Roadmapping a Circular Society

Analysing and shaping the discourse field of the Circular Society as a starting point for transformative processes

Master's thesis

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Resume

The Circular Economy (CE) is being discussed by an astounding number of academics, business associations, governments, Think Tanks and NGOs as a key strategy for addressing social-ecological challenges of the Anthropocene. Nonetheless, a critical debate has emerged, that points to blind spots and one-sided orientations of CE debates and strategies. The term Circular Society (CS) has been introduced to provide a complementary or alternative framing to circular strategies which integrates them into the larger framework of social-ecological transformation. The discourse developing under the term CS is still young and dynamic and has been little explored. A prerequisite for revealing the transformative potential of this discourse and for targeted intervention in scientific and social (political, economic) discourses by means of transdisciplinary research processes, requires a precise knowledge of its characteristics and issues. In line with this, this paper empirically examines the Circular Society Forum 2021 (CSF), a transdisciplinary discourse arena of CS. The research identifies characteristics of the CS discourse field and starting points for transformative (research) processes. Furthermore, this thesis reflects transdisciplinary workshop formats carried out at CSF and derives learnings for future transdisciplinary (research) processes.

The research design can be outlined by three lines of inquiry. First, a critical literature review has been conducted examining core challenges of CE approaches and outlining current conceptualisations of CS approaches. Second, approaches and methods of transformative research for sustainability are outlined as sensitising concepts for this thesis' research mode. Third, participatory visioning and roadmapping workshops were carried out at the CSF. The workshop results were analysed, reviewed, and recomposed based on feedback sessions, research workshops, key literature, and further empirical material.

The results of this research gave rise to systems knowledge on key actors and their (un)shared interest in CS, target knowledge in the form of a target frame, CS principles and vision themes as well as transformation knowledge including starting points for further roadmapping processes. The CS principles are intended to capture current CS trajectories and provide guidance for the design, implementation, and evaluation of CS projects in the future. By highlighting prominent CE principles and contrasting them with CS understandings, the differences between CE and CS become clear for researchers and practitioners alike.

Based on the findings, the main challenges and potentials for further conceptualisation of CS as well as for its implementation are discussed. Followed by closing remarks on the implications for practitioners and scholars.

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CE	Circular Economy
CS	Circular Society
CSF	Circular Society Forum
C	Challenge
HSF	Hans Sauer Foundation
WGBU	German Advisory Council on Global Change
IPCC	Intergovernmental Panel on Climate Change
C2C	Cradle to Cradle
P	Principle
EASAC	European Academies' Science Advisory Council

PART I: STATE OF THE ART & RESEARCH GAP

1. State of the Art: Circular Economy

The Circular Economy (CE) is being discussed by an astounding number of academics, business associations, governments, Think Tanks and NGOs at the regional, national, and international levels as a key strategy for addressing pressing sustainability issues. While there are various definitions of CE, it essentially proposes a regenerative and restorative system of production and consumption that closes the input and output flows of the economy, minimises energy losses, and dematerialises production and consumption to reduce environmental damage and create economic benefits (Geissdoerfer et al., 2017; Murray et al., 2017; WBGU, 2014). The political intentions for CE are exemplified by the German resource efficiency program "ProgRess" introduced in 2012 and the statement of the WBGU, which considers the rapid transition to CE as key for the transformation to sustainability (WBGU, 2016). At the European level, CE is anchored in the 2015 CE Action Plan and the 2019 European Green Deal. A key goal of these policies is to decouple economic growth and resource consumption to foster sustainable production and consumption systems. Although the CE is widely seen as a promising sustainability strategy, a critical debate has emerged that points to blind spots and one-sided orientations of CE debates and strategies.

This chapter provides an overview of the main challenges and limitations of the CE as discussed in key critical literature (chapter 1.2). The emerging field of the Circular Society (CS) is then outlined (chapter 2), followed by the presentation of a research gap (chapter 3).

1.1. Circular Economy Principles

As there are different definitions of CE, normative principles and theoretical frameworks remain ambiguous. Popular CE principles are those developed by the Ellen MacArthur Foundation (EMF, 2021). Often cited frameworks are the Flow Framework by Bocken et al. (2016) and the 10R Framework by Rieke et al. (2018). Based on these CE approaches, the not-for profit organisation Circle Economy (2021a) recently developed their own framework, distinguishing between core and enabling elements of a CE. The former refers directly to material and energy flows. The second refers to supporting strategies that remove barriers to circularity and help implement the core strategies. Since this classification includes indirect but necessary aspects to implement the CE and thus takes a more integrated approach, it is applied in this study. However, the term *principle* instead of *element* is used here, emphasising not only components of a CE but guidelines for action.

Core Principles

Bocken et al. (2016) propose that a CE requires product design and business models that modify material and energy loops by focussing on narrowing (using fewer resources for the same outcome), slowing (extending and intensifying the use rate of products), closing (using waste streams as input for production) and/or regenerating (removing toxins, pollutants, and fossil fuels). The authors emphasise that sufficiency-driven business models (narrowing), are the greatest drivers for sustainability (as also evidenced by Bocken & Short, 2016).

The 10R framework by Reike et al. (2018) prioritises retention strategies cascading down from "refuse" to "remine". The authors conclude that companies and policymakers should focus their efforts on the short loop retention strategies, where recycling is not included.

For the EMF (2021) the CE is restorative and regenerative by design, aiming to decouple growth from finite resource consumption and to circulate materials in biological and technical cycles. To achieve these, the EMF emphasises design solutions and builds on three principles:

> *(1)* ***Design out Waste and Pollution:***
> Preventing negative externalities from economic activities that cause harm to humans and nature.
>
> *(2)* ***Keep Products and Materials in Use:***
> Designing materials that can circulate and keep contributing to the economy.
>
> *(3)* ***Regenerate Natural Systems****:*
> Enhancing natural capital by fostering conditions for regeneration and encouraging nutrient flows.

Based on those CE approaches, Circle Economy (2021a) recently formulated three key elements of a CE:

> *(1)* ***Prioritise regenerative Resources:***
> Ensuring that renewable, reusable, and non-toxic resources are utilised as materials and energy.
>
> *(2)* ***Stretch the Lifetime:***
> Maximising the lifetime of resources through strategies such as repair and reuse.
>
> *(3)* ***Use Waste as a Resource:***
> Utilising waste as secondary resource.

Table 1 provides a comparative overview of the approaches. While Reike et al. (2018) do not consider regenerative flows, EMF (2021) and Circle Economy (2021a) do not include sufficiency-driven approaches, as called for by Bocken and her colleagues (Bocken & Short, 2016).

Table 1 ***Overview of core CE Principles*** *(own illustration, based on EMF, 2013; Circle Economy, 2021a, Bocken et al., 2016; Reike et al., 2018)*

Approach	**Core Principles of a CE**				
Strategies of Resource Cycling (Bocken et al., 2016)	Narrow Flows	Narrow Flows	Slow Flows	Slow Flows Close Flows	Regenerate Flows
10 Rs (Reike et al., 2018)	Short Loops			Medium Loops Long Loops	
	R0 Refuse	R1 Reduce	R1 Reduce, R2 Resell/ Reuse R3 Repair	R4 Refurbish R5 Remanufacture R6 Repurpose R7 Recycle R8 Recover R9 Remine Compost Cascade	
CE Principles (EMF, 2021)		Design out Waste & Pollution	Keep Products and Materials in Use	Design out Waste & Pollution; Keep Products in Use	Regenerate Natural Systems
CE Key Elements (Circle Economy, 2021a)		Prioritise Regenerative Resources	Stretch the Lifetime	Stretch the Lifetime; Use Waste as a Resource	Prioritise Regenerative Resources

Enabling Principles

In 2013, the EMF formulated six building blocks that are meant to enable CE core principles. Eight years later, Circle Economy (2021a) presented their version of elements that could enable the implementation of the CE. A comparative overview is presented in Table 2.

Table 2 ***Overview of enabling CE Principles*** *(own illustration, based on EMF, 2013; Circle Economy, 2021a)*

Approach	**CE Building Blocks** (EMF, 2013)	**CE Enabling Elements** (Circle Economy, 2021a)
Enabling Principles of a CE	*Cross-cycle and cross-sector collaboration:* Working together on fields like joint product development and infrastructure management.	*Collaborate for Joint Value Creation:* Working together throughout organisations and across sectors and value chains.
	Skills in reverse Cycle and Circular Design: Developing skills to make better material and design choice. *Education:* Raising awareness in public, businesses, and university curricula.	*Strengthen and Advance Knowledge:* Developing integrated research, pursuing knowledge management and dissemination.
	New business models: Fostering performance business models where products become services and consumer users.	*Rethink the Business Model:* Changing business models to price the product life cycle and foster long-term cooperation.
	Favourable investment climate: Promoting the availability of financing and risk management tools.	—
	Rules of the game to quickly reach scale: Regulating accounting, taxation, certification, and corporate responsibility.	—
	—	*Design for the Future:* Designing with a systemic approach to circulate resources and reduce resource demand.
	—	*Incorporate digital Technology:* Facilitating actor networks and tracking resources with digital technology.

The enabling CE elements by Circle Economy (2021a) and the CE principles by EMF (2013) overlap to a large extent. They both emphasise the need for new forms of collaboration, business model innovation and knowledge/ skills. While Circle Economy includes systemic design and the potential of digital technologies separately, the EMF addresses financial structures and regulations.

