary audience is the Earth Innovation Institute. The thesis will serve as an in-depth background for the management, team leaders, and the board of Earth Innovation Institute, the people who strategise, shape, and decide on EII's approach and strategy.

Objectives

The main question is: How can the field of Systems Oriented Design help Earth Innovation Institute enrich and develop its approach to systemic interventions? The thesis searches for more effective ways of navigating complexity, which comprises decision-making, strategising, and communicating the role and impact of EII's work more precisely.

Related to co-design, the thesis asks: How can SOD inspire improvements in multistakeholder and meta-organizational workshops? Multistakeholder processes run by NGOs are widely used to support government policy and strategy developments.

The thesis then asks: How SOD at EII would interact with the areas of management and leadership to form a coherent strategy that integrates the three areas?

I have chosen to split Management[1] and Leadership[2] in two to make the point that the former, in this context, is more about operations and administration, and the latter more about where people are coming from, within themselves, and the collective direction. The concepts do not represent precise definitions. They serve as pragmatic concepts.

Furthermore, the thesis will discuss how EII can continue its evolution journey to drive systemic change.

The thesis is to open for and allow change opportunities and more innovation to emerge during the next phase of EII's strategic evolution journey.

Structure

Context—The context describes the connection between the climate and biodiversity crises and the societies of the Amazon Region. It introduces the reader to Earth Innovation Institute and its efforts to accelerate the transition to nature-positive, thriving Amazon societies.

Leading practices – is an introduction to organisations' practices that are relevant to both the field of SOD and to the approach strategy of EII.

From the thesis questions, the literature review of the field of SOD and its roots points to the theory that can help relate and integrate SOD with EII's strategic approach that comprises systemic design, management and leadership. Takeaways are summarised at the end of the section.

The method chapter provides an overview of how Research by design was applied, the methodologies used, and the activities carried out during the study.

---

[1] Management is defined as including the coherent phases of design (SOD), implementation, and operations. Moreover, management is what concerns the measurement and evaluation reported to donors and the administration of interventions in complex systems.

[2] Leadership is defined as thought leadership and leadership in multistakeholder processes, which includes the connecting inner and outer human drivers and stakeholders' sense of belonging to the land, culture and identity. Referred to as the axis of leadership.

Results - present the outcomes of the Research by design.

Discussion – relates the results to SOD theory and discusses lessons learned from the perspectives of the two target audiences, SOD scholars and the management of EII.

Further work – builds on the discussion and outlines a direction for further research and development.

The conclusion chapter answers the main research questions and summarises the study and its contributions.

Context

In light of the introductory poly-crisis and the mitigation efforts convened by the UN on climate change and biodiversity loss, the thesis focuses on tropical forests and, therefore, the entire Amazon region.

The thesis applies the basic assumption that policy and regulation at governmental scales are fundamental for change in interaction with all other drivers of societal change, such as business and market forces, voluntary action, human rights, technology, etc.

*Figure 1 **One Amazon.** Image source: WWF Living Amazon Report 2016*

A socio-ecological system: The Amazon

Massive systems clash and interact in the Amazon: Earth systems (climate), ecosystems (nature), food, political, and transport systems—and so on.

Tropical forests, or rainforests, are Earth's oldest living ecosystems, with some surviving in their present form for at least 70 million years. The forests are incredibly diverse and complex, home to more than half of the world's plant and animal species—while they cover just six per cent of Earth's surface (Johnson, 2023). The world's largest tropical forest is the Amazon, with its share of 54% of the world's primary forest across nine countries (Butler, 2024). Nature, i.e. land-based vegetation, absorbs about a quarter of the world's carbon dioxide emissions.

The loss of tropical forests is predominantly caused by land-use changes. In the Amazon, typically forest-covered land is converted to cattle farming, and then 30-35 per cent of the cattle area suitable for cultivation is converted to agriculture. 94% of deforestation in the Amazon is land-use driven (Systemiq for Aya Earth Partners, figure 4, 2022). Consequently, food systems are central to the context. Food systems cause one-third of global carbon dioxide emissions (Crippa et al., 2021).

The strategic focus of Earth Innovation Institute springs from governmental-scale system change.

Earth Innovation Institute

In 2010, EII's founders left IPAM (IPAM, 2024), a science-based institute in Brazil aiming to mitigate forest loss in the Amazon, to establish an international equivalent organisation, the IPAM International Program. It became independent in 2013 as Earth Innovation Institute.

In California, engaging with Governor Arnold Schwarzenegger's team that was setting up the Governor's Climate and Forest Task Force (GCF), the journey of Earth Innovation Institute began with a bold ambition: to devise a mechanism channelling essential funds to tropical regions transitioning toward forest-positive, socially inclusive rural development. The approach involved engaging across tropical forest regions worldwide, initiating conversations, and building relationships with all major stakeholders across country borders, cultures, sectors, and institutions, from governments and indigenous peoples to farmers. No group or organisation is to be excluded.

Grants funding EII's work range from months-long projects to multiyear programs, typically funded by North American philanthropists or European government programs.

The concept of *Jurisdictional Reduction of Emissions from Deforestation and Degradation* (JREDD+) was developed by a group of leading scientists that included EII-founder Dan Nepstad and was introduced to UN negotiations in 2003 and took hold in 2005 (Santilli et al., 2005). JREDD+ aimed to reward regions for their success in reducing carbon emissions caused by deforestation and has since delivered hundreds of millions of dollars in support to states, provinces, and nations making these rural development shifts.

EII realised that transformative solutions to complex problems like Amazon deforestation are a long-term endeavour. Today, EII sees a window of opportunity for the systemic J-REDD concept. In the best of scenarios, UN "JREDD can deliver billions of dollars annually, benefitting Indigenous peoples, traditional communities, businesses, etc., entire economies and thereby providing the financial muscle to protect and restore forests while building low-carbon food systems and economies" executive president Daniel Nepstad wrote in a recent blog titled *Empowering Change* (Nepstad, 2024).

The team of 40 people at EII stands out in this landscape of Amazon interventions and policy as a trusted partner for sub-national governments, and it is in close dialogue with national governments in South America and donor countries. The highly educated team of acknowledged experts has a unique combination of competencies and skill sets: It combines the scientific knowledge of forest ecosystems with expert experience of UN REDD+ rules and regulations. The team has developed a collaboration, connecting-the-dots, and diplomacy skill set and has an orientation towards systems and the common good of society. In contrast to campaigner NGOs, EII sees the importance of building capacity and collaborating across sectors with governments, indigenous peoples, farmers, companies, etc., to make societal systems nature-friendly.

EII is recognised for its role and what it brings to collaborative systemic interventions. It is invited to join projects led by other NGOs and into systems change networks. In the spring of 2023, Earth Innovation Institute was invited to participate in the inaugural Villars Summit. Two hundred fifty invitees, including students, entrepreneurs, NGOs, politicians, business people, and academics from around the globe, discussed and workshopped on bringing about the societal system shifts needed worldwide.

EII collaborates with 16 states and provinces across the Amazon region in Brazil, Peru, and Colombia, representing 41 per cent of the Amazon biome. The work Includes support for participatory, multi-sector creation and formalisation of low-emission rural development strategies through decrees and laws.

EII developed the Territorial Performance System (Earth Innovation Institute, 2015), a strategy for driving large-scale transitions. EII in 2021 substantiated the UN jurisdictional REDD+ concept with an adaptive management methodology illustrated for Ecuador's national program, the REDD+ Action Plan, with a value of 120 million USD in commitments of results-based payments and international funding (Nepstad et al., 2021). Both papers demonstrate advanced systemic intervention methodologies and practices respected by governments and stakeholders and have led the way for interventions across the Amazon.

EII has also published a paper regarding assessing progress and measuring impact (Stickler et al., 2020) and co-wrote a paper on mapping the complexity of Amazon deforestation driven by commodity supply chains (Boshoven et al., 2021).

Leading practices

In this section, I introduce three leading systems-oriented design practices that are near and relevant to EII's approach strategy. I scanned the field for leading practices for about two years. I found the following three particularly relevant to EII and to SOD theory: The UNDP, Reos Partners and the Villars Institute.

United Nations Development Programme (UNDP)

In 2021, the UNDP significantly shifted to designing development policies by focusing on system transformation and the Sustainable Development Goals. To strengthen its approach, the UNDP partnered with the CHÔRA Foundation, a non-profit systemic designer firm working with transformative innovation to protect nature and increase people's well-being (UNDP, 2021).

The UNDP and their former head of strategy, Giulio Quaggiotto's approach to working with government policy and multistakeholder collaboration resembles that of EII. The UNDP Strategic Innovation team works with best development practices within systems change and how to measure it (Haldrup, 2023). The team seeks new modes of measurement and evaluation designed for complexity that can be managed and reported to donors, which are some of the main challenges for all systemic intervenors. About six years ago, I was invited to a UNDP strategy workshop that identified gaps between complex systems and donor and reporting demands. I see UNDP's explorations as efforts to bridge that gap by developing new ways of measuring, evaluating, administering, reporting, etc. – bridging methodology gaps between designing complexity and management.

These experiments led UNDP to publish a Portfolio Approach Primer, a competency framework, and portfolio boot camps. The portfolio approach was implemented in 55 countries (Uriartt et al., 2024). UNDP gave three reasons why the portfolio proposition received favourable responses from stakeholders: coherence creates leverage, long-term "irreversibility," and leveraging and acceleration.

The UNDP strategy innovation team has explored ways of acquiring expertise and resources across fragmented interventions both in-house and amongst different organisations operating in the field of policymaking. The team points to the importance of direction for development interventions and the pragmatic option of working with what you have that features an intervention portfolio (Begovic & Quaggiotto, 2023). Too often, systems neglect existing infrastructure and resources and assume that

interventions must start from scratch. Consequently, system transformation comes across as an intimidating task that can only exist in a distant future. Well-managed portfolios can bring momentum and agency to stakeholders, reveal options for interventions that are immediately available, and, most importantly, are innovative options in the typical situation of insufficient funding.

The methodology perspective makes UNDP particularly interesting: Measurement and evaluation can help overcome challenges of reporting systemic impact to donors, developing competencies, training people, and managing organisational resources.

EII has collaborated with the UNDP, and the two are potential partners for future projects.

Reos Partners

Reos Partners, a leading facilitator of societal transformations, strives to make the world more peaceful, just, and sustainable through enhanced multi-stakeholder collaboration. It is dedicated to facilitating systemic change across various sectors, employing a unique approach that integrates the human drivers of love, power, and justice into their methodologies. Reos has introduced 'radical collaboration' to address societal challenges, proposing that real systemic transformation requires engaging with these fundamental human drives (Kahane, 2023; Reos Partners, 2023b). The relevance of Reos in this context is primarily how they facilitate multistakeholder processes and the enabling conditions surrounding them.

Reos Partners employs various strategies and methodologies, such as transformative scenarios and social labs, to help diverse stakeholders work together across differences. These tools are designed to uncover the root causes behind complex problems and arrive at collective solutions that can be tested and implemented in the real world. Reos Partners aims for systemic change with an enduring impact on society's most pressing challengesby facilitating dialogue and collaboration among participants from different sectors and perspectives.

Adam Kahane, a leading figure at Reos Partners, has written extensively on the topic, including his book Facilitating Breakthrough (Kahane, 2021). In this work, he elaborates on transformative facilitation to enable groups to collaborate more effectively by removing obstacles to love, power, and justice. This approach seeks to create a space where participants can contribute equitably and

work together to transform their situation. Adam Kahane worked with other well-known systems thinking and leadership names, such as Joseph Jaworski, Otto Scharmer and Peter Senge.

Villars Institute

The Villars Institute (Villars Institute, 2024), established in 2022, is a non-profit foundation focused on accelerating the transition to a net-zero economy and restoring planetary health through systems leadership and intergenerational collaboration. Located in the Swiss Alps, it serves as a community for systemic change, leveraging artistic, cultural, and sports activities to promote biodiversity, planetary health, and sustainable development. The summit is becoming a community, and EII is part of it.

The Villars Summit aims to address climate and biodiversity crises by fostering interdisciplinary cooperation to accelerate systemic change in energy transition, nature restoration, and agricultural food production. What resonated with me from the inaugural summit (Villars Institute, 2023) and has shaped my approach was that collaborative processes for shifting systems are fundamentally about *convening, coordination, and direction*, and the paradox that *accelerating systemic change at the global level requires slowing things down at a human level*.

Other practices

The following practices may inspire further research and development: Systemiq – reports on the Amazon (Systemiq for Aya Earth Partners, 2022). The EU Systems Transformation Hub includes Systemiq and the Club of Rome (The Club of Rome, 2024). Cynefin - mapping, patterns, making sense, decision-making, unknown unknowns, etc. (D. Snowden, 2023; D. J. Snowden, 2004). The Griffith Centre for Systems Innovation has published a helpful workbook that uses patterns and portfolios to understand and monitor complex development and impact (Griffith Centre for Systems Innovation, n.d., 2023, 2024; Yunus Centre Griffith University et al., 2022). Chôra Foundation participated in the RSD11 and is a partner of UNDP (UNDP, 2021). The Jurisdictional REDD+ Technical Assistance Partnership is an emerging collaboration to support forest countries in large-scale conservation (JTA Partnership, 2024). The Mobilizing an Earth Governance Alliance participated in the 2024 Villars Summit and works to strengthen global environmental governance to protect Earth's ecosystems (Mobilizing an Earth Governance Alliance, 2024). The World Economic Forum offers transformation maps and strategic intelligence on "issues and forces driving transformational change across economies, industries, and global issues" (World Economic Forum, 2024).

Literature review

The theoretical framework for this master thesis is the field of systemic design and focused on Systems Oriented Design (SOD). The broader field of SOD (including its roots) is reviewed to help answer the questions posed in the objective section of the introduction: How can SOD help enrich and develop EII's approach to systemic interventions, in which ways SOD can inspire improvements of co-design, and how SOD affiliates with management and leadership?

The review includes literature outside the syllabus of the SOD executive master course. This is motivated by the question regarding SOD's integration with management and leadership. The review's broader scope also makes explicit aspects likely to resonate with EII's worldview. Moreover, the review includes historic developments in the field. It all serves to facilitate introducing the field and the language of SOD to the secondary target audience, the management at EII. To compensate for the length of the review, a summary of takeaways is available at the end of the section.

Systems Oriented Design

The core intention of Systems Oriented Design (SOD) is to improve the ability of intervenors to navigate complexity (Sevaldson, 2009).

SOD suggest ways of accepting and manoeuvring complexity rather than trying to design it away. It offers a language of awareness and visuals to describe complex contexts. SOD is a possibility to articulate the real-life experience in more specific and detailed ways that resonates more with practitioner experience and to avoid inaccurate translations to fit rigid requirements developed in the past century—an opportunity for practitioners to make themselves understood. It is practice-oriented as indicated by the red area of the figure:
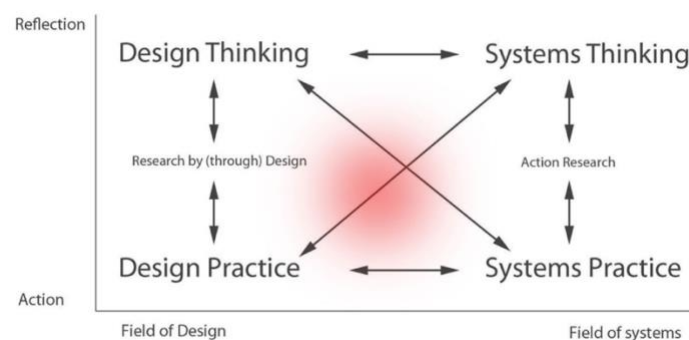
*Figure 2 **The position of SOD*** (Sevaldson, 2022, p. 30)

SOD ask practitioners to accept that systems are everywhere and always dynamic. Instead of being overwhelmed by complexity, one is encouraged to look beyond objects and look at the gestalt, patterns and the whole system and design. It uses design to work with systems. SOD enables a practice in complex problematiques to hold out in frustration, allowing space and time for things to mature, loosen up and access the yet undiscovered.

Gigamapping - gigamapping is about externalising knowledge on a large canvas, getting started, and continuing to draw. From there, as you add layers and draw new maps, you share, discuss, learn, explore together, etc.

Sevaldson refers to gestalt psychology as the 'hidden' relation between design and systems, and his intention with gigamapping is that it can enable visual dialogue and visual thinking. He refers to Rudolf Arnheim (Arnheim, 1974) and the connection of gestalt psychology directly to creativity and design via visual thinking (Sevaldson, 2022, p. 164). Visualisation becomes a way of coping with and recognising wholes. There is a memory aspect to visualisation that is fundamental for understanding complexity.