1.2. Overview of Challenges and Limitations

While the strategies and goals of a CE are promising in addressing the pressing challenges of the Anthropocene, its conceptual foundations and practice approaches still face many challenges and limitations in reaching their full potential. Calisto Friant et al. (2020) recently conducted an extensive literature review on the key challenges and limitations (C) of a CE. In the following, an interpretation of these findings is presented in a summarised, rearranged, and supplemented manner, covering four areas of criticism.

C1: Greenwashing, Rebound and Counteracting Effects

As the CE discourse is mainly led by state and private sector actors pursuing specific political and economic agendas, CE is sometimes used as a narrative vehicle for greenwashing (Ampe et al., 2019; Korhonen et al., 2018b; Nylén & Salminen, 2019; Van den Berghe & Vos, 2019; as cited in Calisto Friant et al., 2020) and has therefore been criticised as an oxymoron, comparable to green growth or ecological modernisation (Gregson et al., 2015; Lazarevic & Valve, 2017; Monsaingeon, 2017; Valenzuela & Böhm, 2017; as cited in Calisto Friant et al., 2020). In fact, an analysis of 114 CE definitions found that only 38% included environmental sustainability (Kirchherr et al., 2017). While this could be explained by the fact that CE has its origins in the pursuit of environmental goals and thus does not explicitly express them, the reality however shows that CE strategies are far from achieving those goals (Hobson & Lynch, 2016; Zink and Geyer, 2017).

The understanding of CE as better waste management in terms of efficient recycling (e.g., German CE Law from 1996) is still widespread. However, an eco-efficiency-oriented CE approach can lead to rebound effects, where reduced costs for a product or service generate savings that increase the demand for it and/or create incentives for consumption in other areas. Primary production is then supplemented rather than replaced by secondary production (Bocken & Short, 2016; Hobson & Lynch, 2016; Zink and Geyer, 2017). Braungart and McDonough (2016) speak of a "licence to harm", as the process of environmental degradation and resource consumption is subtly delayed, accompanied by the displacement of pollutants and the loss of value and material.

Examples of CE in practice do not always lead to environmentally desirable outcomes or even lead to counteracting effects, causing greater negative impacts than their linear counterparts (Haupt & Hellweg, 2019; Hobson and Lynch, 2016; Zink and Geyer, 2017; Buch et al., 2018). This is the case, for example, with biotechnologies that place high demands on land, water, and energy to replace mineral resources, or when systems of industrial symbiosis contribute to lock-in unsustainable material systems, such as the petrochemical industry's infrastructure network (Calisto Friant et al., 2020; Velenturf & Purnell, 2021). To prevent unsustainable CE policies, the currently weak link between the CE and sustainable development should be strengthened and fundamental conceptual gaps closed (Geissdoerfer et al., 2017, Velenturf & Purnell, 2021).

C2: Weak Conceptualisation and Impact Assessment

The above-mentioned pitfalls of CE can be explained to a large extent with weak conceptualisation. It is not clearly defined which economic model with which societal goals shall underlie a CE. While this makes the concept easier to promote and adopt, it also means that it faces important inconsistencies and limitations (Calisto Friant et al., 2020; Geissdoerfer et al., 2017; Hobson & Lynch, 2016; Reike et al., 2018). Hobson (Kersty[1]) compares CE to a "beautiful but dangerous fairy tale" that illudes a solution to unsustainability that can be achieved with market-based solutions within continued economic growth. And indeed, the issue of decoupling economic growth from resource use is probably the "largest elephant in the room for CE" (Calisto Friant et al., 2020). While many CE advocates, such as the EMF, emphasize the goal of enabling green growth through decoupling, other researchers rank the likelihood of achieving sufficient decoupling, either in a relative sense or in absolute terms, as low or clearly unrealistic (Hobson, 2016; Jackson, 2016; Parrique et al., 2019). As strategies of a weak form of sustainability, market-based solutions within the capitalist growth paradigm and their policy instances, are often criticized as ineffective in addressing the core causes of environmental unsustainability. They are described as superficial leverage points that are very unlikely to lead to a shift away from unsustainability (Hobson, 2016; Hobson & Lynch, 2016; Meadows et al., 1999). As a result, voices have recently become louder advocating for strengthening growth-agnostic (Raworth, 2017) or sufficiency (Calisto Friant et al., 2020; Jaeger-Erben et al., 2021) strategies within CE.

In addition to the lack of evidence that absolute decoupling can succeed, the inevitability of entropy casts doubts on the assumption that CE is feasible in a context of sustained economic growth. Materials degrade in quantity and quality at their rate of use. This means that even establishing a perfect CE, where all resource inputs come from recovered or renewable

[1] See Kersty Hobson at CSF on “Circular Consumption” [conference presentation]; https://www.youtube.com/watch?v=95dJ6nP2jHQ&list=PLnsIHr9Ovr4Kq0OzHPSYbvij-5Tw6s883&index=15.

materials, would require an overall reduction in material demand and economic throughput (Calisto Friant et al., 2020; Korhonen et al. 2018a). Given the unmet needs of a large part of the world's population, a then necessary cap on global resource consumption to sustainable levels would entail critical geopolitical and normative issues of equity and global wealth redistribution. Yet questions of global and democratic governance remain largely untouched in current CE discourse (Calisto Friant et al., 2020).

Moreover, dealing with climate change, biodiversity loss and resource scarcity involves many complex trade-offs. As indicated in C1, a poorly managed CE transition can lead to an increased demand for energy, resources, and land. This then can increase emissions and pressure on ecosystems. It is therefore essential to balance the increased demand for natural resources and renewable energy with efforts to conserve and restore biodiversity (Calisto Friant et al., 2020). However, a recent paper by Velenturf & Purnell (2021) revealed that the concepts of nature and society are discussed in parallel in less than 2% of the CE publications under study. This is somewhat paradoxical given that promoting practices that are 'restorative and regenerative by design' are core principles of CE (s. chapter 1.1). In fact, only 1-2% of the publications analysed mention natural capital or ecosystem services at all.

Accordingly, and in view of the rebound and counteracting effects (s. C1), a multi-dimensional, quantitative, and qualitative assessment and evaluation of the sustainability impacts of circular systems is another unanswered challenge (Calisto Friant et al., 2020; Haupt & Hellweg, 2019; Jaeger-Erben & Hofmann, 2019).

C3: Lack of Social Dimension and Consideration of Transformation Processes

Just as examples of CE in practice do not always lead to ecologically desirable outcomes and even to opposite effects, social aspects are often completely ignored and worsened (Haupt & Hellweg, 2019; Hobson and Lynch, 2016; Zink and Geyer, 2017; Buch et al., 2018). The focus on economic value creation and technical innovation fails to recognise the underlying, necessary, and massive socio-cultural change, and misses a systemic understanding of CE that perceives the economy as part of society that is based on and part of a larger natural ecosystem[2]. However, to transform the root causes of unsustainability, interventions need to target deep leverage points within the systems design and intent (Meadows, 1999). The social dimension, including a social purpose or vision, is completely missing. Social aspects such as global and intergenerational justice, quality of life, and participation in transformation are at best marginally addressed (Jaeger-Erben & Hofmann, 2019; Kirchherr et al., 2017; Kirchherr et al., 2017; Millar et al., 2019; Moreau et al., 2017; Murray et al., 2017; Temesgen et al., 2019). This is despite practitioners seeing cultural

[2] See Hummel at al. (2017) for a conceptualisation and analysis of critical societal relations to nature.

barriers as the biggest hurdles to a shift towards more circularity (Kirchherr et al., 2017).
The (re-) distribution of costs and gains along with the role of democratic global governance is again not discussed in relation to circular systems (Calisto Friant et al., 2020). The lack of recognition of social aspects could ultimately be a reason for the gap between theory and practice. Despite the increasing relevance of circular concepts, their global diffusion is marginal: The recent Circularity Gap Report estimates the "gap" on the path to circularity at 91.4 %, trending upwards (Circle Economy, 2021b).

C4: Lack of Alternative Visions and Solution Strategies

There is little research on the intersections of CE concepts and other (more radical) concepts aiming at sustainable socio-economic structures, such as degrowth or steady state economy. Perspectives of sufficiency, social and ecological justice or approaches of social movements from the global South, are only gradually being addressed in the context of CE. However, these approaches could address some of the previously mentioned challenges (Calisto Friant et al., 2020; Hobson & Lynch, 2016). Research by Calisto Friant et al. (2020) has shown that CE-related approaches from social movements of the Global South and North provide a plenitude of alternative visions. Even the origin of CE approaches, offer alternative visions to the current dominant techno-economic understanding. Here, a challenge might be to open the CE discourse to alternative visions with relevant overlaps while remaining internally coherent and clear.

2. An Emerging Field in Research and Practice: Circular Society

To build on the potentials of CE approaches while addressing its challenges and limitations (s. chapter 1.1; 1.2), the term *Circular Society* (CS) has been recently used and highlighted by different actors in research and practice. A first body of academic and programmatic work on CS has been developed, which together with critical CE literature is outlined in Table 1.

Table 3 ***Overview of key Contributions to the critical CE debate, and CS*** *(own illustration)*

Focus	Contributors
Critical CE Debate	*Scientific literature:* Calisto Friant et al. (2020); Geissdoerfer et al. (2017); Hobson (2016, 2019, 2020); Hobson & Lynch (2016); Kohornen et al. (2018a, b); Miller et al. (2017); Murray et al. (2017); Moreau et al. (2017); Temesgen et al. (2019)
CS	*Programmatic and scientific literature:* Boch et al. (2020); Calisto Friant et al. (2020); Jaeger-Erben & Hofmann (2019a,b); Jaeger-Erben et al (2021); Velenturf & Purnell (2021); Zwiers et al. (2020) *Conferences and symposia:* Boch et al. (2021); DBU (2020); University of Freiburg (2020); Utrecht University (2020)

Research on CS is mainly conducted by a group of scientists from Utrecht University (Calisto Friant, Vermeulen, Salomone) and Berlin (Jaeger-Erben, Hofmann, Zwiers). In addition to the scientific examination of the issue, the Hans Sauer Foundation (HSF) is a key actor at working on CS at a conceptual and operational level. Several academic (Jaeger-Erben & Hofmann, 2019a; Jaeger-Erben et al, 2021; Zwiers et al., 2020) and programmatic publications (Jaeger-Erben & Hofmann, 2019b; Boch et al., 2020) were followed by presentations, panel discussions, workshops, symposia and conference contributions by the aforementioned actors and partners (e.g., DBU, 2020; Hofmann & Zwiers, 2018; Jenne et al., 2020; University of Freiburg, 2020; University of Utrecht, 2020). Jaeger-Erben et al. (2021, p. 1) describe the CS debate as "still young, dynamic and in many parts more visionary than practical" and argue that further work on conceptual foundations and practical implementation should be conducted in a transdisciplinary setting. This is since transdisciplinary research approaches can relate and produce the required scientific systems and transformation knowledge as well as socio-cultural and lifeworld knowledge on targets and normative guidelines (Hummel at al., 2017).

Addressing this transdisciplinary claim, a virtual gathering was organised in Autumn 2020, in a cooperation between the Berlin research group and the HSF, targeting actors from (social) business, politics, the public sector, and civil society. The aim of this event was to discuss the requirements for a possible CS network and to identify core areas and tasks. Yet, it became clear that priority should be given to jointly sharpen the common understanding of CS; including goals, values, core issues and areas of practice. The format for this process ought to combine the theoretical level with a practical, integrative, and dialogue-oriented approach. In response,

the Circular Society Forum was organised in February 2021. This transdisciplinary conference featured various scientific and non-scientific contributions and involved more than 600 participants including key actors working on a CE, its critique and/ or the idea of a CS.

2.1. Tentative Circular Society Target Framework & Principles

The terminological proximity between the terms ‘Circular Economy’ and ‘Circular Society’ presents a critical perspective on CE concepts, whilst recognising their inherent potential. A common denominator of CS interpretations is the understanding that CE transitions are not possible without the engagement and participation of society and that CE must be consistently aligned with social and environmental goals (Jaeger-Erben et al., 2021).

According to Jaeger-Erben and Hofmann (2019), a CS should be oriented towards sustainable development and be part of a social-ecological transformation. In this context, Jaeger-Erben and Hofmann (2019) refer in particular to the reports *Great Transformation towards Sustainability* and the *Normative Compass* developed by the German Advisory Council on Global Change (WGBU). The WGBU calls for a transition to sustainable economics in the form of a great social-ecological transformation. As a target, the WGBU urges for creating a “safe space”, that allows human needs to be met without overstepping planetary boundaries (WGBU, 2011). The 2016 WGBU flagship report then expanded the goals into a Normative Compass of three dimensions:

(1) sustaining natural livelihoods;

(2) assuring social justice and participation;

(3) developing socio-cultural ‘Eigenart’ (German term).

The first dimension implies that the effects of societal development must not endanger the natural life-support systems of present and future generations. The second dimension addresses the substantial participation of all citizens in political and economic processes. The third dimension, on ‘Eigenart’, emphasizes the diversity of human and social development and aims to enable the free unfolding of identity and quality of life in accordance with local socio-spatial and socio-cultural conditions. This is linked to a devolved autonomy to find local solutions to sustainability problems. Here, similarities to Sen and Nussbaum's (e.g., Nussbaum, 2011) capability approach can be drawn. Technology and economy are understood to have a serving function, enabling a fair distribution and satisfaction of needs.

In line with that, Jaeger-Erben and Hofmann (2019b) tentatively formulate a target frame for a CS. In accordance, while CE rarely covers all three dimensions of social, ecological, and economic sustainability and is strongly biased towards economic targets (Kirchherr et al., 2017), a CS is meant to pay attention to environmental integrity as well as to individual and societal well-being:

> *'The Circular Society is intended to be a societal vision where ecosphere, technosphere and sociosphere are in balance, ruled by economic practices that serve consistently and exclusively for social well-being within planetary boundaries.' (Jaeger-Erben & Hofmann, 2019b, p. 3)*

Based on the criticism of common CE approaches and the need for a comprehensive socio-ecological transformation, the researchers have proposed seven tentative CS principles (s. Table 4) of the biosphere, technosphere and sociosphere. With the latter five principles, human spheres of life and its cultural practices, normative values, and social relations are considered. Those five principles of the sociosphere are interconnected, with circular literacy, transparency, and empowerment as prerequisites for communality and innovativeness (Jaeger-Erben & Hofmann, 2019).

Table 4 ***Tentative CS Principles of Biosphere, Technosphere and Sociosphere*** *(own illustration, based on Jaeger-Erben & Hofmann, 2019)*

Sphere	**CS Principle**
Biosphere	*Embedding in biological resource cycles*
Technosphere	*Slowing down and closing technical resource cycles*
Sociosphere	*Circular Literacy* describes the knowledge-based capability to understand and respect natural cycles and material flows and to develop and implement circular solutions for sustainability. *Transparency and Accessibility* are considered prerequisites for participation in social and economic development. This includes access to natural resources and knowledge as well as to infrastructure for education, health, consumption, and production. *Democratisation and Empowerment* stands for the provision of concrete opportunities for participation and co-design in political, economic, and cultural processes. *Communality, Collaboration, and Solidarity* can unfold due to the expanded opportunities for participation. Empowered people and communities act actively, manage nature and culture as common goods, and negotiate guidelines for economic, political, and cultural action. *Innovativeness and Creativity* arise from the previously mentioned principles. Accessible spaces for experimentation (e.g., real-world labs) enable new forms of local solutions to sustainability problems to be developed and tested.

In addition, Velenturf and Purnell's recent research proposes a framework of goals and principles for a sustainable CS (Velenturf & Purnell, 2021). However, as the authors are not part of the discourse arena studied in this thesis (s. chapter 6.1), their approach is not further elaborated here. A comparison however with Velenturf and Purnell's work is promising for future research on CS principles.

2.2. Reformist and Transformational Circular Society Discourses

While Jaeger-Erben and Hofmann (2019) as well as Velenturf and Purnell (2021) define CS as an alternative concept within the CE framework, Calisto Friant et al. (2020) use CS as an umbrella term. Accordingly, CS encompasses ideas of classical CE concepts but also of approaches that primarily address societal transformation and subordinary circularity, such as "Ubuntu" (Shumba, 2011). Based on the review of 72 circularity-related concepts from the global North and South, the authors developed a typology of circularity discourse that distinguishes between two types of CE and two types of CS. In their view, the fundamental difference between CE and CS is whether they adopt a holistic or a segmented approach. Holistic CS discourses integrate social, ecological, and political aspects of the circularity. Segmented CE discourses, focus on economic, technical and to some extent ecological components of CE. The second typological distinction classifies discourses according to whether they are optimistic or sceptical about the ability of technology and innovation to avert irreversible social-ecological collapse. This results in two typologies of CE (Fortress CE and Technocentric CE) and two CS typologies (Reformist CS and Transformational CS).

		Approach to social, economic, environmental and political considerations	
		Holistic	**Segmented**
Technological innovation and ecological collapse	Optimist	**Reformist Circular Society** • *Assumptions:* reformed form of capitalism is compatible with sustainability and socio-technical innovations can enable eco-economic decoupling to prevent ecological collapse. • *Goal:* economic prosperity and human well-being within the biophysical boundaries of the earth. • *Means:* technological breakthroughs, social innovations and new business models that improve ecological health, resource security, and material prosperity for all.	**Techncentric Circular Economy** • *Assumptions:* capitalism is compatible with sustainability and technological innovation can enable eco-economic decoupling to prevent ecological collapse. • *Goal:* sustainable human progress and prosperity without negative environmental externalities. • *Means:* economic innovations, new business models and unprecedented breakthroughs in CE technologies for the closing of resource loops with optimum economic value creation.
	Sceptical	**Transformational Circular Society** • *Assumptions:* capitalism is incompatible with sustainability and socio-technical innovation cannot bring absolute eco-economic decoupling to prevent ecological collapse. • *Goal:* a world of conviviality and frugal abundance for all, while fairly distributing the biophysical resources of the earth. • *Means:* complete reconfiguration of the current socio-political system and a shift away from productivist and anthropocentric worldviews to drastically reduce humanity's ecological footprint and ensure that everyone can live meaningfully, and in harmony with the earth.	**Fortress Circular Economy** • *Assumptions:* there is no alternative to capitalism and socio-technical innovation cannot bring absolute eco-economic decoupling to prevent ecological collapse. • *Goal:* maintain geostrategic resource security and earth system stability in global conditions where widespread resource scarcity and human overpopulation cannot provide for all. • *Means:* innovative technologies and business models combined with rationalized resource use, imposed frugality and strict migration and population controls.