It is a work tool that helps explore together without disconnecting. Its value is during workshops and meetings, whereas it seldom serves as communication for other groups or the public. For communication, different visuals and synthesising maps are more suitable. Gigamaps serve to iterate with experts and collaboratively map with stakeholders, allowing for 'jumping' (Wettre et al., 2022) and changing conversations (Shaw, 2002). Gigamaps visualise the interconnectedness of workshop contributions.

Gigamapping is a technique that moves from a descriptive to a generative mode that stimulates dialogue and coordination. It serves to connect across sectors, disciplines, and groups. Across cultures, sectors, and trades, inevitably, there will be different rituals and languages that can be nudged to the surface through gigamapping. It can elicit Johari Window 'unknown unknowns' (Sevaldson, 2022, p. 55) and aid the identification of problems, potential, ideas, and points of intervention and innovation (Sevaldson, 2022, p. 275).

It is a way of mapping across multiple layers to investigate all sorts of relationships, connecting what seems separate and thereby contributing to system boundary critique. It can appear a messy

process: With a designerly constructed real-life situation, a mix of illustration and text, etc., large amounts of information, multiple size scales, opening wide, zooming into details, and incorporating multiple system changes approaches (Sevaldson, 2009). Gigamapping can help visualise and develop a vocabulary beyond texts.

Sevaldson integrates the gigamapping tool with Rich Design Space and Rich Research Space frameworks (Sevaldson, 2008) to train our brains to cope with complexity (Sevaldson, 2022, p. 214). The purpose of setting up a Rich Design Space is to create the flexibility to integrate new information at any time throughout a process, and it enables design practitioners to move more freely between holistic and fragmented approaches (Sevaldson, 2022). Richness in SOD is featured as "a methodological concept in its own right" (Sevaldson, 2022, p. 63) – part of a multi-methodology; it is pluralism in all dimensions of a process, materials, mediums etc.

Complexity - complexity in systems is hard to nail down precisely what is. However, Sevaldson suggests some generic principles (Sevaldson, 2022, pp. 13–14):

1. Complexity emerges from the interaction of many entities within a system and the interaction of the system and its parts with the environment.
2. Complexity is a feature of systems that operate over time.
3. Complex systems produce emergent phenomena. Their result is more and different than the sum of their parts.
4. Complex systems adapt to the environment and change over time.
5. Complex systems might challenge and change the rules they operate from. This is especially evident in social systems.
6. Complex systems challenge the orthodoxy of planning since while we plan the systems change.

Navigating complex systems thus calls for designing in new innovative ways, leaving space for emergence, and therefore approaching it with more trust and less control – loosening the grip, working in multiple dimensions of the system, over time – a more aware, subtle, and respectful way of approaching systems (Meadows, 2001).

The design categorisation below indicates that upstream interventions, such as policy design, in the higher scales of the complexity hierarchy are more complex and have more strategic impact, which trickles down through the scales of complexity:
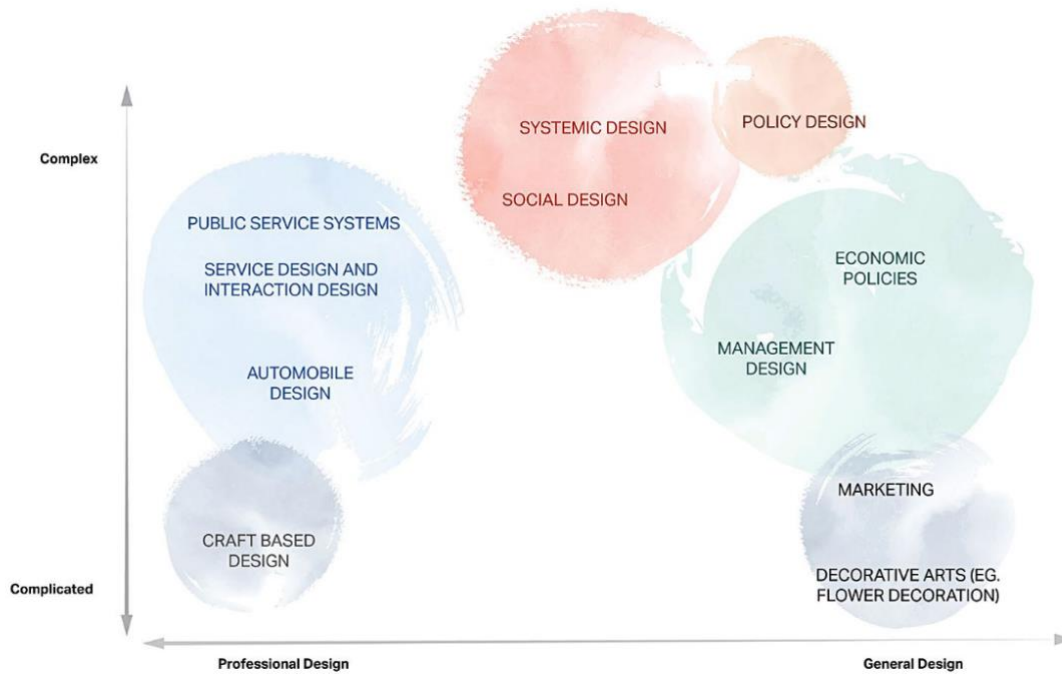
Figure 3 **The highly diversified field of Design.** (Sevaldson, 2022, p. 94)

Otto Scharmer created the 'Theory U' framework to help leaders and organisations navigate complexities by fostering deep listening, empathy, and co-creation (Scharmer, 2016, 2018). In Theory U, Scharmer identifies three types of complexity that resonate with the thesis context: Dynamic, social, and emerging complexity. Simpler than SOD and more towards strategy and management, however, in a different language that complements SOD. Furthermore, Theory U's deep listening and 'pre-sensing' in the bottom of the U is a phase of slowing down, patiently anticipating the moment when insights and understandings resonate with one's inner state of mind – to then acting swiftly.

Roots of System Oriented Design

The below illustration of the vast knowledge ecology of SOD gives a visual of historical developments in the field. It indicates several connections to co-design, management and leadership:
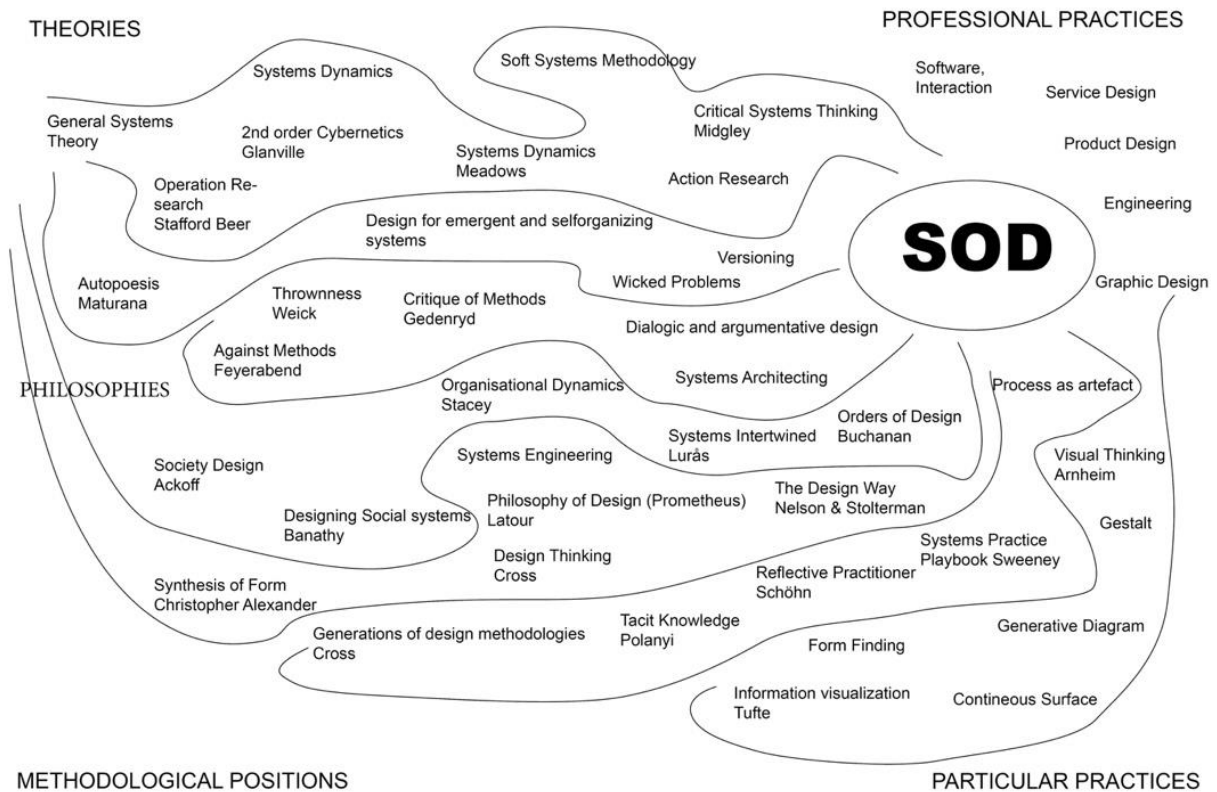
*Figure 4 **Roots - The Knowledge Ecology of SOD*** (Sevaldson, 2022, p. 189)

Systems Thinking

Systems Thinking captures the importance of understanding the interrelationships and interactions within complex systems. "Systems Thinking is the philosophy, art, and science of interconnectedness" (Sevaldson, 2022, p. 14). SOD draws pragmatically on Systems Thinking as a way of thinking that offers perspective and mindset to comprehend connectedness and relationships in systems better.

The field of Systems Thinking, as it is known today, derives from General Systems Theory (Bertalanffy, 1969). Systemic ways of thinking have influenced Western thought over the past four centuries but have faced problems when applied to human action and how we understand human participation, freedom, and transformation (Stacey & Mowles, 2016, p. 64).

Systemic Design

Systemic Design (SD) is by Sevaldson referred to as "the renaissance of Systems Thinking in Design", and he positions SOD as one of many "dialects" within the field of Systemic Design (Sevaldson, 2022, p. 2).

Nelson and Stolterman define design as what humans engage in when "we create new things—technologies, organisations, processes, environments, ways of thinking, or systems. Coming up with what we think would be an ideal addition to the world and giving that idea of actual existence—form, structure, and shape—is at the core of design as a human activity" (Nelson & Stolterman, 2014, p. 1).

As we perceive it today, the field of design is closely associated with the industrialisation that occurred over the past centuries. In the 20th century, many design methodologies were formalised. However, much of the design was user-centric and product-oriented, and it came with "an idea of simplicity at the cost of removing attention from richness and complexity" (Sevaldson, 2022, p. 100) - ignoring severe and unintended consequences.

More recently, Jones and VanPatter have suggested design concepts with increasing scales and complexity. Design 4.0 drives "the integration of systems-informed inquiries with design methods" and addresses "complex social systems and involves external change, wicked problems, multi-stakeholder processes, and sensemaking" (Jones, 2018, p. 11; Sevaldson, 2022, p. 93), illustrated in the figure:

Peter Jones' work in systemic design is relevant here, not at least because of its focus on multi-stakeholder processes and participatory approaches that offer insights and methodologies for addressing complex challenges. His collaboration with UN projects, where there

*Figure 5 **Four levels of design***
(Sevaldson, 2022, p. 93)

is a need for inclusive, collaborative, and systemic solutions, is particularly relevant to the Amazon context. Equally relevant for this context is his systemic version of the theory of change (ToC), the Theory of Systems Change and Action (TOSCA). By fostering dialogue among diverse groups, leveraging systemic design tools, and advocating for adaptive interventions, Jones' approach can help

pave the way for more sustainable and effective global governance and policymaking. (Jones, 2020, 2022a; Sevaldson & Jones, 2019)

Since 2012, with the first Relating Systems Thinking and Design Conference (RSD, 2012) at AHO in Oslo, the System Design field has developed and become increasingly mature, demonstrating a variety of theory methodologies and phraseologies. It has spurred the development of the field of Systemic Design. The convergence of systems thinking and design into systemic design represents a milestone in solving complex problems. This integration combines the analytical rigour of systems thinking, focusing on understanding complex interactions and dynamics, with the creative and generative aspects of design, focused on innovation and the creation of solutions. It stresses the importance of a holistic, integrated approach to understanding and shaping human experiences and the natural environment. By recognising their deep historical roots and the evolution of their methodologies, we can appreciate Systemic Design as a continuation of a long human tradition of inquiry, creativity, and problem-solving dating back to the dawn of civilisation.

Soft Systems Methodology

Peter Checkland (Checkland, 1983) took a stand against the engineering view of hard systems thinking and, in contrast to the popularity of computer modelling, argued that systems are mental constructs of individuals. According to Stacey and Mowles (Stacey & Mowles, 2016, pp. 209–212), Checkland "brought back philosopher Immanuel Kant's view of the regulative 'as if' nature of systems" and writes that "Checkland developed SSM to express that systems are related to the process of inquiry, meaning and intention". Further, Stacey and Mowles describe three phases of SSM:

1. Build up a rich picture of the problem situation.
2. Multiple systems viewpoints are drawn from a rich picture while keeping problem solutions open.
3. Construction of conceptual system models to debate change.

Checkland later added a cultural view of social systems, roles, norms, values, politics, and power and a logical analysis. The purpose of SSM is to allow a systemic learning process that provides space for different viewpoints yet coordinates a basis for change. It uses system models to facilitate social processes of inquiry. Checkland's methodology included root definitions "derived by asking what the system does, how it does it, and why it does it" (Sevaldson, 2022, p. 139).

Critical Systems Thinking

Following the above developments, Jackson, Mingers, Flood and Midgley created critical systems thinking (CST) as "a critique of SSM and operational research pioneered by Peter Checkland and Russell Lincoln Ackoff and Charles West Churchman", respectively (Stacey & Mowles, 2016, pp. 212–216).

Gerald Midgley's third wave of systems thinking contains "two *criticalities*: power relations, which were criticised for not getting enough attention in the second wave of soft systems approaches, and multimethodology, formed by the notion of methodological pluralism" (Sevaldson, 2022, p. 143).

Midgley's process philosophy accentuates reality's dynamic and interconnected nature. The fluidity of boundaries and systems' emergent properties cannot be understood by analysing their components in isolation. Midgley seeks to create methodologies that are robustly anchored in process philosophy and practically applicable in addressing societal, organisational, and environmental problems. Without practice, philosophy and methodology are worthless (Midgley, 2000).

Midgley's angle is beneficial in the present context as it posits that the universe is in a state of constant change; systems change even as we aim to change them. The point of multi-perspectives is that no simple model can fully explain what is happening.

The practice of systemic interventions guides practitioners from problem framing through to the implementation of solutions and reflective learning. It allows for flexibility and responsiveness to emerging insights and changes within the system. Key aspects of the methodology include boundary critique informed by process philosophy, looking out, looking in, and acknowledging that boundaries are social constructs and have ethical implications.

Michael C. Jackson says complexity requires multi-methodology, and he has people and people issues at the centre of systems thinking. The core of Jackson's critical systems thinking (Stacey & Mowles, 2016, p. 214) is "Holism; different worldviews indicate different boundaries, knowledge elements form cognitive, structured frameworks forming coherent wholes, and a coherent multi-perspective, multi-methodological systems thinking framework".

In *Critical Systems Thinking and the Management of Complexity* (Jackson, 2019), Jackson identifies six types of complexity and argues that no single methodology can adequately address all types of complexity. Instead, he advocates for a pluralistic approach, Total Systems Intervention (TSI), which suggests matching the problem context (characterised by the types of complexity) with an appropriate methodology or combination of methodologies.

Jackson's framework encourages flexibility, adaptability, and the use of a broad toolkit of systems methodologies to navigate the complexity of modern organisational and societal challenges.

Dynamics and Structure

Systems are dynamic; however, identifications of system dynamics and forces to better understand the undercurrent logic of systems are often absent or only vaguely covered in policy and intervention co-creation.

In System Dynamics, mathematical models are constructed to monitor how systems change states over time. Critical systems thinkers and others criticise system dynamic approaches. However, even though models lack cultural and social understanding, quantification and qualification (Senge, 2010) of dynamics hold a potent possible addition to systemic interventions in tropical forest regions, not as a stand-alone but as a qualification of underlying forces that could complement the use of Gigamapping in co-creation processes.