Figure 1 ***Circularity Discourse Typology*** *(Calisto Friant et al., 2020).*

Reformist CS discourses assume that a reformed form of capitalism can be combined with sustainability and that a decoupling of economy and ecology is possible. The goal of these discourses is economic prosperity and human well-being within the biophysical limits of the earth. This is to be achieved through technological breakthroughs, social innovations and new business models that improve ecological health, resource security and material prosperity for all. Concepts that fit into this category include, e.g., Cradle to Cradle (C2C) and the doughnut economy (Calisto Friant et al., 2020).

Transformative CS discourses assume that capitalism and sustainability are incompatible and that socio-technical innovations cannot lead to sufficiently decoupling economy and ecology to prevent widespread ecological collapse. The goal of these discourses is "a world of conviviality and frugal prosperity for all while equitably sharing the Earth's biophysical resources" (Calisto Friant et al., 2020, p. 11). This is to be implemented through a complete transformation of the prevailing socio-political system, a shift away from material- and human-centred worldviews, and a general economic downscaling and expansion of sufficiency strategies. Local production, redistribution of global resources and direct participation in the democratic design of circular futures are emphasised. Concepts that fit into this category include, transition movement, degrowth and radical pluralism (Calisto Friant et al., 2020).

The goal of Calisto Friant et al.'s (2020) research was to systematise the various discourses on circularity, thus promoting pluralism in the debate and demonstrating the holistic nature of the CE's roots. In particular, the authors emphasised the need for political empowerment and social justice as part of circular transformation models. The typology of circularity discourses can be used to further conceptualise CS. Returning to Jaeger-Erben and Hofmann's (2019) definition of the CS goals presented in chapter 2.1, aspects of the two CS typologies proposed by Calisto Friant et al. (2020) can be recognised: Economic practices are to serve social well-being within planetary boundaries (Reformist CS) and social well-being encompasses the pursuit of global social justice and ‘Eigenart’ (Transformational CS).

3. Research Gap

While there is a variety of academic studies on the CE concept that elaborate distinctions within CE thinking, formulate principles and develop definitions (e.g., Geissdoerfer et al. 2017; Kirchherr et al., 2017; Reike et al., 2018), at this stage only Calisto Friant et al. (2020) propose a systematic and comprehensive classification of discourses on circularity that also considers the critical CE debate and other circularity-related concepts. However, the discourse developing under the term CS as an alternative concept to established CE approaches has not yet been examined neither in a desk-based nor in an empirical study. At the same time, the discourse field of CS is still young and dynamic and not only more visionary than practical, as described by Jaeger-Erben et al. (2021), but also more visionary than theoretically grounded. The CS principles of Jaeger-Erben and Hofmann (2019), for example, are a first approximation to the idea of a CS and, in their own words, these same principles are rather "sketchy in character and can be understood as inspiration" (p. 46; translated from German). Accordingly, there is a need to explore the developments in recent CS discourses and at the same time to further explore, develop and consolidate the concept.

PART II: SENSITISING CONCEPTS & RESEARCH GOALS

4. Transformative Research for Sustainability

Transformative research aims at accelerating a transformation towards sustainability. The role of research is to identify, evaluate and initiate possible solutions to problems of unsustainability (Caniglia et al., 2017). There are numerous methods and theories to transformative research. In the following, two guiding theories that support the research process are outlined: The approaches of different types of knowledge and the concept of leverage points for sustainability transformation. Transdisciplinary workshops as well as visioning and roadmapping techniques are then presented as research methods.

4.1. Systems Knowledge, Target Knowledge, Transformation Knowledge

Sustainability science, transformative research and transdisciplinary research often relate to three types of knowledge (ProClim, 1997; Hirsch Hadorn et al., 2008; Schneidewind & Singer-Brodowski, 2013):

> *(1) Systems knowledge:*
> Knowledge of the current status, of structures, processes, and variabilities.
>
> *(2) Target knowledge:*
> Knowledge of a target status including prognoses and scenarios, guiding ideas and visions.
>
> *(3) Transformation knowledge:*
> Knowledge about how to make the transition from the current to the target status.

All three forms of knowledge are understood as prerequisite for the successful implementation of transformation processes. As early as 1997, ProClim emphasised that the development of target knowledge, transformation knowledge and systems knowledge, especially in the human and social sciences, is a pressing need.

4.2. Leverage Points for Sustainability Transformation

In 1999, Meadows identified twelve leverage points to influence systems in a sustainable way, illustrated in Figure 2. The twelve points are arranged according to the effectiveness of their leverage, from the least effective (12) to the most effective (1). With that, a distinction is made between shallow leverage points (12-5) and deep leverage points (6-1). Shallow leverage points include those that target changes in parameters and physical modifications (parameters and feedbacks). While strong leverage points focus on information structures, organisational forms, and normative aspects such as values, goals, and mindsets (design & intent).

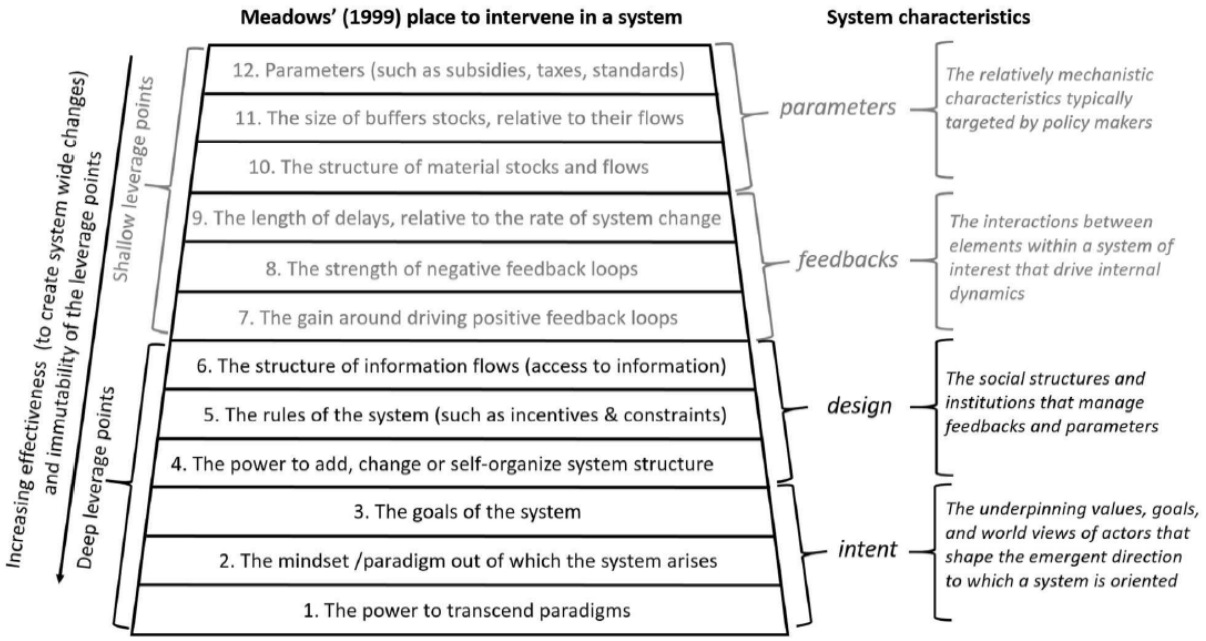

Figure 2 ***From twelve Leverage Points to four System Characteristics*** *(Abson et al., 2016)*

Meadows describes the tendency of society and especially politics to focus on tangible but usually weak leverage points. Interventions are frequently preferred that are easy to implement but have limited potential to be transformative. Yet, parameters such as subsidies and taxes are quite easily changeable but act reactively on social and environmental problems and do not address their root causes. As an example, Meadows describes that air quality standards improve air quality but do not address the causes of air pollution. According to Meadows, parameters are only effective if feedback loops are influenced. For example, a birth rate can limit the growth of the world population, which in turn would have a major leverage effect on sustainability. Considering her work, a sustainable transformation of systems requires a strategic shift from reactionary measures to the roots of the problems.

According to Abson et al. (2016, p. 34), sustainability science also predominantly addresses weak leverage points. In line with Meadows, the research team pleads for a more system-oriented, inter-, and transdisciplinary research approach in sustainability science. Given that the way in which knowledge is produced, shared, and used can have an impact at all levels of the leverage points. The authors recommend elements of knowledge production for a sustainable transformation: problem- and solution-oriented approaches to science, rethinking of the role of science in society through mutual learning processes (transdisciplinarity) and consideration of values, norms, and context-specific characteristics in research processes.

The three forms of knowledge presented in chapter 4.1, can also be recognised in the leverage points model. To find possible leverage points, knowledge about the system is needed. Target knowledge is needed about what the system should look like, what values, norms and rules

guide it. And finally, transformation knowledge is required to address the right leverage points and to set the intended change processes in motion.

4.3. Transdisciplinary Visioning and Roadmapping for Sustainability

A method to generate target knowledge (s. chapter 4.1) within transformative sustainability research is visioning for sustainability. After all, the sustainability discourse has recognised that utopian thinking and shared visions set a course for action and behaviour. Even more, they can create identity and community and provide an incentive for change (Wiek & Iwaniec, 2013). The exact purpose of visioning workshops is manifold. A common aim, however, is to create shared ideas or images of the future that serve as a basis for strategy development. At the same time visioning as a practice, helps the participants to learn about different actors' wishes, ideas and needs, how to communicate their own and to work creatively and in collaboration (Vidal, 2004).

According to Wiek and Iwaniec (2014) most visioning methodologies, thereby adopt the following procedure:

(1) ***Framing:*** Framing the visioning process.

(2) ***Initialising:*** Creating initial vision material (vision pool).

(3) ***Analysing:*** Decomposing and analysing this material.

(4) ***Synthesising and Finalising:*** Revising and recomposing the vision.

While step one and three are mainly based on desk research, steps two and four include participatory elements. For the design of each step and its evaluation, the ten quality criteria for sustainability visions illustrated in Table 5 can be used. Accordingly, sustainability visions ideally are visionary, sustainable, systemic, coherent, plausible, tangible, relevant, nuanced, motivational and shared.

Table 5 ***Key Features and Sources of the Quality Criteria for Sustainability Visions*** *(Wiek & Iwaniec, 2014)*

	Quality criterion	Key features	Sources
1	Visionary	Desirable future state; with elements of (aspirational) surprise, utopian thought, far-sightedness, and holistic perspective	Dreborg (1996); Höjer and Mattsson (2000); Raskin et al. (2002)
2	Sustainable	In compliance with sustainability principles; featuring radically transformed structures and processes	Holmberg and Robèrt (2000); Newman and Jennings (2008)
3	Systemic	Holistic representation; linkages between vision elements; complex structure	Meadows (1996); Bossel (1998); Raskin et al. (2002)
4	Coherent	Composed of compatible goals (free of irreconcilable contradictions)	Wiek and Binder (2005); Potschin et al. (2010)
5	Plausible	Evidence-based—informed by empirical examples, theoretical models, and pilot projects	Wright (2010); Wiek et al. (2012)
6	Tangible	Composed of clearly articulated and detailed goals	Ravetz (2000); Wiek and Binder (2005)
7	Relevant	Composed of salient goals that focus on people, their roles, and responsibilities	Cash et al. (2003); Wangel (2011); Wiek and Larson (2012)
8	Nuanced	Detailed priorities (desirability)	Trutnevyte et al. (2011); McDowall and Eames (2007)
9	Motivational	Inspire and motivate towards the envisioned change	Swart et al. (2004); Smith et al. (2005); van der Helm (2009)
10	Shared	Display a critical degree of convergence, agreement, and support by relevant stakeholders	Smith et al. (2005); van de Kerkhof (2006); Krütli et al. (2010); Quist et al. (2011)

Based on the quality criteria, decisions on the fitting visioning methodology can be made. Sustainability visioning methodology should combine and apply several methods: creativity and visualization techniques; methods for sustainability assessment, system analysis, consistency analysis, plausibility appraisal, target specification, actor-oriented analysis; and participatory settings. For more information s. Table 21 in the appendix.

A roadmap then takes the vision as the destination and provides a strategic plan to turn it into reality. The map might reveal hurdles and potentials as well as parallel pathways to overcome the first and take advantage of the second. A key feature is its time reference, with the vision being in distant future and the pathways displaying short and mid-term actions (Simonse, 2017). Roadmapping is commonly used to drive technology or design innovation (e.g., Phaal et al., 2004; Simonse, 2017) and to guide policymaking (e.g., hydrogen roadmap for Germany, Hebling et al., 2019; CE Roadmap for Germany, CEID, 2021). Often, roadmapping processes combine the three steps of value mapping (visionary), idea mapping and pathway mapping (Simonse, 2017). Although roadmapping is not popular in transformative research yet, similar approaches such as back casting (Quist et al., 2011) are. In this thesis, it is assumed that transdisciplinary roadmapping holds the potential to complement visioning practices and translating it step by step into implementations. Thus, by combining visioning and roadmapping practices, it is expected that systems, target, and transformation knowledge for sustainability issues can be developed and applied.

An effective format for transformative research on complex societal problems is transdisciplinary workshops. They not only yield results, but also promote networking between actors from science and practice. This helps generating the necessary knowledge to face complex problem situations, to take values and preferences into account and to create

ownership for solution approaches (Defila & Di Giulio, 2015; Lang et al., 2012). Depending on research and practice interests, method collections such as those by Bergmann et al. (2012) can be used to design transdisciplinary research and workshops. Open-source method collections can also be found online, for example, on the research and community platform for transdisciplinarity tdAcademy (https://www.td-academy.org/en/tdacademy/transimpact/) and the toolbox for co-producing knowledge by the td-net (https://naturalsciences.ch/co-producing-knowledge-explained). At the same time, Defila and Di Giulio (2015) emphasise that it is usually necessary to develop one's own methods based on existing methods and scientific creativity. This does not mean that the workshop defies scientific criteria. Rather, transdisciplinary research needs a broader concept of methods beyond classical, disciplinary research methods. Specific methods are necessary for the support of joint knowledge production, diverse communication practices and integrating different types of knowledge from academia and practice (Bergmann et al., 2021). Regarding transdisciplinary workshops, both the overall structure of the workshop and the individual methods used in the workshop must be comprehensible and justifiable (Defila & Di Giulio, 2015).

5. Research Goals & Research Questions

Addressing the research gap described in chapter 3 and the research mode of this thesis illustrated in chapter 4, the aim of this thesis is to explore and develop the emerging and dynamic CS discourse field in terms of real-time observation and design. The work thus pursues both an analytical and a formative claim. More precisely, the aim is to contribute to better understand the currently emerging concept of the CS in its manifold, possibly also contradictory connotations, and to derive first starting points for transformative (research) processes. To this end, characteristics of the CS discourse field and the focused discourse arena of the Circular Society Forum 2021 (CSF) are identified and formulated. Furthermore, learnings with the design and conduction of transdisciplinary visioning and roadmapping formats are derived.

Research questions:

(1) *Which characteristics are there in the discourse field of the CS and what are possible starting points for transformative (research) processes within the discourse arena of the Circular Society Forum?*

(2) *What conclusions can be drawn from the experiences of the visioning and roadmapping workshops (lessons learned) and how can these formats be further developed?*

The research questions are specified by sub-questions and research criteria:

Table 6 ***Overview of Research Criteria and Sub-questions*** *(own illustration)*

Research criteria		**Sub-question**
People	**Societal Sectors & hierarchical Levels** **Interest in CS** **Aspects of Consent & Dissent**	- From which sectors and hierarchical levels do the actors who are interested in or committed to CS come? - Why is the CS relevant to them? - Is there any conflict (of interest) among the actors?
Principles	**Core Topics, Visions & Principles**	- Which social, economic, ecological, and political aspects are discussed on different levels (individual, organizational, material, structural, etc.)? - What principles of CS and vision themes can be formulated?
	Thematic Complexity **Drivers & Logics of Transformation**	- To what extent are limitations of CE addressed by CS? - How holistic/ segmented are the topics and fields of action? *(s. Calisto Friant et al., 2020)* - Which assumptions about drivers and logics of transformation shape the discourse? *(s. Calisto Friant et al., 2020)*
Practices	**Fields of Practice** **Measures** **Methods**	- What are dominant fields of practice? - Which next steps for transformative (research) processes are there? - To what extent can participatory visioning and roadmapping workshops serve as catalysts for field building, knowledge production and transformative processes? How can these formats be improved and taken further?
Potentials & Hurdles		- What are the potentials for a CS? - What is hindering the implementation of a CS?

The characteristics of the CSF discourse arena as well as learnings derived from the transdisciplinary visioning and roadmapping are clustered into the result categories pf “people”, “principles” and “practices:

Chapter 9 on “people” provides insights on the perspectives, interests and backgrounds of CS protagonists and highlights aspects of consent and dissent among them.

Chapter 10 on “principles” presents eight CS principles and respective strategies and vision themes as derived from the empirics and literature. The CS principles illustrate the above-mentioned aspects of priority topics and fields of practice, thematic complexity as well as drivers and logic of transformations, in an abstracted and synthesised framework. As a framework they are intended to provide guidance for the design, implementation, evaluation and improvement of circular projects and practices in the future. Based on the findings, a CS target frame is proposed.

Chapter 11 on “practices” gives recommendations on formats, process design and key areas for further transdisciplinary (roadmapping) projects towards a CS. A detailed description of the design, implementation and evaluation of the transdisciplinary workshops held at the CSF can be found in chapter 7. Here, the extent to which those processes can serve as catalysts for field-building, knowledge production and action-taking is explored.

Chapter 12 discusses the challenges and potentials of a CS and its implementations referring also to a wider context of current societal and political conditions. Summarised implications for scholars and practitioners alike are provided in chapter 13.

PART III: METHODOLOGY & TRANSDISCIPLINARY WORKSHOPS

6. Methodology

In the following this thesis' methodology is presented referring to the sampling design, data and data collection and the applied methods for analysis.