On a global scale, the report 'Limits to Growth' (Meadows et al., 1972), commissioned by the Club of Rome, was a milestone publication that became a series of publications. The model was based on the System Dynamics work by Jay Forrester of MIT, as described in his book 'World Dynamics' (Forrester, 1971). Meadows and her co-authors wrote a 30-year update (Meadows et al., 2004). In 2022, two of the original authors, Jørgen Randers and Dennis Meadows, along with 19 other authors, published 'Earth for All' (Dixson-Decleve et al., 2022) as a 50-year update that featured further developed work on planetary boundaries by Johan Rockstrōm and connected to Doughnut Economics developed by Kate Raworth (Raworth, 2017).

Planetary boundaries further align with the perspectives shared by Vaclav Smil in 'How the World Really Works' (Smil, 2022) and Hannah Richie in 'Not the End of the World' (Ritchie, 2024), which both challenge conventional narratives and encourage a more nuanced understanding of global systems and their complexities. These works underscore the need for looking deeper into the

systems of the Amazon and for evidence-based approaches to navigate the challenges facing our world.

Donella Meadows extended Forrester's work by identifying leverage points in systems (Meadows, 1999) - areas within a complex system where a slight shift in one thing can produce significant changes in everything. Her 'Dancing with Systems' (Meadows, 2001) encouraged us to work with systems rather than against them. Work with nature rather than against it, and understand its inherent wisdom and resilience. Meadows' leverage points range from parameters and feedback loops to the goals of the system and the mindset or paradigm out of which the system arises.

At the heart of System Dynamics is the principle that the dynamics are often counterintuitive, leading to policies and interventions that may not yield the intended outcomes. Together, various system dynamic methodologies offer an interesting added dimension to SOD's gigamapping that is not directly present today.

Shifting Societal Systems

The books by Midgley and Jackson (Jackson, 2019; Midgley, 2000) in the CST section are part of a book series 'Contemporary Systems Thinking' (Flood, n.d.) featuring a range of titles related to the roots of SOD and to the topic of shifting societal systems, such as Bela H. Banathy's 'Designing Social Systems in a Changing World' (Banathy, 1996) and 'Guided Evolution of Society' (Banathy, 2000), and 'Sociopolitical Ecology – Human Systems and Ecological Fields' by Frederick L. Bates (Bates, 1997).

Another key figure in the SOD 'knowledge ecology' is Russell L. Ackoff's work in Society Design about redesigning societies, management and finding purpose in complex systems. Ackoff wrote 'From Data to Wisdom' (Ackoff, 1989), reminding us that it is the wisdom we seek, and thus also about patterns and dynamics that are not immediately known to the human mind.

Stewart Brand's *Pace Layering* (Brand, 2018) describes that the layers of infrastructure and governance take considerably longer to learn and change than commerce and *fashion*. Nations change on a time scale of centuries. He points to the order of a healthy civilisation being that "the fast layers innovate, and the slow layers stabilise", combining learning with continuity.

Leadership and Management in Complexity

Societies do not shift without leadership. A web article on *'Quantum leadership in a complex world'* discusses *'bridging the leadership gap'* and *'navigating the future'* (Choudhary & Bhandari, 2024). For many systemic intervenors in complex systems, the field of Quantum Leadership will be worth exploring and testing. Building on Danah Zohar's work in the 1990s, the field has evolved to offer concrete tools and frameworks for implementation (Tsao & Laszlo, 2019; Zohar, 2022). A key contribution of it is that it connects to the inner drivers of people.

The roots of SOD and the SOD syllabus do contain leadership and management thinking that is systemic. They are dealt with under one of the two, either as leadership or management. Entangled. I kept them separate to make the point that transformative change needs a strong axis that connects the inner and outer dimensions of people and collaboration and connects to place and sense of belonging – which I defined as leadership. As transformative change also needs methodologies of administration, standards, measurement, evaluations, etc. – critical functions that organisations need – which I defined as management. However, it is not consolidated as systemic leadership, which is an existing field. Moreover, while Ralph Stacey (Griffin & Stacey, 2001; Stacey, 2012; Stacey & Mowles, 2016) enriches SOD with his thinking on management in complexity, SOD does not consolidate how SOD and management in complex systems interact and how they could form a coherent concept that overcomes barriers to implementation of SOD in systemic intervenor organisations.

The methodologies developed by the UNDP and described in the Leading Practices section are valuable contributions to management, and Lowe also points to the identification of patterns of lessons learned as perhaps the most meaningful indicator of progress for long-term development work (Lowe, 2023; Lowe & Wilson, 2017)

Co-creation

A great example that inspires improvement of co-creation processes is an approach developed during the COVID-19 pandemic by Oxford Saïd Business School to collaborative strategy for businesses, non-profits, and policymakers coming together in networks of organisations (meta organisations) to tackle large-scale challenges (Ramírez et al., 2023). The review of co-creation is a further development of SOFA (D'Silva et al., 2023).

Co-design is the arena where systemic design research involves the dynamics of the system: policy, voluntary action, business logic, nature, human rights, etc. Peter Jones talks about co-creation with

system stakeholders (Jones, 2018). In this thesis, co-creation is used to describe co-design, multistakeholder processes, meta-organizations, participatory design, etc. – processes consisting of a series of workshops or labs.

Jones' framework for co-creation practices in systemic design aims to provide a methodology for stakeholder design for social complexity that enables practitioners "to define interventions and options for social design problem resolutions" (Jones, 2018, p. 48). He aims to introduce processes to improve collaborative efficacy for design and decision-making in multi-stakeholder co-creation. It comes with a warning that the framework will fail if adopted in part and not as a whole guideline for design practice (Jones & van Ael, 2022).

Jones's study aims to continue developing a practice theory for Systemic Design that can be adopted for convening practices and the management of large systems change programmes involving multiple venues and communities of participants. The framework applies the progression of social science to complex design and initiates a journey to formulate better models and categories across the many forms of collaborative design practice.

Jones suggests that collaborative efficacy in multi-stakeholder participation "might be observed and measured through criteria" (Jones, 2018, p. 48). We might be able to use criteria and evaluations to determine how "intended system-level outcomes can be achieved productively" (Jones, 2018, p. 27).

Binder and Brandt have presented a design research approach that builds on participatory inquiry and collaborative design, emphasising knowledge production (Binder & Brandt, 2008). This scope of participatory design is also extended to include a comprehensive understanding of 'coordination' that will spur multistakeholder processes in directions of desired change, building on my takeaways from the 2023 Villars Summit that it boils down to convening, coordination and direction (Villars Institute, 2023).

"The evolution in design research from a user-centred approach to co-designing is changing the roles of those involved in the process and is changing the landscape of design practice as well, creating new domains of collective creativity", write Sanders and Stappers, and expressed hope "that this evolution will support a transformation toward more sustainable ways of living in the future" (Sanders & Stappers, 2008, p. 5). For it to do so and realise that participatory design processes have not yet brought about the societal transformations needed to solve the poly-crisis, it must matter

more to people and organisations. Factors such as belonging and other human drivers, including people's beliefs and inner values, must be part of the multi-methodology available to multistakeholder processes.

Therefore, development conditions at the front end of participatory design processes should be considered to increase the likelihood of breaking through the resistance of vested interests in prevailing systems. Formerly called *pre-design*, the "front end describes the many activities that take place to inform and inspire the exploration", and "it has been growing as designers move closer to the future users of what they design" (Sanders & Stappers, 2008, p. 6):
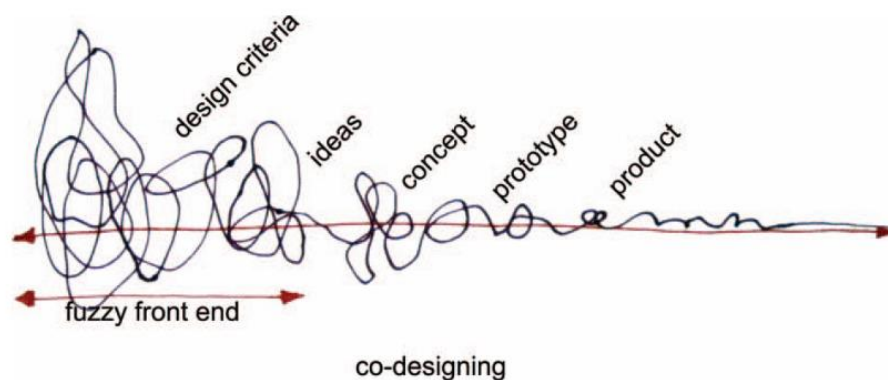
*Figure 6 **The fuzzy front end of design processes** (Sanders & Stappers, 2008, p. 6)*

Development, or enabling conditions – are suitable and supportive for multistakeholder processes and interventions aimed at transforming systems. Accessing participant's emotions and connecting inner and outer drivers, beliefs, belonging, role, values, and leadership are examples of such social factors of importance from the outset of co-creating. Leadership, the taking on the responsibility of direction, willpower, attractiveness and commitment, and universal values such as love, power and justice should be addressed early when people are invited and check into co-creative processes.

This approach to leadership and values may be universal; however, it enjoys a more substantial presence in the Nordic countries. Participatory approaches such as the "Scandinavian" (Sanders & Stappers, 2008, p. 6) approach, featuring *the user as a partner*, the lower right area in the below figure:
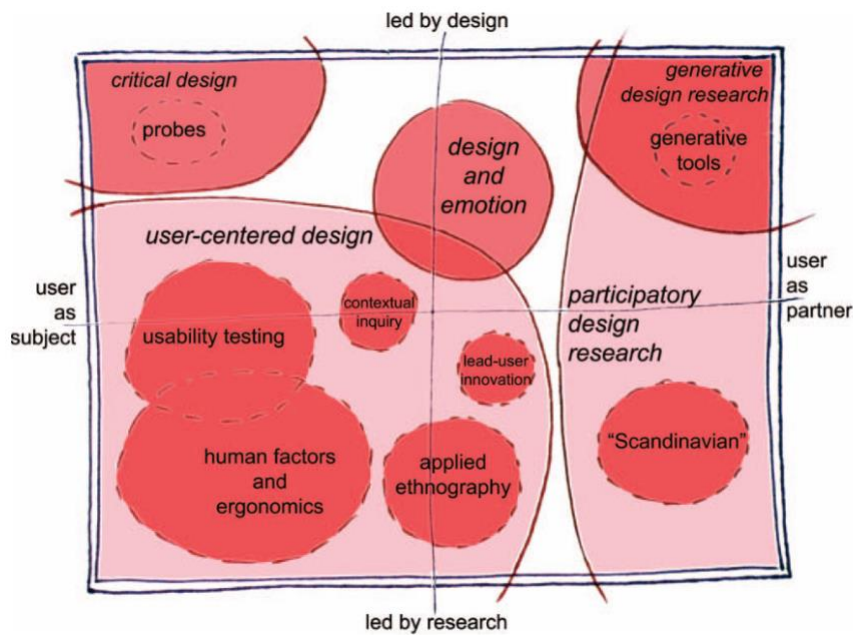
*Figure 7 **Landscape of human-centred design research** (Sanders & Stappers, 2008, p. 6)*

Tone Bratteteig refers to Bødker (Bratteteig, 2003), who connects the critical tradition to other cultural features in the Nordic countries, emphasising representative government and enlightenment of the people. This again connects with how Bildung, the folk high schools and organising in cooperatives played a vital role in the economic developments and societal progress made in the Nordic countries during the nineteenth century. Andersen and Björkman incorporate 'belonging' to place and culture and Robert Kegan's *Evolving of the Self* in their call for a Bildung 2.0 (Andersen & Björkman, 2017).

Sanders and Stappers refer to Cross, who, in the Preface to Design Participation in 1972, pointed out that design in every field had failed their assumed responsibility to design out the adverse effects of interventions. In other words, we have not designed sufficiently for the common good of all life. Cross states that harmful consequences can no longer be tolerated "if we are to arrest the escalating problems of the man-made world", and he points to participation in decision-making could provide a necessary reorientation. (Sanders & Stappers, 2008, p. 7). They also mention Robert Jungk, who, in the closing comments for Design Participation in 1972, writes about the need for radical change: "That participation must go further than decision-making and about participation in the moment of idea generation". Jungk did not expect this change to occur before the century's end. "We will have to suffer first from the lack of foresight of our fathers and forefathers. After that, something radically different can come, but it will not come on its own: it has to be prepared" (Sanders & Stappers, 2008, p. 8).

Consumerism stands out as a dominant driver of economic growth that has kept participatory design in the shadows of it for decades – "participatory thinking is antithetical to consumerism" (Sanders & Stappers, 2008, p. 9). The user-centredness of consumerism is reductionistic in that it zooms in on the users. It ignores the broader consequences for the common good and their impact on climate and the environment.

Designing for purpose - purpose-driven design disciplines are based on participatory practices in combination with user-centred methods. It builds on "traditional design skills to address social and economic issues and use the design process to enable a wide range of disciplines and stakeholders to collaborate" (Burns et al., 2006, p. 6). 21st-century design transitioning from designing categories of 'products' to designing for purposes, including for society and humanity. It requires a different long-term approach and wide-scope inquiry. The emerging design practices are changing what we design, how we design, and who designs – including who is involved.

Co-design in the context of this thesis is about transitioning societies, essentially transforming societal systems to restore nature so that societies and ecosystems can become regenerative and only be genuinely sustainable from that point. Design principles have been developed with the increase in change dynamics. Examples are Design for Transformation and Sustainability (Kjøde, 2024), Transition Design (Irwin, 2015) and Regenerative Design (Sachs, 2022; Wahl, 2016) – all pointing in a similar direction.

In co-creation, the people who will eventually be served through the design process, who will *own* and live with the outcome, are given the position of experts of experience and play a significant role in knowledge development, idea generation and concept development.

The issue of Power - the requisite variety of stakeholders (Jones, 2018) will inevitably lead to disagreement and conflict. Bratteteig et al. identified three core issues: power, mutual learning, and co-realisation, and concluded that the power issue is essential to participatory design (Bratteteig et al., 2012).

In the concluding remarks of their paper, Bratteteig and Wagner write that: "Disentangling the concept of power and analysing how power materialises in practice has given us a vocabulary for understanding the dynamics of participation and power, and of decision-making in PD – even when

the decision-making concerns a non-decision" (Bratteteig & Wagner, 2012, p. 50). I perceive it to be a significant insight that, alongside SOD, indicates ways of generating new language from co-creation.

Participatory design opens the possibility of systematically including users and other stakeholders in the decision-making processes in design. The decisions that shape solutions should be shared with those who will use them; hence, sharing the power to decide on the scope and shape of the solution is central to PD. The power aspect includes a range of issues, such as colonialism. However, decision-making is also complex. Influence can be consensus-oriented, but it often has a strategic element and uses persuasion. Many decisions are based on trust. Other non-decisions just happen. Hence, the shared power resides in the person who implements a decision, making it material – connecting design to implementation to operations.

Gerald Midgley's methodology, which is included in the Critical System Thinking section (Midgley, 2000) and is informed by process philosophy, also emphasises participatory approaches and reflective practice. Midgley advocates for engaging stakeholders in the intervention process to ensure that diverse perspectives and knowledge are integrated into the understanding of the system and the formulation of solutions. This participatory aspect is critical for addressing the ethical dimensions of interventions, promoting equity, and enhancing the legitimacy and effectiveness of outcomes.

Coming together in a series of workshops - design, implementation and operation processes will include concepts such as '*Design:Lab'*, defined as "open collaborations between many stakeholders sharing a mutual interest in design research in a particular field" (Binder & Brandt, 2008, p. 115), multistakeholder processes, meta-organizations and other processes where "*come together in networks of organizations to tackle large-scale challenges"* (Ramírez et al., 2023, p. 62), to navigate the complexity of changing societal systems.

These concepts resonate with Özbekhan's stakeholder-centred approach, outlined in *The Predicament of Mankind* report (Jones, 2022c), which advocated for addressing global challenges through collective action and consensus among diverse stakeholders. Özbekhan emphasised the need for a systemic and participatory approach to problem-solving, where stakeholders co-create solutions to complex problems. Stacey's emphasis on interaction dynamics in complex systems and Özbekhan's focus on stakeholder engagement highlight the importance of inclusivity, dialogue, and adaptive processes in navigating complexity and achieving meaningful change.

In the following, I am viewing co-creation and related management and leadership through the lens of Ralph Stacey's contributions to understanding the dynamics of collaboration in complex environments. In these environments, behaviour patterns emerge from the interactions between agents within the system rather than being centrally controlled or planned (Stacey, 1996, 2001, 2012; Stacey & Mowles, 2016).

Stacey and Mowles suggest that effective collaboration in complex systems requires acknowledging uncertainty, embracing change's emergent nature, and fostering relationships that enable constructive conflict and dialogue.