6.1. Sampling Design

The present study was inspired by the meta-method discourse field analysis. This method allows observing discourses in real time, creating knowledge, and preparing targeted interventions. It is a meta-method, since there are no fixed set of instruments for conducting it. Different methods and approaches are used depending on the research question and the epistemological interest. Jahn and Lux (2009) suggest a problem-oriented procedure focusing on knowledge conflicts within a discourse field. Yet, as this thesis follows a broader research interest, only the basic elements were applied. The terminology of 'discourse field' and 'discourse arena' and suggested selection criteria were adapted as suggested by Jahn and Lux. Table 7 presents the terms and selection criteria modified for CS discourses:

Table 7 ***Definitions of the Discourse Field and Discourse Arenas of the CS*** *(own definition, based on Jahn & Lux, 2009).*

#	Aspect	Working Definition
1	Discourse field of the Circular Society	The CS discourse field comprises scientific and societal discourses that work with or on the concept of CS. This includes negotiation processes, e.g., about problem views and proposed solutions. It is characterized by high complexity, dynamics and plurality and shaped by several discourse arenas.
2	Discourse arenas of the Circular Society	The CS discourse arenas are specific contexts or frameworks in which negotiation processes take place. Selection criteria for CS discourse arenas are the representation of national and international debates and different approaches (political, private, civil society, scientific). They should also play a key role in thematising CS.

Due to capacity constraints, this paper did not cover the entire CS discourse field but focused on one discourse arena. For two particular reasons, the CSF, as described in chapter 2, served as sample. First, the CSF fulfilled all the selection criteria presented in Table 7. It promoted building a network and strengthening the discourse field on an international level. Moreover, the CSF connected driving actors from different backgrounds. Second, both I as a student employee at HSF and my co-supervisor Prof. Dr. phil. Melanie Jaeger-Erben were part of the CSF organising team. This granted direct access to the discourse arena and allowed the collection of data and to conduct participatory workshops.

It was expected that some of the claims from the CS literature are reflected in the empirical results. This was because a significant number of the CS authors were part of the organising team of the CSF or key speakers at it (e.g., Jaeger-Erben and Calisto Friant).

6.2. Data & Data Collection

This research was based on three types of data collection and various types of data:

> *(1) Collection of empirical material in transdisciplinary visioning and roadmapping workshops:*
> The data included thoughts on sticky notes, observation logs and participatory stakeholder maps. Additionally, 19 participants wrote 'Letters from the Future' (s. chapter 7) which served as text material. 20-30 participants took part in each workshop.[3]
>
> *(2) Collection of literature written by participants of the CSF beyond the Forum:*
> The data included academic and programmatic literature on CS and key literature on the critical debate on CE presented in chapter 2, Table 3.
>
> *(3) Collection of further data produced by other participants or speakers within CSF:*
> The data included film footage of recorded sessions, discussion notes, session abstracts and contributions on the conference platform[4]. In some cases, access to film transcripts was available through subtitles. When subtitles were not provided, the footage was annotated.

The collection of empirical material in transdisciplinary visioning and roadmapping workshops was the main method for both data collection and field and community building. The workshops are therefore described in detail in chapter 7.

6.3. Data Analysis Methods

This thesis' data analysis was inspired by 'open coding' in Grounded Theory (after Strauss & Corbin, 1990) and a combination of inductive and deductive research practices (after Perry & Jensen, 2001). Most data was analysed in an iterative and reflexive process between empirics, reflection, and conceptualisation. Here, data analysis involved the following three steps, iterated until theoretical saturation:

> *(1) Decomposition and Analysis based on workshops:*
> Analysis of the workshop outcomes through category building, coding, and writing of memos. The research criteria (s. Table *6*) serve as guiding aspects for analysis.
>
> *(2) Revision and Recomposition based on literature:*
> Analysis of the key literature using the empirical categories. Categories are simultaneously adapted and completed.
>
> *(3) Revision and Recomposition based on further empiric data:*
> Analysis of further material produced by CSF participants. It aims at revalidating, adapting, and complementing the previous categories, codes, and general findings.

[3] Documentation of the workshops: https://media2-production.mightynetworks.com/asset/21403300/CSF_Documentation_Visioning_Roadmapping_Workshops.pdf
[4] Registrants were invited to introduce themselves and share their interest in CS: https://www.circularsociety.de/posts/would-you-like-to-briefly-introduce-yourself-to-the-others-and-share-why-you-are-interested-in-the-circular-society-gerne-auf-deutsch

For identifying and formulating CS principles a fourth step was added:

> *(4) Revision and Recomposition based on feedback sessions and research workshops:* Analysis of the empirically derived CS principles in feedback sessions with HSF employees and research workshops with CS scholars[5]. Aiming at collaborative revision and validation. Distinction to popular CE principles is illustrated.

An exception to this analysis process was the descriptive actor analysis (s. chapter 9). Here, characteristics such as affiliation to a societal sector and hierarchical level were described. Likewise, the reasons for interest in or commitment to CS were investigated and conflicts of interest were highlighted.

[5] Miro board of the research workshop: https://miro.com/app/board/o9J_llQwgkE=/?invite_link_id=611694547732

7. Co-Creation of Visions and Roadmaps in Transdisciplinary Workshops

This chapter provides insights into the design, implementation, and evaluation of the visioning and roadmapping workshops. Content-related insights from the workshops are included in all chapters of the results section. Methodological learnings and derived recommendations for further visioning and roadmapping processes are depicted in chapter 8 and 11.1.

7.1. Visioning

Workshop Design, Tasks & Templates

The aim of the workshop was to develop *shared*, *sustainable,* and *visionary* visions for an ideal CS from which principles and vision themes can be derived. Furthermore, these visions prepared the roadmapping workshop by offering a destination that is *relevant* to people from different sectors. Likewise, the visions developed were expected to be *tangible* and *motivate* action. Ideally, the visions would express clear differences from CE approaches and offer differentiated, *nuanced,* and *systemic* representations. Thus, the goals encompassed eight of the ten quality criteria for sustainability visions formulated by Wiek and Iwaniec (2014). Going into the remaining two criteria (*coherent* and *plausible*) was beyond the scope of the workshop. These two criteria were outside the capabilities of a conference workshop and are more likely to be addressed in research processes. Another objective was that participants gain transformation, systems and target knowledge, plus that networking is encouraged. The context of the workshop was kept open intentionally and the approach divergent in order to create an overarching understanding of CS.

The workshop was designed to be carried out digitally over a period of two hours. It was suitable for a number of 24 to 60 participants. Templates and tasks for up to 10 small groups were prepared. The workshop was targeted at people from different sectors, disciplines, and positions of power. This aimed at fostering the vision's relevance for diverse actors. Prior knowledge of circularity or sustainability related topics was not needed. However, due to the vocabulary used and the complexity of the tasks, a certain level of education was required. Also, technical affinity with the digital collaboration platform miro[6] was a prerequisite. To strengthen digital skills, a tutorial was created, individual assistance was offered additionally. The main language of the workshop was English. The visioning workshop took place on the

[6] Digital collaboration platform miro: https://miro.com/

first evening of the CSF, 22 February 2021, with 27 participants and 10 facilitators. The latter were part of the conference team or speakers at the CSF. I took on the role of the observer.

17:00 Arrival, Welcome & Impulse
17:25 Introduction to the Workshop & Icebreaker

17:55 **Work in facilitated subgroup**
18:35 **Sharing Session**
19:05 **Postcards from the Future**

19:15 Feedback
19:25 Closing

Figure 3 ***Agenda of the Visioning Workshop***

After a short welcome, the visioning workshop began with a 10-minute impulse talk by an external speaker (Christoph Soukup[7]). In it, the audience was asked to distance themselves mentally, spatially, and temporally from reality. Next, the workshop team outlined the aim and agenda of the workshop, presented in Figure 3. To create a common base, a brief introduction was given to the key potentials and limitations of CE approaches and the basic elements of CS approaches. Finally, the participants were invited to travel forth in time to the year 2087. This particular year was chosen in the distant future, because experience of HSS team members has shown that participants usually think more short-term than desired. After the input, an icebreaker exercise was conducted to initiate an open and creative atmosphere. This was followed by the main working session in facilitated subgroups, a sharing session and a creativity technique for reflection and synthesis. The workshop was concluded with room for feedback and questions.

The workshop templates prepared on the collaboration platform miro[8] supported an interactive exchange. Here, a workspace was prepared for each group. This workspace included a Multi-Stakeholder-System Map, a vision, and an evaluation template. Template 1 exemplifies the workspace of the first group, which focused on "Actions & Practices" in an ideal CS. For a readable version see the miro board. Following the advice of Simonse (2017), a clear and consistent template design was aspired to support the work process by providing orientation and inspiration. Colour distinctions between the vision elements and the use of expressive icons could ease the participants to find their way around the template and promote ideation.

[7] Christoph Soukup at CSF on “Mayday on Spaceship Earth.” [conference presentation]; https://www.youtube.com/watch?v=vHaHw4kOUt8&list=PLnsIHr9Ovr4Kq0OzHPSYbvij-5Tw6s883&index=10
[8] Miro board of the visioning workshop: https://miro.com/app/board/o9J_ITG5hko=/?invite_link_id=251946299047

Template 1 ***Exemplary Group Workplace with the three Tasks and Templates*** *(own illustration)*

The first template was based on the Multi-Stakeholder-System Map developed by HSF (2021b). The map is designed for stakeholder management in projects where it is important to address and activate stakeholders from different sectors and hierarchical levels. The stakeholder map resembles a cake, where each slice represents a societal sector. The sectors include business, civil society, science, politics, the public sector, the social economy, and miscellaneous. The societal levels, represented by three circles on the cake, range from local or individual contexts on the inside, to international and trans-organisational contexts on the outside. At the beginning of the work phase, the participants were asked to locate themselves on the map with a sticky note, the intention being to provide information for the actor analysis (s. chapter 9.1).