Stacey's writings are a rich source for thinking about organising and managing co-design and multistakeholder processes. Stacey critiques dominant thinking about change processes and the role of leaders and managers by drawing on sociology, psychology, and philosophy and further turns to insights from the complexity sciences to challenge prevailing ways of thinking.

Stacey and Mowles want us to be aware of the challenges caused by the contrasts in systemic and responsive process thinking. Systemic perspectives address improvement (design) and movement to a future destination. In contrast, responsive process thinking concerns complex responsive processes of human relating in which strategies emerge in the living present (Stacey & Mowles, 2016).

Unless we uncover social dynamic blind spots and willingly challenge how we come together and organise co-creation, social dynamics will likely continue to undermine the co-design process and weaken outcomes.

Stacey moves away from the notion of an organisation as a *"fixed structure"* (Stacey & Mowles, 2016, p. 24)*.* Instead*,* he draws on certain strands of sociology that stress human interdependence and regard individuals as social selves that arise in human interaction. That interaction he describes as complex responsive processes between people. In some ways, the organisation of multistakeholder and policy processes may be even more in tune with Stacey's thinking; in other ways, it may be less. However, given humanity's struggle to solve problems in large groups, it would be foolish to ignore Stacey's thinking. It certainly resonates with my international experience in management.

From the perspective of responsive processes, the impact and effectiveness of co-creation processes are related to participation in communicative interaction, power relating, meaningfulness, and the creation of knowledge.

Stacey and Mowles challenge established ways of collaborating in that "the whole is not a co-creation of *some thing*; instead, it is a *feeling* arising in people's bodies in relation to other human bodies in joint activity" (Stacey & Mowles, 2016, p. 395). In other words, we must take feelings, emotions, and the unconscious seriously and be critical of process and practice perspectives when we come together to co-create.

The theory of complex responsive processes rejects the dominant discourse that decision-makers can know the social world unproblematically, what is happening on the ground, in daily life, from a detached position in a remote meeting room. Instead, it is interested in what people do in contexts and at particular times, with a keen awareness of power relations.

It further shares a view drawn from pragmatists like G. H. Mead and Norbert Elias, where intentions do not arise in the autonomous minds of individuals but are formed during social interactions that are conversational in nature. Humans are social beings, and the interplay between people allows patterns to emerge – anticipated, often unexpected and even unwanted. This means placing unpredictability and uncertainty at the heart of multistakeholder processes instead of pretending that visions and strategy can be reduced to simplified plans and actions. People will want to understand what it means to them by talking to others.

It explores and respects the differences, which are highly relevant to co-design and abundant in multistakeholder processes. Rather than setting them aside to avoid conflict, it argues that novelty arises *because* of diverse points of view that emerge from the tension between the formal and informal (shadow) being together during such processes, reflected in conversation and narratives of identity.

Navigating the complexity of multistakeholder collaboration in systemic change processes involves recognising the unpredictable, emergent nature of complex systems. Stacey turns to ethics related to the unpredictability of social life. When engaged in societal change, participants take on the responsibility to act, although we cannot know the outcome of our actions. That takes courage. Moreover, together, responsibility and courage are at the heart of leadership. Here, leadership is

understood to be a game of social processes of recognition. Managers are particularly influential players in the game but do not control how it unfolds. In negotiating direction and strategy, *"people negotiate, persuade and are persuaded using rhetoric and disciplinary power, constrain and enable each other in differing conceptions of the good"* (Stacey & Mowles, 2016, p. 517)*.*

Co-creation can be further enriched by indigenous cultures of sensing and knowing, as Canadian Melanie Goodchild discussed with Dan Longboat, Peter Senge and Otto Scharmer. Goodchild quotes Rick Hill saying that "there is a knowing in our senses that we need to uncover and cultivate" (Goodchild, 2021, p. 89), and throughout the conversation, there is talk about *going down the river of life together, telling our stories, knowing by living, and Mother Earth is sacred, including the soil.* Peter Senge says, "It is instinctual to human beings — connecting to the land, not something we need to learn" (Goodchild, 2021, p. 98). Indigenous peoples living in the Amazon could bring ancient wisdom about interconnectedness to workshops. It connects with Gerald Midgley, who is on the JABSC editorial team (JABSC, 2024). Indigenous knowledge systems often talk about the deep interconnectedness of all elements within a system, advocating for approaches that are in harmony with the natural world. It also connects with recent SOD publications (Fitzpatrick et al., 2024).

Summary

The characteristic of SOD sums up the opportunities in SOD to enrich systemic intervention approaches in the Amazon (Sevaldson, 2022, p. 31):

1. Practicing a designerly way of understanding and creating systems

2. Applying central SOD techniques, including gigamapping

3. Addressing complex problems using multiple perspectives

4. Emphasising relations and interconnections

5. Understanding soft, as well as hard, system approaches

6. Applying multiple perspectives, stakeholder perspectives, micro, meso, and macro perspectives. Working with problem-fields, problem-networks, and situations, rather than singular problems

7. Taking responsibility for intended and unintended consequences of the design

8. Representing affected bystanders, as well as non-human actors

9. Facilitating participatory processes with stakeholders, experts, and all relevant organisations and individuals.

10. Considering ethics: SOD is about improving things

From the perspective of EII's proven methodologies and practice, SOD can inspire the development of multi-methodologies, and research and explorations of SOD can stimulate the development of language, definitions and nuances etc., adapted to EII's needs and serve to improve communication, fundraising, and reporting to donors. Additionally, one of the SOD roots, System Dynamics by Donella Meadows, and the broader field of system dynamics inspire us to apply these as a supplement to gigamapping pragmatically.

Co-design is a field in a flux of development. Purpose-driven design disciplines such as transition design, transformative design, design for sustainability, regenerative design, etc., contain methodologies that can make EII's present practice more resilient and expand the scope of fundraising of multistakeholder processes. Participatory Design suggests adding the "fuzzy front end" to improve the enabling conditions for collective action. Ralph Stacey's thinking on management in complexity can also improve how multistakeholder processes are managed and led. The theory review contains insights on power issues in general, such as developing a vocabulary, which connects to the possibility of including indigenous knowledge and cultures to improve co-design in the Amazon. Merging the insights from the roots of SOD implies that co-design should be considered part of a coherent process that is interconnected with implementation and operations.

Roots of SOD connect to management. The SOD syllabus, especially Ralph Stacey's ways of thinking about management and leadership in complexity, is a rich source. However, these contributions do not meet the management methodology (measurement and evaluation) needs of a systemic intervenor, as defined in the introduction of the thesis.

Moreover, while there are several of the theory contributions to leadership that can be seen as part of what has become Systemic Leadership, a theoretical gap between the core of SOD and leadership remains. Indigenous knowing and the scholars engaged in the Journal of Awareness-based Systems Change, such as Scharmer and Midgley, point us in the direction of a newly developed field, the field of quantum leadership. The integration of management in SOD lacks methodologies that are necessary for daily administration and reporting in systemic intervenor organisations.

Method

The method of this thesis unfolded as an explorative design research process, learning and letting emerge in a dynamic field. It builds on Gerald Midgley's creative design of methods, saying "that different purposes require different methods throughout a process unfolding over time" (Midgley, 2000, p. 225). I wanted to avoid rigid methods and being blinded and trapped in so-called established truths from specific fields of rainforest conservation. Parts of the design process took a form that reminds me of what Horst Rittel described as an *argumentative process* (Sevaldson, 2022, p. 201) and the praxeology defined by Sevaldson: "The knowledge, experience, adaptability, and competence to operate in real-world contexts (Sevaldson, 2022, p. 202)."

Applying a Research by design methodology (Sevaldson, 2010), a flexible multi-methodology of unstructured interviews, ongoing conversations, workshops, meetings, cases, gigamapping etc., was carried out. The purpose of these activities (Appendix 01) was to explore how to approach the complexity of the thesis context and how EII can drive systemic change, partly by enriching practices and methodologies by learning from the field of SOD and partly by adapting its management and leadership to the systemic design nature of its approach.

Overview of the research activities:

*Figure 8 **Overview of Research Activities***

The people interviewed, the board members and the advisory panel were all highly regarded international experts and leaders in the field of Amazon conservation. It involved eleven people based in Brazil (2), the UK (2), the US (5), Germany (1), and Switzerland (1), and representing business and non-governmental organisations. Internally, the leadership team includes the heads of the country teams in Brazil, Colombia and Peru, the head of the geospatial team, and the five-person management team.

Below are brief descriptions of each activity that was carried out as part of my research:

I. **Weekly talks with executive president Daniel Nepstad** (Earth Innovation Institute, 2024a)

Since 2020, the weekly talks have become a river of conversations. From the autumn of 2021 I attended the SOD executive master course. SOD became a lens through which I saw EII's work and challenges. Thus, it coloured how Dan and I shared, suggested, co-sensed, refined, discussed, digested, and visualised aspects of EII's approach. It was down to earth and consistently applied to real-life challenges and opportunities. It would flow into discussions on strategy and, in some cases, into specific proposals for funding.

More generally, it left an imprint on language, narratives, and thus communication. It informed a pragmatic probing of options. Illustrations and gigamaps, either made by hand or in Miro, were used to visualise insights or ideas from the talks.

My suggestions, informed by SOD, rested on my respect for EII's track record of thought leadership and interventions in tropical forest regions. It was a search for ways of strengthening and complementing EII's already proven systemic design approach. Topic by topic, perspective after perspective, involved viewing, re-viewing, listening, discussions, learning, questioning, pragmatic probing and re-telling what we had heard from each other. It was a process of synthesising and design research.

II. **EII leader team workshops**

A strategy process ran from late 2021 to December 2022 and consisted of the following:

Phase 1: Structural Assessments—funded by the Gordon and Betty Moore Foundation. The former director of a large international conservation NGO led it. It largely followed a proven recipe that did not fit EII, and in the late spring of 2022, it was abandoned.

Phase 2: Funded by the David and Lucile Packard Foundation, this phase was led by me and aimed to develop a new EII strategic document that includes a revised theory of change, operational models, communications strategy, and revised fundraising strategy. It interacted with the other design research methodologies mentioned in this chapter.

Initially, several workshops and interviews with the participation of EII leaders' team members resulted in an organisational development assessment, lessons learned and trends and

opportunities. The workshops were online and used Miro boards to capture ideas and inputs and some pre-designed frameworks that used Post-its.

From June 2022, we applied a pragmatic approach to the process, consolidating strategy work alongside new ideas, learnings, and insights. We went deeper to understand the core nature of EII more precisely and to open for new insights and learnings, not least triggered by the advisory panel meetings. The learnings and findings were consolidated with previous work and analysis and synthesised to produce a strategy summary document (Appendix 02).

III. Advisory panel

An advisory panel was set up to add external high-level expert reflections, and with the following members: Joko Arif, Packard Foundation; Juliana Lopes, Amaggi; Charlotte Streck, Climate Focus; Sabine Miltner, Moore Foundation; Bruce Cabarle, Partnerships for Forests at The Palladium Group; Kate Jackson and Richard Gledhill, from the Board of EII; and Daniel Nepstad, executive director and president. There were five iterations.

IV. Board meetings

Ahead of each iteration with the board, there were team leader workshops with the same agenda. Once iterated with team leaders, a revised version of ideas, and concrete concepts and approaches, to various degrees inspired by SOD, were presented to the board of directors for feedback and discussions. The team leaders were also invited to join the board meetings.

V. Gigamapping of interviews

I did four unstructured interviews with leaders in the field. The interviews aimed to learn and gain insights into the field of work related to the Amazon Forest and systemic approaches. They were gigamapped for my purpose, in hand, while talking online, and did not involve the interviewee (Appendix 03).

The following were interviewed: Two members of the Peruvian team regarding its systemic DRIVENET (Reyes, 2024) and *bottleneck analysis* methods. The Peruvian team had emerged as the operational model for EII's country teams.

I interviewed Charlie O'Malley, UNDP, twice. UNDP introduced several ideas for more holistic and systemic approaches. Charlie invited me to one of UNDP's internal workshops in 2018, and I interviewed him to learn how UNDP saw development work and systemic change.

Interview of Juliana Lopes, Director, Amaggi, Brazil. Juliana, who represents an agribusiness company, serves on the UN global compact board for Brazil. She is engaged in many multistakeholder processes and meta-organizations that address agriculture, food, nature, and sustainability. She was also selected for EII's advisory panel.

VI. Gigamapping workshops

The Glückstadt Real Life Lab, August 2022: This was a three-day conversation and systemic design lab between the forest scientist/forest policy 'diplomat' (Dan Nepstad) and the trader/businessman (myself). It was a meeting of systems; Dan, who has a Ph.D. in forest ecosystems, met System Oriented Design.

Twice in the past, strategy process attempts at EII had fallen short. This was a restart. The organisation was stretched out, which ruled out longer processes with more participation of team members. Despite the constraints, it was an open approach, and time was available - no plan, agenda, or schedule. Over three days, we moved around Glückstadt, from Dan's home office to cafes and restaurants, and we went on a bike tour along the Elbe River. All along with our notebooks, A3 sheets, and pens for gigamapping. Moving around, changing scenes, and changing our working and talking methods proved valuable. We were producing creativity, breakthrough thoughts, insights and gigamaps (Appendix 04) that helped us see things differently and make progress.

COP 26, Glasgow, November 2021: During the Glasgow Climate COP, Dan, Monica (head of the Brazil team), and I took a time-out from the COP. Over lunch at a pub and in the afternoon in a hotel room, we discussed and gigamapped what a JREDD systemic approach in the subnational states of the Brazilian Amazon could look like. We worked on several gigamaps (Appendix 05), mapping out the parts of JREDD, how the parts and stakeholders connect, how it works, how it was developed within the UN system, how it could be connected to other agendas and approaches, how to better engage businesses and farmers, etc. Upon our return home, Monica and I began converting the gigamaps done by hand to Miro with the intention of continuing the work in Miro. Shortly after, it stopped, though, and was not continued.

Forest Champions workshops and Gigamapping: Maria Adelaida Fernandez, head of the EII Colombia team and I were tasked with reviving the Forest Champion Concept launched as part of the Balikpapan Challenge (Nepstad, 2018) but never reached its full potential. We met online, and over 4-5 meetings, we worked our way through what had been produced in the past, how it connected with other work, programs and initiatives, etc. We took a fresh view of things and shared what we saw on a gigamap in Miro (Appendix 06), trying to understand what Forest Champions was about before developing suggestions for going forward.

Strengthening jurisdictional programs and landscape initiatives through strategic communications with investors: Claudia Stickler led this project. During the initial phase, we started visualising and gigamapping perspectives, parameters, etc. It was of some help initially, but partly due to a lack of funding and thus the availability of country team members, Claudia did most of the work herself without workshops and gigamapping.

I produced the first version of a *European demand-side* gigamap. The idea was to connect demand-side gigamaps with gigamaps representing Amazon countries, states, and provinces to visualise how these complex systems are connected at a global scale (Appendix 07).

VII. My gigamapping of proposals for funding and my reflections

Three proposals for funding were gigamapped by me to establish what work EII included in such proposals and what not:

> The Territorial Performance System concept (TPS) (Appendix 08)
>
> Proposal for funding to Bezos Earth Fund (BEF) (Appendix 09)
>
> Proposal for funding to the Land Innovation Fund (LIF) (Appendix10)

My thinking was that gigamapped proposals could be used as a work tool to generate new insights and learning. The gigamaps could also be connected to other gigamapped contexts as a way of moving around in a globally connected system and into subsystems. This would require some cumbersome work, so this was a sparse beginning to indicate how it might work. The proposals submitted to potential donors contained the most concrete and specific information about what work EII was seeking funding for. Initially, three recent (2022-2023) proposals for funding were selected and gigamapped (during Feb-March 2024).

During the study, I used gigamapping to reflect on the research process (Appendix 11). It became a way of shifting work and reflection mode from dialogue to writing to the visuals of gigamapping. These formats ranged from poster-size to notebooks to Miro.

My reflections were further processes with fellow SOD students Torun Degnes and Francis D'Silva. The three of us co-wrote a submission on implementation from the viewpoint of SOD (Degnes et al., 2023), and we co-wrote a paper for the Relating Systems Thinking and Design Symposium (RSD12, 2023). The paper 'SOFA – A Systems Oriented Facilitation Approach to Shift Societal Systems' (D'Silva et al., 2023) built on each of our years of management experiences in three different sectors and featured EII within food and nature. Across sectors, we had similar experiences, and on the other hand, we experienced during this learning journey how we, too, had to deal with different definitions, languages, cultures, etc. It was very much about bridging silos (Wettre et al., 2019). It involved a year of workshops, drawing, illustrating, gigamapping, sharing and developing on Miro and Slack.

VIII: Author's experience
The essence of my experience and knowledge position: Leadership, the global food system, and nature-based solutions.

Career: I have held commodity trading, food industry management, and CEO positions in international companies. I have also worked in nine countries, working across cultures. Archer Daniels Midland (ADM, US), Amaggi (Brazil) and Aarhus Karlshamn (AAK, Denmark).

Engagement in nature and climate: I engaged in the zero-deforestation agenda as a CEO from 2011 – 2020. I led a Norwegian food industry multistakeholder process 2014-2015 that involved dialogue with the Norwegian government, the government of Mato Grosso, Brazil and stakeholders in Norway, Brazil, and internationally - resulted in a signed commitment to zero deforestation and more responsibilities on imported soy (Thomsen, 2015). It was highlighted as a leading Norwegian example by the minister of climate and environment at the launch of the UN Better Business Better World report in 2017. I was a Balikpapan steering committee member, a multistakeholder process run by EII. I participated in COP meetings and panel discussions at climate COPs and the Oslo Tropical Forest Forum. The Norwegian government invited me as a keynote speaker at the Biodiversity Conference in Trondheim 2019.

Leadership: My leadership experience points towards Otto Scharmer, Peter Senge, Robert Kegan, etc., partly through the Stifinder[3] Leadership Program (Drouin, 2017; Stifinder, 2024). Board member Emergence School of Leadership.

My role regarding the thesis: In the autumn of 2020, I was engaged as an external consultant at EII. When I enrolled on the SOD course in September 2021 and during the research process (2021-2024), I worked part-time at EII, and the design process of this thesis constituted the lion's share of the work. The SOD course was at my own expense and applied to EII pro bono. I had one foot in the door while not entirely inside EII. Mainly, my contribution was to bring outsider perspectives from my background in food sector management, as well as SOD. In the spring of 2024, I became a member of the management team at EII. Before 2020, I collaborated with EII and did two multistakeholder processes with Daniel Nepstad.

Summary of activities

Throughout the research period, the founder and executive president of EII, Daniel Nepstad, and I regularly talked for one hour every week. The conversations were about EII's strategic approach, to which I offered my perspectives gained from a business career in the food system and multistakeholder experience related to the Amazon. Knowledge of SOD naturally flowed into the conversations. We began discussing and reflecting on how SOD practices and methodologies resonated with multistakeholder processes and how everything could be connected to EII's strategy.

The conversations with Daniel Nepstad were the backbone of the design research, interwoven with iterations with EII team leaders in Brazil, Colombia, and Peru, the board of directors, and the advisory panel of international experts.

In 2022, much of the work was funded; therefore, we accumulated extensive documentation of findings and insights into a 135-page document (Appendix 02). Simultaneously, results were pragmatically tested in new concepts, communication, and fundraising.

I gigamapped four interviews, with gigamapping working well for my personal use.

---

[3] Stifinder meaning 'pathfinder'

I introduced gigamapping in four workshops. During two in-person workshops, the two other participants perceived it as valuable. An initial online gigamapping was discontinued early, and the Glasgow gigamap also became inactive after being transferred to Miro. One online gigamapping (Forest Champions) worked well. Further, I tested gigamapping on proposals for funding that had been submitted during the previous two years, first by hand and then re-mapping them on Miro. That produced little value, and I found gigamapping to be of greater value early in creative phases, e.g., when developing new policies or concepts. Throughout the research, I use gigamapping for my reflections.

Finally, experience played a key role, e.g. fields such as leadership, the global food system, and nature-based solutions. Daniel Nepstad's experience as a leading international figure in science and global efforts to mitigate tropical forest deforestation, the experience of team leaders, advisors and board members, and my own experience.

Results

In this section of results, I pull forward specific milestone outcomes and consolidate other results for further research and development. The results were derived from the thesis research by design activities. The research consisted of a mix of research activities that were related to senior management experience, and a literature review of the broader field of SOD and selected literature outside the syllabus.

The results are structured by their relation to the questions of the thesis:

1. Enrichment of systemic interventions, methodologies and practice
2. Improvement of co-design and collective action
3. Integration of strategic intervention approach pillars: SOD, management and leadership

Overview of the results

Firstly, two specific outcomes: In the spring of 2024, Earth Innovation Institute shifted its approach to "driving systemic change" with a plan for connecting the dots of lessons learned. A pan-Amazon purpose-driven concept named *Amazon Regeneration* was developed with imprints of SOD.

SOD helps structure system contexts into governmental layers and enriches the systemic design language at EII, both infusing communications and fundraising. It played a role in re-discovering the roots and identity of EII. The literature review suggests that EII can widen its current methodologies and develop resilient multi-methodologies to expand funding opportunities. There is a flux of developments in the field of SOD and opportunities to co-learn with leading scholars and practices.

In addition to the above, co-design can be improved by adding a front end and enabling conditions. Both additions can be fundraised for. Indigenous culture can enrich co-design, and SOD facilitation can make it more effective. Gigamapping can be added as a tool.

The literature review revealed a methodology gap between SOD and management; however, leading practices that have brought new ways of measuring and evaluating complex interventions using patterns and portfolios can narrow the methodology gap both for SOD and EII. Another gap is a theoretical gap between the fields of SOD and leadership, which could be narrowed by connecting to indigenous knowing and the work of scholars engaged in the Journal of Awareness-based Systems Change etc., pointing to further research in the direction of systemic and quantum leadership.

Evaluation of the process

Dan Nepstad, the central figure of the research, expressed that SOD "had shaped his thinking". When asked to reflect on the weekly talks, Dan replied (9th May 2024) that they:

- Bridged "two fields" – talks between the executive president of an NGO and the former food industry CEO, between the forest ecology scientist and the food commodity trader.
- "We were able to think and talk about ourselves" – EII's role, identity, approach, impact, worldview, beliefs, theory of change, etc.
- "Outside the box, we got to think more broadly about EII".
- During the Glückstadt workshop, we "re-connected to the founding idea of EII, and connected that to years of lessons learned, and connected all key areas of EII's approach and work—connections that are poorly communicated and not evident to outsiders", e.g., connecting peer-reviewed papers representing thought leadership to the *triangle* of fundraising, relations building, and communication. Dan referred to this as "referential research."

Documented results

The results and lessons learned from the 2022 strategy and design research process were compiled in a 135-page long-version strategy document, and a letter with a summary document was submitted to the Packard Foundation (Appendix 02). Workshop takeaways and advisory panels were also documented and shared with team leaders on Google. In the letter to the Packard Foundation, 30th December 2022, we summarised the process (extract): "... We became better aware of how we dance with, get the beat and listen to the wisdom of systems (Meadows) – as we work with systemic interventions in complex systems. During the first phase, It became clear to us that proven methods and operational models introduced from parts of the conservation community simply did not resonate with prevailing beliefs and the approach of EII … we learned what EII was not, and gradually we saw how various parts of EII's approach resonated more with systemic design and newer approaches that were getting more attention."

During the first half of the restructuring process, the lead consultant and the management repeatedly disagreed. The process followed a proven conservation-NGO method that the management felt restrained EII. However, it taught us much about EII regarding identity, worldview, practice, and methodology. Halfway into the process, the study was changed to the design research of this master thesis.

It resulted in implementing only what could be pragmatically and immediately applied. Further implementation was postponed due to a lack of resources, people, time, and funds.

The Amazon Regeneration Concept

An example of a concrete outcome, however, was a new concept developed by Dan Nepstad. The restructuring process insights and the weekly talks partly inspired the concept. It was a pan-Amazon vision for forest-friendly system change across the countries, states, and provinces of the Amazon Region. It was called Amazon Regeneration (Appendix 12). The first version, November 2022, was followed by a second version in 2024 and shared with potential donors. One of the innovative ideas here was to agree on action plans for restoration and regeneration with Amazon governments during the period between the biodiversity COP in Colombia in late 2024 and the climate COP in Belem, Brazil, in October 2025.

For the first version of Amazon Regeneration, layers of system structure were developed based on SOD macro, meso, and micro perspectives and governmental scales. It had seven layers, later reduced to five: Global, Regional (international), National, Sub-national and Landscapes. This way of structuring complexity was a way of navigating complexity without over-simplification. The structure was built on suggestions from talks and iterations with team leaders and the board, and it turned out that the Peru team had a similar illustration contextualising their work (Appendix 13).

Multistakeholder processes

The Amazon Regeneration concept and dialogues of the mixed methodology connected to the topic of multistakeholder processes, but co-design was not discussed or iterated in detail. The organisation was stretched out and strained for funding, and the remoteness between Oslo and Latin America and language barriers meant that testing in workshops was not carried out. That meant that multistakeholder processes were discussed, referring to the experience of senior leaders, and the weekly talks referred primarily to the two multistakeholder processes Dan and I experienced together in the past, representing each of our organisations.

To check how co-design was presented to donors, I gigamapped three funding proposals and found that they contained outcomes stemming from multistakeholder processes. However, there were no specifications or details on the processes themselves (Appendix 08-10). EII is respected for its ability

to lead and facilitate multistakeholder processes in the field of tropical forests, and this seems to indicate that funding is based on trust in EII's team.

EII was invited to participate in the Villars Summits 2023 and 2024. These two three-day events explored how systemic shifts could be approached jointly with other organisations and leaders across sectors, and by participating, EII became part of the Villars systemic change community.

With fellow students on the SOD master course, I co-wrote a submission on system-oriented implementation, pointing to a coherent integration of SOD, implementation and operations (Degnes et al., 2023)e published a paper: 'SOFA – A Systems Oriented Facilitation Approach' related to multistakeholder processes or meta-organizations (D'Silva et al., 2023). The paper was built on three examples from three different sectors. EII was one of them. In the case of EII, it refers to two specific multistakeholder processes. The paper argued for bringing more systemic design competencies and facilitation into co-creation.

Finally, many of my reflections that I gigamapped were around co-design and how to break through by joining government, non-government, and business organisations. (Appendix 11).

Driving systems change

12 March 2024 – Dan Nepstad introduced "Earth Innovation is designed to drive systemic change" first to the team leaders and then to the board. It was a culmination of three years of talks and process. It signified that things had come together, and significantly, it resonated with both the founding idea and the existing practice of EII. (Appendix 14).

During our discussions, the team leaders talked about *invisible work*, and a paper shared by one member talked about the complex long-termism of this kind of work. There was nodding, and stories exemplified complexity and systemic interventions. I interviewed the Peru team to understand their practice, which included a multi-factor, complex bottleneck and systemic analysis. There was the mention of institutional milestones as an example of indicators of significant progress in this kind of long-term change environment. Moreover, there were smiles and *likes* when using a 'spaghetti' illustration of complexity. SOD, during the research, resonated with the team leaders the reactions indicated, and some were energised by approaching complexity this way. The "jurisdictional approach is still abstract for many people", a large governmental donor said at a meeting recently.

Under Gustavo Suarez de Freitas's leadership, the Peru team had developed a SOD-like practice, which was included in the strategy document as the leading operational model for all country teams.

Although subtle, one can see how the language changed on this learning journey. In the review of participatory design literature, I found that the language, in a broad sense, is expected to develop and become better able to convey complexity, systemic design research, etc.

Relating to SOD and testing of gigamapping during workshops (appendix 04-06) brought an awareness that helped participants see and sense in new ways, seeing new dimensions and more of the system, and thereby also changing how EII's role and identity were perceived internally. During year three, we discussed identifying patterns indicating that things were progressing in the intended direction. One team leader referred to sub-national governments establishing institutions to manage low-emission and forest strategies as an indicator of progress and future impact on the system. Given the complexity and long-termism of EII-led interventions, identifying patterns in general and, importantly, patterns of lessons learned came across as a sensible way of monitoring real progress – and as the figure illustrates, patterns make a logical connection with complexity (systems), structures and worldviews:
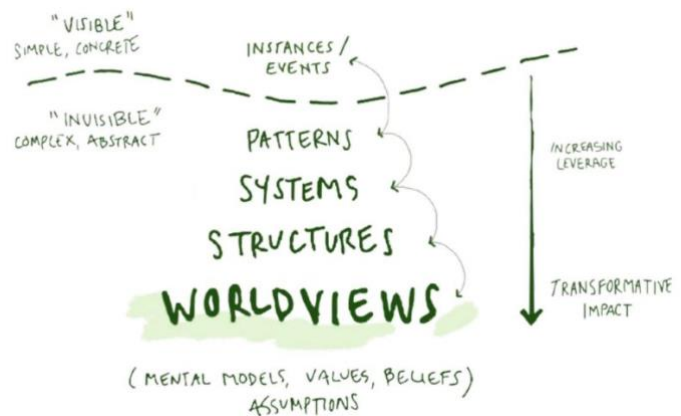

Figure 9 **Patterns, Systems, Structures, and Worldviews.**
Image source: Systemic Design Labs, ETH Zürich

I found gigamapping valuable for my reflections and as a way of widening my perspectives, moving from conversation to text to gigamapping.

Gigamapping in-person workshops showed some promise but were, with one exception, discontinued when the maps were transferred to Miro. I gigamapped proposals for funding. However, this gigamapping did not work as intended. It did show relationships but lacked the dynamic of discovering them and other interconnections that may not have been included in the proposals. The research thus indicates that gigamapping would be of more use earlier in processes when designing proposals and concepts.

Gaps

Given the fact that the relating of SOD to EII's practice far into the research process crossed tracks with strategy, it was clear that systemic design practice, management and leadership were interwoven parts of EII's strategic approach. However, the research activities did not produce any results in terms of exactly how SOD would support management and leadership and the other way around. The SOD syllabus included implementation and general management and organisation in complexity. Thus, a bridge between SOD and management is under construction. At the same time, the thesis finds that leading practices contribute to the development of methodologies that can fill gaps at EII and in SOD. EII's leadership was developed for its systemic approach, although it does not include the front end of co-creation. In comparison, SOD lacks an integration with fields of leadership that could support SOD.

Summary of results

The results described in the previous section state that structuring complex systems, language, and complexity awareness at EII are valuable for the organisation, for clarifying its identity and role, and for improving communication and fundraising. Adding a front end, enabling conditions, and integrating indigenous knowing to co-creation processes can improve the effectiveness of multistakeholder processes and expand fundraising possibilities. Closing the gaps between SOD and the fields of management and leadership can, in different ways, benefit both EII and the field of SOD.

The results are discussed in the following section.

Discussion

In this section, I discuss the thesis questions and the results in line with the strategic approach of EII, namely its practice (referred to as SOD and co-design), and management and leadership and their implications for the two target audiences, SOD and EII.

SOD as an embedded practice at EII

During the research process, SOD made an imprint on EII's thinking. *EII as a driver of systemic change,* was launched. An *Amazon Regeneration* strategy was updated with recent learning and developments, and a concept note was shared with potential donors. However, SOD did not shape multistakeholder processes, nor did it change how systemic interventions were carried out. Adverse funding conditions meant that testing was not possible during the study, and further, my remoteness and language were barriers. The testing and exploration, therefore, were deferred.

From my perspective, as a systemic designer, the learning derived from relating SOD to EII's approach entails several changes that EII could implement without delay. For the changes indicated by these learnings to be accepted at EII, they must be perceived as increasing the efficacy of interventions without adding significantly to the workload. In other words, the changes must have clear practical value for the effectiveness of the work or success in fundraising.

The iterations revealed that parts of the research that was found to be implicit in EII's prevailing practice can be made explicit by relating the practice to SOD. Interventions described by EII in a summarised manner can be nuanced, expanded, and specified to make them visible and fundable. Thereby overcoming a key challenge of EII, which is to get funded part of its systemic work that today serves as background insight when submitting proposals for funding. Moreover, connecting to SOD methodologies and practice can help stimulate development because the field of SOD is in a flux of development as indicated by the literature review and exemplified by the activities of RSD (RSD, 2012). Looking to SOD can also open to learning from other fields of practice, such as co-design in various sectors (D'Silva et al., 2023) and the leading practices of the UNDP strategic innovation team and Reos Partners. Thus, SOD can be synthesised with EII's present approach while being faithful to the core approach of EII.

The emergence of a new language

EII had experienced that stakeholders not fully familiar with its work struggled to understand its role and impact. Subtly, during the weekly conversations, SOD inputs would add perspectives and change how we talked about the work. However, it was confined to these conversations as funding was scarce during this period, so there were few possibilities to include more colleagues or test during workshops, etc. New ideas such as those described in this master thesis, a proposal of how to structure complexity, and *Driving Systems Change* (Appendix 14) were introduced to team leaders and the board and with that followed bits of new language to explain the systemic design aspects of these new thoughts and concepts. Another example from the research that resonated with the people at EII was the term "intrapreneurs", used to describe "those proactively acting within government to make change" (Trebeck, 2024, p. 1).