The second template – the visioning frame – was the centrepiece of the workshop. For its development, a categorical approach was chosen. With such, different aspects of a CS could be explored in an open and holistic but structured way. The impact matrix developed by the HSF (2021a) served as a reference framework for deriving the vision elements. The matrix distinguishes between individual, social, material, and structural levels, covering a broad corridor of societal structure. The categories of each societal level were translated into vision elements and complemented with guiding questions. The latter included, for example: "Which circular actions and practices are integrated into our daily lives? How do we live, work, consume, eat, and travel?". For an

Table 8 ***Vision Elements derived from Impact Matrix*** *– short version (own illustration, based on HSF, 2021)*

Level	Category	Vision Element
Individual	Behaviours, Attitudes	Values, Mindsets & Goals
	Practices, Routines	Actions & Practices
	Skills, Knowledge	Actors & their Capabilities
Social	Relationships	Ways of Organising
	Organisations	
Material	Resources	Resources, Infrastructure & Places
	Infrastructures	
Structural	Discourses	Rules, Norms & Discourses
	Policies, Governance	
	Laws, Rules	

overview see Table 8, for a detailed version including the guiding questions see Table 22 in the appendix, or the workshop's miro board.

In addition, two overarching elements were included in the visioning frame. According to Calisto Friant et al. (2020), the logic and drivers of transformation are central points of disagreement in the discourse, thus, these aspects were translated into one vision element. In addition, the element 'Related Concepts' was added to capture thoughts on similar approaches. In what sense the CS relates to other concepts, was a frequent question in earlier events of the CS discourse field. For a detailed version of the visioning frame. Using this template, participants were asked to develop their visions for an ideal CS in the year 2087. Each group started with an assigned element. The thoughts were to be written down on sticky notes and supplemented with photos, drawings, or graphics if desired. The group work was followed by a sharing session.

This was complemented by the creativity technique „Letter from the Future"[9]. As this exercise usually takes 60-120 minutes, but the schedule only allowed for 10 minutes, the method was adapted. The applied format aimed to give participants space for personal reflection and creativity along with writing down ideas about desirable futures and possible steps towards them. Also, participants were intended to be inspired and motivated to circular agency beyond the CSF when receiving the documentation. The exercise was to write a postcard. This postcard was to travel back in time and be sent from the ideal CS in 2087 to a "Circular Pioneer" who had participated in the Visioning Workshop 2021. In doing so, they were to address two aspects: First, they should thank the Circular Pioneers for the actions that have put society on the path to an ideal CS. Secondly, they were to describe what this ideal CS looks like. The postcards, together with the combined visions[10], were collected and anonymously mailed to the participants.

The third template was designed for evaluation. The evaluation template was based on the quality criteria for sustainability visions by Wiek and Iwaniec (2014, s. chapter 4.3). The aim of the template was to capture the insights and learnings of the participants and facilitators, their opinion on the quality of the visions developed and their feedback on the workshop design. The templates were completed individually at the end of the workshop. Insights from the reflection session with facilitators were also recorded in the template. Responses were provided by using a rating scale from strong agreement, agreement, neutrality, disagreement to strong disagreement. To capture thoughts that exceed this logic, open questions were

[9] See "Letters from the Future" by SessionLab: https://www.sessionlab.com/methods/letter-from-the-future
[10] Documentation of the workshops, including the postcards and a combined vision: https://media2-production.mightynetworks.com/asset/21403300/CSF_Documentation_Visioning_Roadmapping_Workshops.pdf

added. Facilitators received two additional questions on shared or contested understandings and learnings for the upcoming roadmapping workshop.

Evaluation

The reflection on the transdisciplinary co-creation of visions was based on participants' and facilitators' feedback and the researcher's observations. 15 out of the 27 participants and 9 out of the 10 facilitators filled in the evaluation template. Insights from the reflection session with the facilitators were also recorded in the template. The templated consisted of open question and scale rating statements.

Workshop-design

In the perception of the respondents, the workshop was well structured, organised, timed, and facilitated. Yet, it was suggested to make the introduction more inspiring, e.g., through examples of successful visions. Responding participants liked the input on CE and CS, which brought everyone to the same level. The design of the templates was found to be aesthetic and helpful for orientation, however some felt overwhelmed by the volume of information. The participants judged the format as good for digital collaboration and group dynamics. The use of the miro board was seen as an engaging tool for online collaboration, allowing a high level of interaction. Still, some participants did not have the technical skills or conditions to use miro properly. Although miro offers creative features, these were not used. While participants felt that collaboration worked well, some facilitators found it tough. One suggestion for the roadmapping workshop was to let the participants assign groups themselves. Also, the groups were asked to be larger, as virtual collaboration tends to be quieter. Regarding the vision template, opinions differed: While some participants said the division into different vision elements was useful, others suggested keeping it simpler and less abstract. Facilitators suggested trying an integrated approach instead of taking the vision elements apart. Furthermore, facilitators suggested using more creativity techniques to create an enthusiastic atmosphere. Some also found the time horizon (2087) too far away for their imagination. It was experienced that visioning itself is a hard exercise that most are not used to. However, respondents found it is worth practising.

Knowledge genesis

Systems knowledge was generated by offering new perspectives on the CE, increasing knowledge about existing circular innovations, and enabling personal learning about the role of ownership, definitions of success and its measurement. Most participants agreed or strongly agreed (11) that the workshop helped to think differently about CE.

Transformation knowledge was gained through developing vision actions or identifying drivers

of change such as mentality, culture, worldviews, global change, democratic institutions, etc. Most participants (11) (strongly) agreed that the workshop was preparatory for further steps towards a CS. However, four people disagreed.

Target knowledge was produced by exploring the visions. It was discussed that visioning is necessary, at the same time demanding, and needs practice. The question arose whether visioning is even more difficult in times of covid pandemic. It was astonishing that work, use of time, sufficiency, community life and basic income were topics that came up in most subgroups. Furthermore, two participants stated that they learned about the complexity and holism of the CS and found this enriching.

Vision's quality

There was disagreement among the participants about whether the vision is *tangible and nuanced*. Almost one third of the responding participants (5) agreed with the statement, while almost one third (6) stayed neutral and almost one third disagreed (5). Most moderators indicated neutrality or disagreement (7).

Half of the facilitators indicated that the visions show a critical level of *shared* understanding, agreement, and support from relevant stakeholders. The other half indicated neutrality. Different experiences in the subgroups might explain these results. One facilitator stated that it was difficult to get to a shared understanding, while another stated that a shared feeling was arranged through vivid exchange. Many participants emphasised the high level of consensus and good group dynamic, which they experienced as motivating.

Furthermore, all responding participants agreed or strongly agreed that the visions developed are *visionary*. The facilitators took in a more sceptical role. It was doubted whether the visions are truly futuristic or rather states where past idyllic or currently existing narratives have become real. This was especially the case for practices and actions. For technology and resources, it seemed easier to think futuristic.

The quality criteria best rated was the visions being *motivational*. All responding facilitators (9) and most of the participants agreed or strongly agreed (15) that the visions are motivational.

7.2. Roadmapping

Workshop Design, Tasks & Templates

The aim of the roadmapping workshop was to discuss measures on how to address hurdles and unlock potential to move closer to a CS. Regarding the phases of roadmapping (Simonse**,** 2017), visioning equates to value mapping, while the roadmapping workshop encompasses idea and pathway mapping. It has a more convergent character compared to visioning.

16:00 Arrival, Welcome & Impulse on the Vision
16:10 Introduction to the Workshop

16:30 **Work in facilitated subgroup**
- gallery walk on visions' elements
- work on roadmaps
- dot voting

17:15 Sharing Session & Discussion

19:45 Feedback
19:55 Closing

Figure 4 ***Agenda of the Roadmapping Workshop***

The duration, number of participants and target group of the roadmapping were set in the same way as those of the visioning workshop. The only difference was that the roadmapping workshop took place on the 25 February 2021, the last afternoon of the CSF, and was attended by 28 participants. The workshop started with a presentation of the CS visions developed three days earlier. Then, the moderator outlined the goal and agenda of the workshop, as shown in Figure 4. This was followed by a presentation on potentials and limitations of CE approaches. A working session, sharing round, feedback and closing remarks followed.

To facilitate orientation, similar templates and designs from the visioning workshop were used (s. chapter 7.1). One insight from the visioning workshop was that the template should be as simple as possible only presenting the most important information. Another insight was that the workspaces should be divided into several miro boards to avoid loading times. Both aspects were adapted at short notice for the roadmapping workshop. The interactive exchange was again supported by the workshop templates prepared on the collaboration platform miro[11]. A workspace was prepared for each group, as shown in Template 2. This workspace contained the same Multi-Stakeholder-System Map and a similar evaluation sheet as those of the visioning workshop. Instead of the vision template, a roadmapping template was located at the centre. For a readable version see the miro board.

[11] Miro board of the roadmapping workshop: https://miro.com/app/board/o9J_lS6IvTQ=/?invite_link_id=783529077813

Template 2 ***Exemplary Roadmapping Group Workplace with the three Tasks and Templates*** *(own illustration)*

Likewise to the visioning, the second template – the roadmapping frame – was the centrepiece of the workshop. It was based on the categorical approach of the visioning frame. The visioning results were mapped on the right-hand side of each roadmapping template and served as the destination for the roadmap. In this way, roadmaps for each vision element have been explored by different subgroups. In addition, the two overarching elements 'related concepts' and 'drivers of transformation' have been included in the roadmapping frame. Each group was asked to work on three questions: (1) What is the foundation *(potentials)* we have to build on for our way to a CS? (2) What *hurdles* do we face on the way to a CS? (3) What *next steps* can be taken within the next year?