Further to language and text, gigamapping and visuals (Sevaldson, 2022), methodologies, and tools have the potential to interact as means of communication, including metaphors, storytelling and other ways of conveying complexity and systemic interventions. Developing new means of communication from a richer source of language and visuals could support the externalisation of what is complex, e.g., work that involves systemic relationships and connecting the dots. It can be perceived as a multi-language (D'Silva et al., 2023) that is needed to convey the role of the intervenors and the complex nature of systemic transformation over time.

Communicating patterns of lessons learned

Towards the later stages of the design process, it emerged in the dialogue with Dan Nepstad that writing up lessons learned over the past more than ten years would help communicate the work and impact of EII. Writing up lessons learned and the relationships between these lessons may well turn out to be a better way of understanding the real impact, short and long-term (Lowe, 2023; Lowe & Wilson, 2017). A SOD approach could shed new light on patterns of lessons learned and provide the framework that is needed for such patterns to unveil their broader importance as indicators of progress towards longer term targets. An importance that practitioners know them to have. However, it is easy to understand donors' need for control and holding grantees accountable; government donors are accountable to legislators and need quantifiable indicators of impact. As societal systems undergo transitions, measurement and reporting frameworks must transition along or preferably ahead of them. Meanwhile, systemic change practitioners likely must satisfy both the need for learning and adaptation and, on the other hand, satisfy more rigid and linear demands for measurable results and reporting to donors.

Researching lessons learned for indicators will make EII able to identify patterns of achievements that constitute a pattern. Thereby its impact on the system, structures, and worldviews and beliefs can be contextualised and communicated.

Structuring complexity to navigate entanglements

Understanding the Amazon system, its local, national, and international layers, and the complexities and interactions among these layers, is a challenge.

By structuring the complexity during the study, e.g., Amazon Regeneration (appendix 12), system navigation was made more accessible without unnecessary and undesired simplifications and reductions. The Peruvian team had already created a similar structure to illustrate its work. The number of system hierarchy levels varied. They all contained the various governmental levels relevant to the interventions.

Outside the SOD syllabus, recent literature featuring statistics and data (Ritchie, 2024; Smil, 2022) were discussed regarding their contribution to system dynamics. For example, using data to reveal how the ammonia market is an overlooked determinator of the global food system - recalling that agriculture is a significant driver of deforestation. One way of moving forward from here could be to investigate and test how EII could further develop its Green Jurisdictions Database (Earth Innovation Institute, 2024b) by exploring different methodologies for analysing the dynamics of societal and ecological systems of the Amazon. Not to develop a system dynamics computer model but to develop a methodology, partly quantitative and partly qualitative. I believe such an approach to system dynamics would make sense to both progressive forest-friendly governors in the Amazon (who fail if they do not do well in the economy) and to business-savvy philanthropists. During workshops such analysis could be combined with the creative explorations of the gigamapping tool.

Co-creation - the system transformation arena

Co-creation[4] has, over the years, become a practice developed by experienced and respected senior managers at EII, although the methodology was not formally documented. Embedded in EII's

---

[4] Co-creation includes co-design, participatory design, etc., as well as design research and enabling conditions related to multistakeholder processes, meta-organizations and other collaborative processes, where

multistakeholder methodology are the layers of government and a cross-sector approach. And furthermore, it follows the principle of free prior and informed consent and is defined by JREDD rules defined the UN Warsaw Framework and the Cancun rules on safeguards. I gigamapped proposals for funding to obtain an initial overview of how co-design was presented to potential donors. The proposals featured outcomes and stakeholders, but neither specified processes nor elaborated on methodologies. Admittedly, gigamapping three proposals is an insufficient basis for any conclusion. It may indicate that EII could be able to enrich its co-creation methodology and its effectiveness by experimenting with co-creation in general and engage with leading practices such Reos Partners (Reos Partners, 2023a).

In the following, I will briefly recap the lessons learned from the literature review and from the experiences mentioned in the method section to suggest a framework for approaching multistakeholder processes. It is not to be perceived as a complete framework; it is meant for development and adjustments. However, the parts must be brought together in a coherent systemic approach. The previously mentioned results, such as seeing the system and developing new language, structure, and patterns, are equally valuable for co-creation.

I suggest adding a "fuzzy front end" (Sanders & Stappers, 2008, p. 6) to multistakeholder processes. The front end plays an increasingly important role in for-purpose participatory design. My experience is that multistakeholder processes risk producing lowest denominator learnings and outcomes if participants, designers and experts do not assess their motivation, purpose, inner drivers and beliefs. But also the front end can serve to coordinate the level of ambition, align on values that can support the process, clarify roles, and coordinate intent and direction, and more.

Multiple methodologies (inspired by Scharmer, Senge, Kegan, Stifinder, Kahane, etc. in the literature review) can be considered at the front end; the point is to spend time in the front end, strive for people to get on board wholeheartedly, team up and get the gears in place to improve the conditions for the process.

The front end is where the process is connected to place and people's sense of belonging, i.e. cultures and identities (Andersen & Björkman, 2017). Co-creation in the Amazon is thus a unique

---

organisations come together to solve complex problems. It relates to all dynamics of the system: policy, voluntary action, business logic, nature, human rights, etc.

opportunity to engage Indigenous culture, sensemaking, etc., which can enrich the entire approach (Goodchild, 2021). The front end is also about establishing awareness of pace layers (Brand, 2018) of societal change and the work pace of co-designing in complexity – thereby managing both short and long-term development.

The below illustration is a synthesis of the reviewed literature and my experience with co-creation:
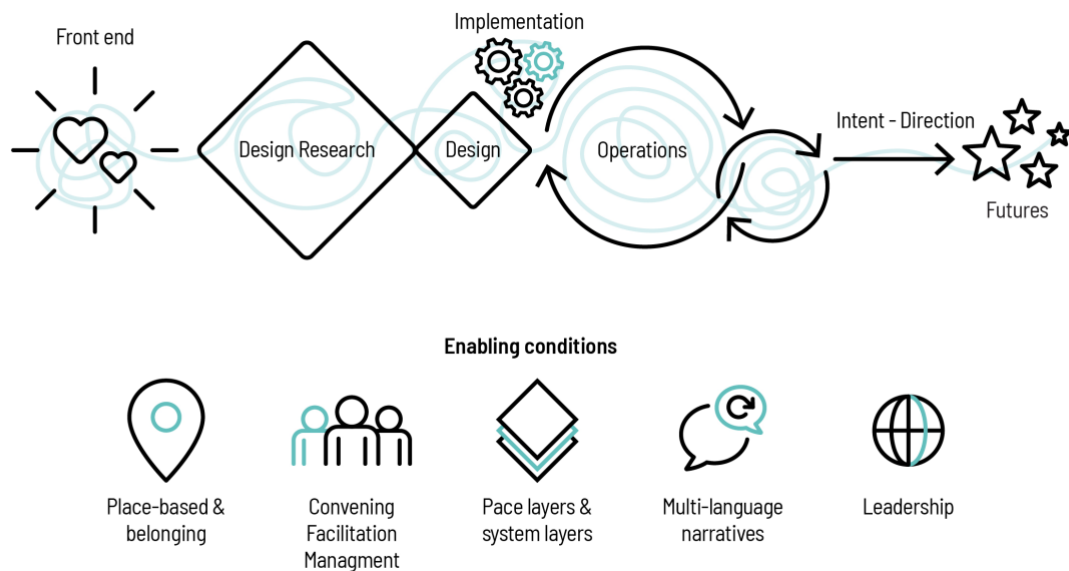

*Figure 10 **A systemic design approach to co-creation***

The co-creation framework contains the elements of convening, systemic design facilitation (D'Silva et al., 2023) and management, along with narratives and leadership that are enabling conditions for co-creation. Management is a must-have but often treated as separate from co-creation and design; I argue that it should be considered an integrated part of co-creation. I make a point of convening as not being part of facilitation and management. Convening as such can increase the attractiveness for participants to show up, depending on the status of the convenor and the hosting environment.

Intent and direction connect to leadership and are included to say that long-term developments of societies are fundamentally about having a clear intent and nudging the giant gears of change in a desired direction. Futures are included because visualisation of future scenarios is helpful, and realising they will look different from participant to participant, there will be multiple future scenarios. The key is to align behind a shared purpose that is broad enough to contain these futures.

Purpose-driven design and design research, such as regenerative design, design for sustainability, transition design, etc., have been gaining momentum these years. Thus, there are plenty of open sources for methodology research in co-creation available for further studying. It may comfort the system intervenors at EII to realise that they are not alone when in despair, that their experience is valuable, and that there are many with whom to co-learn.

Implications

The research results pointed to two main implications, which are discussed in the following section.

Firstly, SOD needs a closer affiliation to a suitable and supportive management framework. Secondly, there is a gap between the academic fields of SOD and leadership that would need to be bridged for the two fields to become better integrated. The two implications are different for the two target audiences, SOD and EII, though. Thus, I am relating the implications to both audiences.

Given that my entry point at EII are the managers and leaders, my concern was that unless the whole strategic approach of systemic design, management and leadership was addressed, it would leave a vacuum that could result in hesitation or otherwise weaken the learnings and potential identified in the field of systemic design – and thus constitute a barrier to the further development of an overall systemic approach at EII. EII's approach goes beyond design. Beyond the efficacy of interventions and co-design, it is also about the ability to articulate, communicate and manage impact, and about trustworthy verification, trusted use of funds – and coherence with leadership that creates common ground, is innovative, influences, and is getting noticed. One thing is to do systemic interventions out there on the grounds of the Amazon. However, if it does not work in tandem with management and leadership, the 'business' model will suffer.

Although the fields of management and leadership are intertangled, two sides of the same coin, I have chosen to make a distinction in this thesis. For the present purpose, leadership is defined as direction, intent, and taking responsibility, as well as inner drivers, consciousness, courage, and the will to move things in a new direction. It is thought leadership and policy, and it plays a vital role in convening, coordinating, and the direction for multistakeholder processes.

Management is about operations and the organisation as a going concern: finances, administration, people, organisation, legal matters, regulations, etc., fundraising, specifically for non-profit intervenors like EII, and monitoring, validating, and reporting impacts to donors.

As stated in the introduction, humanity needs to move from *talking* about systemic change to *making it happen,* establishing better-suited enabling conditions for systemic transformation to unfold. We can tailor management practices and frameworks to substantiate SOD. SOD should not be separated from strategy and leadership. Therefore, I argue that theories and approaches from the field of leadership to be pulled close to support systemic approaches that include SOD.

The management implication

Having realised that the approach to management in complexity needs a new framework and certainly new methodologies, such as measurement and evaluation of systemic impacts and learning, I returned to the literature and leading practices.

Firstly, it must be recognised that the roots of SOD contain several fields that can is connecting SOD to management. I would point to more recent literature, such as Michael C. Jackson's 'Critical Systems Thinking and the Management of Complexity' (Jackson, 2019). The SOD executive master curriculum includes Ralph D. Stacey's thinking on complexity in an organisation – e.g. 'Strategic Management and Organisational Dynamics' (Stacey & Mowles, 2016). Also, SOD-related articles about implementation (Degnes et al., 2023; Thøgersen et al., 2023; Wettre & Christodoulou, 2022) can be included here. Moreover, Peter Jones' systemic design research on co-design and design management, including his Theory of System Change and Action (TOSCA) (Murphy & Jones, 2020; Thomsen, 2022). Initially, I will stress the importance of a coherent co-design process as illustrated by the figure:
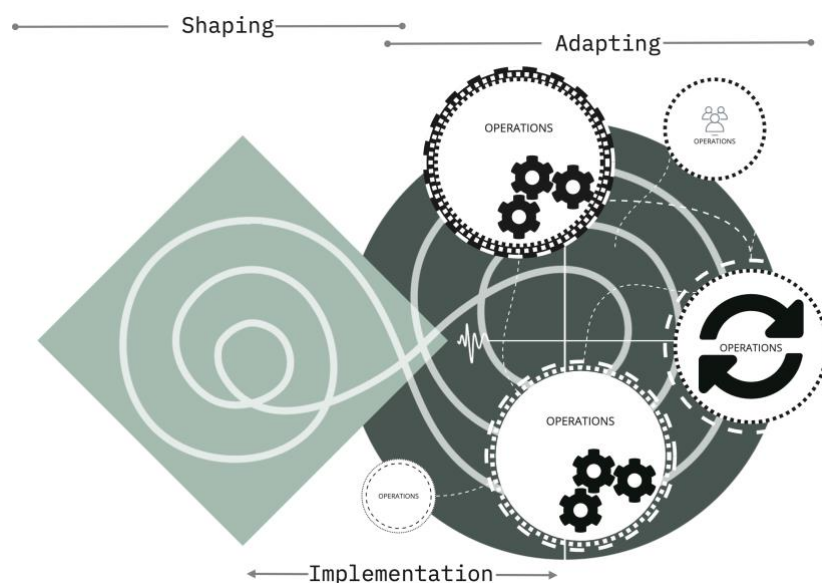

*Figure 11 **The coherent process of shaping, implementing and operating** (D'Silva et al., 2023, p. 17)*

As illustrated, the three phases of shaping, implementing and operating swirl into each other and indicate that some designerly representation should be present throughout, and so should the operators. Examples of a lack of coherence would be an architect being dismissed following design, and the construction and operations of a building resting entirely in the hands of people estranged by the prior design research.

Recognising that the connection between SOD and management may be a bridge under construction and on a steep learning curve, I argue for additional development of methodologies. The most promising practice I encountered in this part of my research is the work led by the UNDP strategic innovation team in partnership with the designers at Chôra Foundation (CHÔRA Foundation, 2024). Their learning journey ran in parallel with the design research process of this thesis, and it is at the forefront of co-design in development work. Not only that, but the UNDP works under similar conditions in the same realm and is a familiar collaborator of the Earth Innovation Institute.

Developments by leading practices that can improve the integration of SOD and management:
- **Portfolio approaches** are used for more rapid learning and to see the collective impact patterns, as all the interventions are part of the same system. Individual projects and interventions struggle to demonstrate impact in highly complex systems (Begovic & Quaggiotto, 2023).
- **Patterning** (Leadbeater & Winhall, 2022; D. Snowden, 2023; Yunus Centre Griffith University et al., 2022) combined with the portfolio approach suddenly makes groups of intervenors have many more events and indicators available, which establishes the conditions for patterns to emerge. This provides a better measure of impact in complexity and, thus, direction, long-term progress, and critical monitoring and evaluation methodologies.
- **Sensemaking** (Dulmini Perera, 2021; Fitzpatrick et al., 2024; Goodchild, 2021; D. J. Snowden, 2004),

These methodological developments do not amount to a complete management multimethodology, but they offer essential building blocks that can address some of the most pressing challenges faced by EII. Critical, is to connect the two fields of systemic design and management so that learning can flow in both directions. Moreover, recognising that Ralph Stacey's thinking about organising in complexity (Stacey & Mowles, 2016) already plays a vital role in the affiliation of management and SOD.

Hence, what I am suggesting is to develop a management framework with methodologies related to administrative standards, accounting, taxonomies etc. and supporting SOD, narrowing the gap between design and management.

The leadership implication

Leadership Implications for Earth Innovation Institute

There is a vital element of leadership at EII. The most visible part is the thought leadership published as peer-reviewed articles (Nepstad et al., 2013, 2014; Stickler et al., 2018). This leadership and its intent to drive systemic change in the direction of forest-friendly societies connect to how EII operates, its systemic interventions, and multistakeholder processes. Thereby, the connecting of SOD to management and leadership forms a whole strategic approach at EII.

Adding a front end to co-design can improve this leadership, i.e. connecting self-leadership, inner drivers and worldviews of individuals (Koenig et al., 2021) to the outer collective human drives (Kahane, 2023) and the leadership that has to do with intent, direction and desired futures. Aligning inner and outer leadership in the direction of purpose and intent can strengthen co-design, and it could be one of many improvements multistakeholder processes need to break through the resistance of vested interests in systems. The field of Quantum Leadership encompasses these traits (Choudhary & Bhandari, 2024; Tsao & Laszlo, 2019; Zohar, 2016).

In the case of Earth Innovation Institute, engaging with co-learning partners on leadership could be a way of explicitly including leadership on its evolution journey – such as:
- The Villars Institute 'Lead. Change. Leadership for all generations' (Villars Institute, 2024)
- The action research with Brazilian leaders to advance existing approaches of theories of change by introducing awareness-based systems change and to propose psycho-political wellbeing as an approach for bringing social and cultural transformation at scale (Cimini Salles & Homem, 2023)

The theoretical gap between leadership and SOD

In the literature review, I found SOD's connection to leadership theories and thinking vague. It is not that it does not exist at all. Leadership overlaps with management across theories amongst SOD's roots and in the SOD syllabus (e.g. Stacey); however, in this master thesis, I intend to pull forward the importance of connecting individual self-leadership with leadership in transformative change and co-creation. I find that connection robust. It further connects with place-based and belonging that literature (Fitzpatrick et al., 2024; Londres et al., 2023) is essential and resonates with my experience.

I indicate a direction of literature for further studies of leadership in complexity that I believe can enrich SOD: Quantum Leadership (Tsao & Laszlo, 2019; Zohar, 2016) and further the fields of Complex Leadership Theory and Systemic Leadership (Rowland, 2017). From my own leadership experience, I would add Otto Scharmer (Scharmer, 2016), Peter Senge (P. Senge et al., 2015; P. M. Senge, 2010), and the Pathfinder Leadership programme developed by Lasse Zäll (Stifinder, 2024). The Journal of Awareness-Based System Change (JABSC, 2024) with people like Otto Scharmer, Melanie Goodchild, Gerald Midgley, etc., on the editorial team.

Evaluation of the thesis method

The real value of gigamapping would have been to map proposals earlier, researching and developing them. Map policy thought leadership ideas when they are being developed, not after.

Working entirely online when it came to workshops and gigamapping was challenging. In-person workshops were more natural, and gigamapping worked better—at least in these early stages. They were stranded after a while when gigamaps were to be continued using Miro. In one instance, though, it worked well on Miro.

Interviews—Ideally, I would have talked more to external experts. Instead of going wide, the gathering of knowledge went deeper. That proved very valuable; however, I could not follow through with my intentions of engaging with more people who could better represent the circumstances in the Amazon on the ground. The exciting possibility of integrating indigenous knowledge and cultures also had to be deferred.

I did not manage to participate in workshops, test learnings, and explore how intervention practitioners in the Amazon Region would perceive it. In an all-digital work mode, remoteness and language barriers were challenges and had to be postponed. A big task awaits here; I expect it to go over the coming years.

Further work

Research of SOD affiliation to management and leadership

While systemic developments in the fields of management and leadership gain momentum and with similar purposes to that of SOD, I hope to motivate SOD and other systemic design scholars to

further research how the field could become more affiliated with the fields of management and leadership. SOD research reaching out for developments such as patterning practices and the M&E Sandbox led by the UNDP strategic innovation team can accelerate the development. Systemic intervention practitioners need a more robust strategic approach framework. Managing administrative functions such as accounting, risk, reporting, etc., is fundamental to making society's wheels turn. Therefore, there is a need to create new measurement, monitoring, and validation methodologies, as well as standards and definitions that can cope with complexity and make those organisations understood by their stakeholders.

A systemic Intervention Approach journey

I conclude that Earth Innovation Institute's practice and methodologies can gain in multiple ways from looking to SOD. Fundamentally, accessing SOD will allow EII to use Gigamapping and other visuals to enrich its work, develop a language to explain the work and EII's role better, develop a patterning methodology to capture relevant indicators of impact and direction, and develop a new and richer way of either convening, facilitating or leading multistakeholder processes.

It is an opportunity to set forth the evolutionary journey that started in 2022 and develop and improve the overall systemic approach of EII. A learning journey of these transformative dimensions is impossible for any organisation on its own. Hence, I encourage reaching out to other organisations and networks, such as UNDP, —and either join projects funded elsewhere or fundraise for building capacity at EII and financing the first stage of the learning journey. Initially, reaching out for immediately available and low-cost opportunities.

Below I list options and questions that EII may consider in their further research and development:
1. What management methodology gaps is of priority to be addressed? Consider reaching out to leading practices regarding how to measure, report, verify. Study methodologies combining portfolios, patterns and lessons learned.
2. What opportunities for co-learning collaboration, initiatives, networks, and partnerships are attractive?
3. For further enrichment and development, consider connecting to the academic field of SOD, team up with leading practices in other sectors, or develop an in-house team?
4. Consider creating an alliance of intervenors for systemic change collaboration and co-learning with donor communities.

5. Multistakeholder and co-design processes. Are there opportunities for fundraising for the facilitation of co-creation and collective action to make collective action succeed? Reach out to leading facilitation practices.

6. Complementary to present thought leadership and peer review papers, would it make sense to bridge to other sectors and cross-field borders to form alliances for leadership and learning? Suggestion of literature: 'The Dawn of System Leadership' (P. Senge et al., 2015). The Journal of Awareness-Based Systems Change (JABSC, 2024). "Complexity and Experience of Leading Organizations" (Griffin & Stacey, 2001).

7. Experimentations with system dynamics and gigamapping, portfolios and patterns. Merge with Green Jurisdictions Database. Could artificial intelligence become a system dynamics tool – is it an opportunity for a small team such as EII? Russel Ackoff from data to wisdom (Ackoff, 1989), etc., qualitative system dynamics by Senge (P. M. Senge, 2010), quantification of dynamics—Vaclav Smil (Smil, 2022), Hannah Ritchie (Ritchie, 2024), etc.

8. How could EII via its relationships to indigenous peoples incorporate Indigenous knowing, sensing, cultures, identities, belonging, place-based in co-creation? Traditions and rituals that support and enrich multistakeholder processes.

9. Explore more place-based and belonging in co-creation. Deeper connection of human systems (complexity) to EII's scientific knowledge of ecological fields and ecosystems, bioregions etc. Literature: (Bates, 1997), (Lovelock et al., 1974), (Capra & Luise, 2014), (Fitzpatrick et al., 2024) etc.

The thesis does not answer why systemic design is neither discussed nor directly present in Amazon interventions today. Possibly, it is overwhelming for many people. Mindsets might be stuck in more linear frameworks and expectations—media struggle to convey complexity. Intervenors adopt start-up-type pitches. The "jurisdictional approach is still abstract for many people", a large governmental donor said at a meeting recently. We need to change, take more time, experience together, build trust, and tell our stories at length instead of trying to fix gaps in communication.

Conclusion

The thesis makes three contributions: Firstly, it identifies gaps in affiliations to management and leadership for the two target audiences, SOD and EII. Secondly, it suggests improvements in co-creation processes driving Amazon transformation. Thirdly, it connects systemic interventions in the Amazon to the field of Systems Oriented Design.

I outlined how the four fields: Design and Systems Thinking (SOD), Management and Leadership, complement each other and can be further integrated into a robust model for strategic navigation of complexity and systemic change:

Figure 12 *The Four fields of Navigating Complexity*
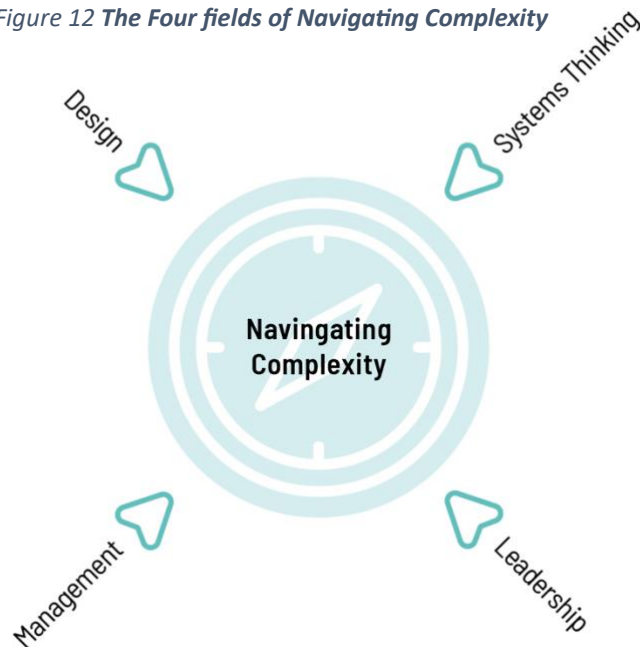
Gaps in SODs affiliation to management and leadership

SOD includes theories based on Ralph Stacey's and other thinking on management in complexity, such as those of Midgley and Jackson in Critical Systems Thinking. However, it was found to lack methodologies for measurement, evaluation and reporting designed for the implementation and the daily operations of systemic interventions in complex environments. The thesis points to the explorations by the UNDP strategic innovation team and other leading practices, using portfolios, learning and patterns in measurement and evaluation - as a direction for further SOD research and development of management methodologies. Similarly, EII can co-learn with the UNDP and others

and complement prevailing management practices to better align its systemic approach with donor expectations.

While EII is recognised for its systemic leadership, the thesis recommends adding the dimension of participants' inner drivers and self-leadership and connecting the facilitation of multistakeholder processes to local cultures and indigenous sensing and rituals. Thereby an axis of leadership emerges, connecting people's inner drivers to collective intent, direction and desired futures.

The thesis finds that there is a gap between the above-mentioned axis of leadership and leadership thinking in SOD. A closer affiliation with fields such as systemic and quantum leadership could give SOD a strategic edge, and it can help SOD overcome barriers to implementation in organisations faced with complexity and rapid change. The thesis recommends this exploration of further research to add strategic strength to SOD through compatible leadership thinking.

Improvements in Co-creation

Making explicit a participatory design front end in co-creation and developing a methodology for analysing system dynamics can potentially increase the effectiveness of co-design. Applying new systemic design language may further broaden the scope of fundraising for multistakeholder processes. Moreover, the thesis recommends that co-creation frameworks include SOD facilitation to add weight to collection action, which is needed to break through the resistance of vested interests in societal systems.

Connecting SOD and systemic interventions in the Amazon

By integrating methodologies and practices from SOD, EII can add resilience and effectiveness to its adaptive approach. Exploring SOD practices at EII can infuse a new language that may enrich communications. A measurement methodology can be developed with lessons learned, portfolios of interventions and patterns, and pragmatic analysis of system dynamics can be combined with the creative practice of gigamapping.

Finally, the thesis shares a direction and questions for EII to do the testing and experimentation pending from this study. It outlines an evolutionary journey of co-learning. And with a hopeful ambition that a movement of systemic interventions emerges and joins forces in a concerted push to preserve the forests vital to all life on Earth.

References

Ackoff, R. L. (1989). From data to wisdom. *Journal of Applied Systems Analysis*, *16*, 3–9.

Andersen, L. R., & Björkman, T. (2017). *The Nordic Secret*.

Arnheim, R. (1974). *Art and Visual Perception - A Psychology of the Creative Eye (The New Version)* (2nd ed.). University of California Press.

Banathy, B. H. (1996). *DESIGNING SOCIAL SYSTEMS IN A CHANGING WORLD*. Contemporary Systems Thinking.

Banathy, B. H. (2000). *Guided Evolution of Society*. Springer US. https://doi.org/10.1007/978-1-4757-3139-2

Bates, F. L. (1997). *Sociopolitical Ecology: Human Systems and Ecological Fields*. Springer US. https://doi.org/10.1007/978-1-4899-0251-1

Begovic, M., & Quaggiotto, G. (2023, November). *Working with what you have. | by UNDP Strategic Innovation*. Medium. https://medium.com/@undp.innovation/working-with-what-you-have-80645b6afe63

Bertalanffy, L. von. (1969). *General System Theory*.

Binder, T., & Brandt, E. (2008). The Design:Lab as platform in participatory design research. *CoDesign*, *4*(2), 115–129. https://doi.org/10.1080/15710880802117113

Boshoven, J., Fleck, L. C., Miltner, S., Salafsky, | Nick, Adams, J., Dahl-Jørgensen, A., Fonseca, G., Nepsted, D., Rabinovitch, K., & Seymour, F. (2021). Jurisdictional sourcing: Leveraging commodity supply chains to reduce tropical deforestation at scale. A generic theory of change for a conservation strategy, v 1.0. *Wiley - Conservation Science and Practice*. https://doi.org/10.1111/csp2.383

Brand, S. (2018). Pace Layering: How Complex Systems Learn and Keep Learning. *Journal of Design and Science*. https://doi.org/10.21428/7f2e5f08

Bratteteig, T. (2003). *Making change Dealing with relations between design and use* [Ph.d.]. University of Oslo.

Bratteteig, T., Bødker, K., Dittrich, Y., Mogensen, P. H., & Simonsen, J. (2012). *Methods: Organising principles and general guidelines for participatory design projects. Chapter 6, pp. 117–145 Routledge International Handbook of Participatory Design*.

Bratteteig, T., & Wagner, I. (2012). Disentangling power and decision-making in participatory design. *PDC 2012: Proceedings of the 12th Participatory Design Conference : August 12-16, 2012, Roskilde University, Denmark*, 41–50.

Burns, C., Cottam, H., Vanstone, C., & Winhall, J. (2006). *Transformation Design*.

    www.designcouncil.org.uk/red.

Butler, R. A. (2024, April 4). *The Amazon Rainforest*. Mongabay.

    https://worldrainforests.com/amazon/

Capra, F., & Luise, P. L. (2014). *The Systems View of Life*.

Checkland, P. (1983). O.R. and the systems movement: Mappings and Conflicts. *The Journal of the*

    Operational Research Society, *34*, 661–675.

CHÔRA Foundation. (2024). *CHÔRA Foundation objectives & functions*.

    https://www.chora.foundation/

Choudhary, S., & Bhandari, R. (2024, February 28). *The Role of Quantum Leadership in a Complex*

    World |. AACSB. https://www.aacsb.edu/insights/articles/2024/02/the-role-of-quantum-

    leadership-in-a-complex-world

Cimini Salles, F., & Homem, M. L. (2023). Psychopolitical Foresensing for Social Transformation

    (PFST): : Theoretical Reflections for Action Research in Brazil Towards the Sustainable

    Development Goals (SDGs). *Journal of Awareness-Based Systems Change*, *3*(1), 148–167.

    https://doi.org/10.47061/jasc.v3i1.5876

Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F. N., & Leip, A. (2021). Food

    systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food 2021*

    2:3, *2*(3), 198–209. https://doi.org/10.1038/s43016-021-00225-9

Degnes, T., D'Silva, F., & Thomsen. Bjørn Rask. (2023). *System Oriented Implementation - submission*

    for SOD executive master course.

Dixson-Decleve, S., Owen Gaffney, O., Ghosh, J., Randers, J., Rockström, J., & Stoknes, P. E. (2022).

    Earth for All - A Survival Guide for Humanity - Club of Rome.

    https://www.clubofrome.org/publication/earth4all-book/

Drouin, M. (2017). Circle of Life . In *CHQ Publishing*.

D'Silva, F., Thomsen, B. R., & Degnes, T. (2023, November 10). SOFA - A Systems Oriented Facilitation

    Approach to Shift Societal Systems. *Proceedings of Relating Systems Thinking and Design*

    Volume: RSD12. https://rsdsymposium.org/systems-oriented-facilitation-approach/

Dulmini Perera. (2021). *Figure title: Theories of Play and Sensemaking, A Cartography*.

    https://doi.org/10.13140/RG.2.2.11406.89926

Earth Innovation Institute. (2015). *TERRITORIAL PERFORMANCE SYSTEM - A framework for driving*

    large-scale, jurisdictional transitions to low-emission rural development in the tropics.

Earth Innovation Institute. (2024a). *Daniel Nepstad bio and CV*.

    https://earthinnovation.org/about/eii-staff/1/daniel-nepstad

Earth Innovation Institute. (2024b). *Green Jurisdictions Database. Key information on climate change and sustainable development in the tropics*. https://greenjurisdictions.org/

Fitzpatrick, H., Luthe, T., & Sevaldson, B. (2024). Methodological Pluralism in Practice: A systemic design approach for place-based sustainability transformations. *Contexts—The Systemic Design Journal, 2. Https://Doi.Org/10.58279/V2003*.

Flood, R. L. (n.d.). *Contemporary Systems Thinking | Book titles in this series*. Springer. Retrieved 18 March 2024, from https://www.springer.com/series/5807/books?page=3

Forrester, J. W. (1971). *World Dynamics: Vol. Second edition*.

Goodchild, M. (2021). Relational Systems Thinking. *Journal of Awareness-Based Systems Change*, *1*(1), 75–103. https://doi.org/10.47061/jabsc.v1i1.577

Griffin, D., & Stacey, R. D. (2001). *Complexity and the Experience of Leading Organizations*.

Griffith Centre for Systems Innovation. (n.d.). *Challenge-led innovation*. Retrieved 1 June 2024, from https://www.griffith.edu.au/griffith-business-school/centre-for-systems-innovation/mission-led-innovation

Griffith Centre for Systems Innovation. (2023, November). *Using the Three Horizons framework to seed futures for wellbeing*. Good Shift | Medium. https://medium.com/good-shift/using-the-three-horizons-framework-to-seed-futures-for-wellbeing-68ddcf53c882

Griffith Centre for Systems Innovation. (2024, January). *Learning about learning. Insights from developing monitoring…*. Good Shift | Medium. https://medium.com/good-shift/learning-about-learning-b7a77a1ed3d3

Haldrup, S. V. (2023, December). What is 'good' systems change and how do we measure it? *Medium | UNDP Strategic Innovation*. https://medium.com/@undp.innovation/what-is-good-systems-change-and-how-do-we-measure-it-68bec17c4d08

IPAM. (2024). *IPAM purpose and history*. The Amazon Environmental Research Institute. https://ipam.org.br/the-ipam/purpose/

Irwin, T. (2015). Design and Culture Transition Design: A Proposal for a New Area of Design Practice, Study, and Research. *The Journal of the Design Studies Forum*, 229–246. https://doi.org/10.1080/17547075.2015.1051829

Ison, R. L. (2023). IFSR Quarterly - Musings from the President. *International Federation of Systems Research*, *4*. https://mailchi.mp/b008e2e8def0/ifsr-quarterly-winter2023?e=5e03a183b1

JABSC. (2024). *Journal of Awareness-Based Systems Change*. https://jabsc.org/index.php/jabsc/index

Jackson, M. C. (2019). *Critical Systems Thinking and the Management of Complexity*.

Johnson, H. J. (2023). *Rainforest*. National Geographic. https://education.nationalgeographic.org/resource/rain-forest/

Jones, P. (2018). *Contexts of Co-creation: Designing with System Stakeholders* (pp. 3–52).

    https://doi.org/10.1007/978-4-431-55639-8_1

Jones, P. (2020). *Redesigning our Theories of Theories of Change Evolution of a systems design*

    practice.

Jones, P. (2022a). *Can You Make Change? Design inquiry into system change and transformation*.

Jones, P. (2022b). *Following 50 years of the Global Problematique | RSD | Systemic Design*

    Symposium. https://rsdsymposium.org/following-50-years-of-the-global-problematique/

Jones, P. (2022c). *Limits to Growth at 50 Years: Reframing the predicament*.

Jones, P., & van Ael, K. (2022). Design Journeys through Complex Systems. In *BIS Publishers*.

    https://www.bispublishers.com/design-journeys-through-complex-systems.html

JTA Partnership. (2024). *Jurisdictional REDD+ Technical Assistance Partnership*.

    https://jtapartnership.org/

Kahane, A. (2021). *Facilitating Breakthrough*.

Kahane, A. (2023). Radical Collaboration to Transform Social Systems. *Journal of Awareness-Based*

    Systems Change, *3*(2), 23–40. https://doi.org/10.47061/jasc.v3i2.6709

Kjøde, S. G. (2024). *Entanglement of Systemic Design and Sustainability Transitions* [PhD candidate].

    University of Oslo.

Koenig, O., Seneque, M., Pomeroy, E., & Scharmer, O. (2021). Journal of Awareness-Based Systems

    Change: The Birth of a Journal. *Journal of Awareness-Based Systems Change*, *1*(1), 1–8.

    https://doi.org/10.47061/jabsc.v1i1.678

Kunming Declaration. (2020). 'Ecological Civilization: Building a Shared Future for All Life on Earth'. In

    The UN Biodiversity Conference.

    https://www.cbd.int/doc/c/df35/4b94/5e86e1ee09bc8c7d4b35aaf0/kunmingdeclaration-

    en.pdf

Leadbeater, C., & Winhall, J. (2022). *SYSTEM INNOVATION INITIATIVE THE PATTERNS OF POSSIBILITY*

    The Patterns of Possibility: How to Recast Relationships to Create Healthier Systems and Better

    Outcomes SYSTEM INNOVATION INITIATIVE.

Lovelock, J. E., Salisbury, N., & Margulis, L. (1974). *Atmospheric homeostasis by and for the biosphere:*

    the gaia hypothesis.

Lowe, T. (2023). Explode on Impact. *Medium*. https://toby-89881.medium.com/explode-on-impact-

    cba283b908cb

Lowe, T., & Wilson, R. (2017). Playing the Game of Outcomes-based Performance Management. Is

    Gamesmanship Inevitable? Evidence from Theory and Practice. *Social Policy and*

    Administration, *51*(7), 981–1001. https://doi.org/10.1111/SPOL.12205

Meadows, D. H. (1999). *Leverage Points: Places to Intervene in a System*.

donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system

Meadows, D. H. (2001). *Dancing with Systems*.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens III, W. W. (1972). *The Limits to Growth A Report for the Club of Rome's Project on the Predicament of Mankind*.

Meadows, D. H., Randers, J., & Meadows, D. (2004). A Synopsis: Limits to Growth: The 30-Year Update. In *The Donella Meadows Project*. https://donellameadows.org/archives/a-synopsis-limits-to-growth-the-30-year-update/

Midgley, G. (2000). *Systemic Intervention*. Springer US. https://doi.org/10.1007/978-1-4615-4201-8

Mobilizing an Earth Governance Alliance. (2024). *MEGA*. Https://Earthgovernance.Org/About/. https://earthgovernance.org/about/

Murphy, R. J. A., & Jones, P. (2020). *Design management for wicked problems: Towards systemic theories of change through systemic design*.

Nelson, H. G., & Stolterman, Erik. (2014). *The design way : intentional change in an unpredictable world*.

https://books.google.com/books/about/The_Design_Way_second_edition.html?hl=da&id=lr34DwAAQBAJ

Nepstad, D. (2018). *Balikpapan Challenge Brings Local Governments together With International Experts to Solve Tropical Deforestation*. Earth Innovation Institute. https://earthinnovation.org/News/7488/1#cookie_setting

Nepstad, D. (2024, February). *Empowering change: A year of big wins for the Amazon forest and beyond - Earth Innovation Institute*. https://earthinnovation.org/Blog/23265/1

Nepstad, D., Ardila, J. P., Stickler, C., De Los, M., Barrionuevo, A., Bezerra, T., Vargas, R., & Rojas, G. (2021). Adaptive management of jurisdictional REDD+ programs: a methodology illustrated for Ecuador. *Carbon Management*. https://doi.org/10.1080/17583004.2021.1926331

Nepstad, D., Irawan, S., Bezerra, T., Boyd, W., Stickler, C., Shimada, J., Carvalho, O., Macintyre, K., Dohong, A., Alencar, A., Azevedo, A., Tepper, D., & Lowery, S. (2013). More food, more forests, fewer emissions, better livelihoods: Linking REDD+, sustainable supply chains and domestic policy in Brazil, Indonesia and Colombia. *Carbon Management*, *4*(6), 639–658. https://doi.org/10.4155/CMT.13.65

Nepstad, D., McGrath, D., Stickler, C., Alencar, A., Azevedo, A., Swette, B., Bezerra, T., DiGiano, M., Shimada, J., Da Motta, R. S., Armijo, E., Castello, L., Brando, P., Hansen, M. C., McGrath-Horn, M., Carvalho, O., & Hess, L. (2014). Slowing Amazon deforestation through public policy and

interventions in beef and soy supply chains. *Science*, *344*(6188), 1118–1123. https://doi.org/10.1126/SCIENCE.1248525/SUPPL_FILE/1248525.NEPSTAD.SM.PDF

Ramírez, R., Lang, T., Finch, M., Carson, G., & Fisher, D. (2023). Strategizing Across Organizations. *MIT Sloan Spring 2023 Issue*, 62–65. sloanreview.mit.edu

Raworth, K. (2017). *Doughnut Economics*.

Reos Partners. (2023a). *Radical Collaboration to Accelerate Climate Action - a Guidebook for Working Together with Speed, Scale, and Justice*.

Reos Partners. (2023b, October). *Navigating systems change: 5 approaches for impact*. https://reospartners.com/blog/navigating-systems-change

Reyes, M. (2024). *DRIVENET: What drives deforestation in the Peruvian Amazon? - CIFOR-ICRAF Knowledge*. CIFOR & ICRAF. https://www.cifor-icraf.org/knowledge/slide/25266/

Ritchie, H. (2024). *Not the end of the world : how we can be the first generation to build a sustainable planet*. https://mitpressbookstore.mit.edu/book/9780316536752

Rowland, E. (2017). *Whole Self, Whole Systems*.

RSD. (2012, October 4). RSD01. *Proceedings of Relating Systems Thinking and Design*. https://rsdsymposium.org/inaugural-rsd1-2012/

RSD12. (2023, October). *Programme | RSD | Systemic Design Symposium*. https://rsdsymposium.org/rsd12-programme/

Sachs, J. (2022). 2022 Jeffrey Sachs - From The Limits to Growth to Regeneration 2030 - Club of Rome. *Club of Rome*.

Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, *4*(1). https://doi.org/10.1080/15710880701875068

Santilli, M., Moutinho, P., Schwartzman, S., Nepstad, D., Curran, L., & Nobre, C. (2005). Tropical deforestation and the Kyoto protocol. *Climatic Change*, *71*(3), 267–276. https://doi.org/10.1007/S10584-005-8074-6

Scharmer, O. (2016). *Theory U. Leading from the Future as It Emerges*.

Scharmer, O. (2018). *The Essentials of Theory U: Core Principles and Applications*.

Senge, P., Hamilton, H., & Kania, J. (2015). The Dawn of System Leadership. *Stanford Social Innovation Review*. www.ssireview.org

Senge, P. M. (2010). *The Fifth Discipline The Art and Practice of the Learning Organization*.

Sevaldson, B. (2008). Rich Design Research Space. *FORMakademisk*, *1*(1), 28–44.

Sevaldson, B. (2009, January 1). *Systems Oriented Design | webpage*. https://systemsorienteddesign.net/

Sevaldson, B. (2010). Discussions & Movements in Design Research. *FORMakademisk*, *3*(1), 8–35. https://journals.oslomet.no/index.php/formakademisk/article/view/137/134

Sevaldson, B. (2022). *Designing Complexity The Methodology and Practice of Systems Oriented Design*.

Sevaldson, B., & Jones, P. (2019). An Interdiscipline Emerges: Pathways to Systemic Design. In *She Ji* (Vol. 5, Issue 2, pp. 75–84). Tongji University Press. https://doi.org/10.1016/j.sheji.2019.05.002

Shaw, P. (2002). *Changing Conversations in Organizations: A Complexity Approach to Change*.

Smil, V. (2022). *How the world really works : the science behind how we got here and where we're going*.

Snowden, D. (2023, December). *Patterns all the way down*. The Cynefin Co. https://thecynefin.co/patterns-all-the-way-down/?utm_source=MBR-LK-JAN-4-24&utm_medium=MBR-LK-JAN-4-24&utm_campaign=MBR-LK-JAN-4-24&utm_id=MBR-LK-JAN-4-24

Snowden, D. J. (2004, September 25). Multi-ontology sense making: a new simplicity in decision making. *PHCSG Annual Conference*. www.cynefin.net.

Stacey, R. D. (1996). *Complexity and creativity in organizations*. Berrett-Koehler Publishers.

Stacey, R. D. (2001). *Complex Responsive Processes in Organizations*.

Stacey, R. D. (2012). *Tools and Techniques of Leadership and Management - Meeting the challenge of complexity*.

Stacey, R. D., & Mowles, C. (2016). *Strategic Management and Organisational Dynamics*. www.pearson.com/uk

Stickler, C., Duchelle, A., Ardila, J. P., Nepstad, D., David, O., Chan, C., Rojas, J. G., Vargas, R., Bezerra, T., Pritchard, L., Simmonds, J., Durbin, J., Simonet, G., Peteru, S., Komalasari, M., Digiano, M., & Warren, M. (2018). *THE STATE OF JURISDICTIONAL SUSTAINABILITY: SYNTHESIS FOR PRACTITIONERS AND POLICYMAKERS SUPPORTED BY*. www.earthinnovation.org/state-of-

Stickler, C., Olivia, D., Chan, C., Ardila, J. P., & Bezerra, T. (2020, June 20). *The Rio Branco Declaration: Assessing Progress Toward a Near-Term Voluntary Deforestation Reduction Target in Subnational Jurisdictions Across the Tropics - Earth Innovation Institute*. Frontiers. https://earthinnovation.org/Pub/18127/the-rio-branco-declaration-assessing-progress-toward-a-near-term-voluntary-deforestation-reduction-target-in-subnational-jurisdictions-across-the-tropics

Stifinder. (2024). *About the Stifinder Program | Stifinder*. https://stifinder.com/en/about-the-stifinder-program/

Systemiq for Aya Earth Partners. (2022). *The Amazon's Marathon: Brazil to lead a low-carbon economy from the Amazon to the world*.

The Club of Rome. (2024, January 24). *Systems Transformation Hub launch* . https://www.clubofrome.org/events/systems-transformation-hub/

Thøgersen, D. M., Wettre, A., & Vink, J. (2023). When Worldviews Collide: An attempt at integrating systems-oriented design and implementation science. *Proceedings of Relating Systems Thinking and Design*, RSD12.

Thomsen, B. R. (2015, October 15). *THE NORWEGIAN COMMITMENTS ON SUSTAINABLE SOY AND FORESTS*. Denofa. https://www.denofa.no/wp-content/uploads/2023/06/THE-NORWEGIAN-COMMITMENTS-ON-SUSTAINABLE-SOY-AND-FORESTS_14-October-2015.pdf

Thomsen, B. R. (2022). *SOD module 3 exam TOSCA* (Submission for SOD Executive Master).

Trebeck, K. (2024). *Getting wellbeing economy ideas on the policy table: theory, reality, pushback and next steps - Club of Rome*. https://www.clubofrome.org/publication/earth4all-trebeck-wellbeing-economy/?utm_source=Earth4All&utm_campaign=94b9d75e0b-EMAIL_CAMPAIGN_2024_April&utm_medium=email&utm_term=0_-66b60eb25d-%5BLIST_EMAIL_ID%5D

Tsao, F. C., & Laszlo, C. (2019). *Quantum Leadership - New Consciousness in Business*. STANFORD B USINESS BOOKS.

UN COP 28. (2023). *COP28 Declaration on Food and Agriculture*. Cop28.Com. https://www.cop28.com/en/food-and-agriculture

UNDP. (2021, August 2). *UNDP and CHÔRA Foundation collaborate to develop cutting-edge policy advisory services*. Press Release. https://www.undp.org/press-releases/undp-and-chora-foundation-collaborate-develop-cutting-edge-policy-advisory-services

Uriartt, S., Leurs, B., & Begovic, M. (2024, May 15). *Can governments accelerate the adoption of a system mindset? | by UNDP Strategic Innovation | May, 2024 | Medium*. Medium | UNDP Strategic Innovation. https://medium.com/@undp.innovation/can-governments-accelerate-the-adoption-of-a-system-mindset-2f63ac9c3c06

Villars Institute. (2023). *Villars Institute Summit 2023*. https://villarsinstitute.org/events/villars-institute-summit-2023

Villars Institute. (2024). *lead. change.* Https://Villarsinstitute.Org/. https://villarsinstitute.org/

Wahl, D. C. (2016). *Designing Regenerative Cultures*.

Watts, J. (Global environment editor). (2024, January). Move to sustainable food systems could bring $10tn benefits a year, study finds. *The Guardian*.

https://www.theguardian.com/environment/2024/jan/29/sustainable-food-production-economic-benefits-study

Wettre, A., & Christodoulou, C. (2022). Use Systems Oriented Design (SOD) for implementation. *Proceedings of Relating Systems Thinking and Design*, *RSD11*.

Wettre, A., Dudani, P., & Sevaldson, B. (2022). Jumping Conversations. *Proceedings of Relating Systems Thinking and Design*, *RSD11*.

Wettre, A., Sevaldson, B., & Dudani, P. (2019). *Bridging Silos A new workshop method for bridging silos*.

World Economic Forum. (2024). *Strategic Intelligence*. https://intelligence.weforum.org/about

Yunus Centre Griffith University, T., Southern Initiative, T., & Co-Design Lab. (2022). *Everyday patterns for shifting systems*.

Zohar, D. (2016). *The Quantum Leader A Revolution in Business Thinking and Practice*. Prometheus Books.

Zohar, D. (2022). Twelve Principles of Quantum Leadership. *Zero Distance*, 137–146. https://doi.org/10.1007/978-981-16-7849-3_13