Participants self-selected the group they wanted to participate in. Many participants already took part in the visioning and stayed with their element. Again, their thoughts were to be written down on sticky notes and supplemented with additional material if desired. Where time permitted it, the subgroups voted on the potential, hurdle, and next step they considered most important. The subgroups shared their results with the others.

Evaluation

The reflection on the transdisciplinary co-creation of roadmaps was similar to the reflection of the visioning (s. chapter 7.1). 16 of the 29 participants and 4 of the 10 facilitators filled in the evaluation template.

Workshop-design

In the perception of the respondents, the workshop set up overall was well organised and facilitated. However, responding participants and facilitators wished for more time in group work. In general, there was a consensus that the time for creating a roadmap was too short and it was suggested to extend the roadmapping beyond the forum. Taking up the results of the visioning process were felt to be enriching, but again lack of time was pointed out. Furthermore, some facilitators noted that roadmapping was not the ideal way to close a

conference, as participants were already tired. In addition, facilitators remarked that hoped for participants did not attend. For example, very few politicians and public sector officials participated (s. chapter 9.1). Digital collaboration and group dynamics was assessed positively by responding participants. In particular, the diversity of participants, perspectives and agendas were perceived as enriching and well supported by the interactive group discussions. One suggestion for the roadmapping workshop was to let participants assign groups themselves and increase the group size. According to the comments, this worked well. Again, while the participants considered the use of miro as a great way to visualise and promote interaction, some facilitators found it difficult. Likewise, there were different opinions about the roadmapping template: Some participants thought the subdivision into different vision elements was useful. Some even wished for a more concrete and specific focus, e.g., by further specifying the elements. For other participants and facilitators, the categories were too abstract. They wished for a more integrated approach working on previously defined core practices or practice fields, such as food and mobility. Despite all the room for improvement, participants and facilitators appreciated the process of roadmapping for a CS.

In the feedback session with the facilitators, the question of whether the workshop served as a catalyst for strengthening the CS (movement) was discussed. Some facilitators stated that the workshop brought together relevant stakeholders and multipliers from different backgrounds and locations, initiating conversations and connections to build a CS movement. Others stated that the workshop did not create "momentum" but that it was important to have it as an experiment for further roadmapping projects. One facilitator pointed out that the CSF as a whole format played a much bigger and successful role as a catalyst for field building.

Knowledge genesis

Systems knowledge was generated by offering new perspectives on CE and CS. Some said that the roadmapping revealed the knowledge and rich perspectives that exists among the participants. Others said that they have learned more about CS and especially about the importance of transparency, social solutions and social justice. Furthermore, all facilitators and most responding participants (10) indicated agreement that the workshop helped to identify hurdles for the change towards a CS. Nevertheless, there was a wide dispersion among participants in terms of what and how much they have learned about circularity. While participants in the groups "New forms of organisation", "Actors and their capacities" and "Norms, discourses and rules" signalled neutral to strong learning experiences, participants in the groups "Actions and practices" and "Resources, infrastructures and places" indicated neutral to no learnings.

Transformation knowledge was gained through the experience with the practice of roadmapping. The responding participants felt better prepared to initiate transformation processes through the roadmapping than through the visioning workshop. Facilitators were

more sceptical, as in their opinion the formulated next steps were too vague. A central question in the discussions was how to reach a critical mass with CS.
Participants who did not take part in the visioning before, were able to gain target knowledge about an ideal CS. One participant noted that visions that should be taken for granted are given a name with the CS.

Roadmap's quality

The roadmaps' quality was assessed in the same way as the vision's quality, based on rating scales that considered several of the sustainability vision criteria suggested by Wiek and Iwaniec (2014). It was assumed that these criteria also apply for sustainability roadmaps.

The visions and roadmaps were perceived as *visionary* and above all *motivating*. The roadmaps were perceived more *tangible and nuanced* and preparatory than the visions. This was to be expected as the roadmaps aim to translate the visions into action points. The disagreement on whether the roadmaps had a critical level of convergence, agreement, and support from relevant stakeholders (*shared*) was higher than for the visioning. One facilitator noted after the roadmapping that participants had different agendas and priorities. It can be assumed that the participants agreed more on the goals than on the means. Then, the process of negotiating measures would need to be strengthened to identify common pathways.

Interim Conclusion

The transdisciplinary visioning and roadmapping formats complemented each other fruitfully, as was expected in the workshop design process. The workshops generated systems, transformation and, above all, target knowledge among the participants. Furthermore, the workshops functioned as onboarding and networking formats. The quality of the visions and roadmaps was mixed but provided a good basis for further analysis of the material and synthesis into CS principles, vision themes and starting points for a roadmap. The extent to which the visions and roadmaps were coherent (consisting of compatible goals; free of irreconcilable contradictions) and plausible (evidence-based) could not be assessed within this thesis. Furthermore, the evaluation templates did not ask for the quality criteria: *relevant* (composed of salient goals that focus on people, their roles, and responsibilities), *systemic* (holistic representations, linking vision elements and complex structure) and *sustainable* (in compliance with sustainability principles, with radically changed structures and processes). It is apparent that a variety of social, ecological, and economic sustainability goals were included in the visions. Rather the question emerged to what extent the results would have been different if one had asked for an ideal sustainable society. The relationship between sustainability and CS needs to be sharpened. What remained open was the question of how

to develop visions that are truly visionary, especially in relation to social practices, and that not just reproduce past ideals or current narratives. Furthermore, a much-discussed question was how to take these CS visions into the mainstream.

Transdisciplinary Visioning and Roadmapping…

…are integrative transdisciplinary methods: Both approaches complement each other.

…can foster knowledge generation: Systems knowledge, transformation knowledge and especially target knowledge can be generated among the participants;

…support field and community building: Visioning has proven to be a good format for onboarding and networking, especially in the academic and business sectors;

…may support capacity building: The visions and roadmaps were assessed as highly motivating;

8. Reflections

While previous studies have relied on research and literature from academia (s. Calisto Friant et al., 2020), this study approaches the CS discourse field with qualitative empirical research. The research process described made it possible to answer the diverse research questions. The open and exploratory empirical approach was suited to capture and advance the young and dynamic CS discourse field. I

What was described in chapter 3 with an analytical and formative research interest is consistent with two forms of theory building. According to Cornellisen's et al. (2021) definition, this work covers both interpretative and emancipatory approaches and outcomes. Analysing the discourse arena and synthesising its characteristics, corresponds to an interpretive approach. Within the research process, existing knowledge resources are used to develop theoretical abstractions. These abstractions offer new perspectives and allow participants and readers to understand the topic differently or more comprehensively than before. Characteristics of the CS discourse field and its CS visions were identified that reflect and capture circularity concerns towards sustainability differently than CE approaches, expanding the theoretical conversation in a normative and practice-oriented direction. Thus, the research process invites readers and participants to engage in a 'normative thought experiment'. This is accomplished in particular through participatory workshops and visioning practices. Tthe feedback from the workshop participants indicates a high motivating and activating effect. Normative decisions are made in this thesis about which aspects of the CS visions should be included in the CS principles. This normative orientation of the research marks a shift in my role as a researcher, involved in the pursuit of emancipation and thus being "positioned and active". Reflection on the fact that I as a co-organiser of the CSF and author on this topic am already significantly shaping the field of discourse is essential.

As far as the sampling design is concerned, the expectation was met that some of the claims from the CS literature will be reflected in the empirical results. This is because a significant number of the CS authors are part of the organising team of the CSF or key speakers at it (e.g., Jaeger-Erben and Calisto Friant).

Data collection was facilitated due to my involvement in the organising team of the CSF. The mixed-data approach proved to be suitable for analysing such a diverse discourse arena where different actors used different communication media.

Indeed, not only different data but also different methods of data analysis proved helpful in providing answers to the different research questions. The orientation of the research process on elements of Grounded Theory provided guidance and allowed for flexibility and openness. Although as an individual researcher I could not meet the requirements of Grounded Theory,

the collaborative research character of this method is in parts applied through feedback sessions, partial joint coding, and research workshops.

Methodological limitations are largely discussed in chapter 12 . Limitations of the actor analysis (s. chapter 9.1), however, do not fit into this chapter. The findings revealed that most participants at the CSF and the visioning and roadmapping workshops belonged to academia, business, and civil society, forming a diverse group of actors from different disciplines, sectors, and professions. Although most sectors were represented, only a few participants could be attributed to politics, the public sector, and the social economy. However, there are both organisational and methodological limitations that could influence the results. The conference was held on weekdays during working hours, making it more difficult for workers to attend than for students in semester breaks and young academics. Although the CSF was not organised as an academic conference, its open, international, and exploratory nature with exercises such as visioning may have been less attractive to public sector and policy actors seeking practical implementation. In addition, politicians, and public sector actors, as well as high-level decision-makers from business and the social economy, may not respond publicly to a post on the conference platform, even if they participated in the CSF. Here, anonymous enquiries at the time of registration would have been a more discrete method. Another methodological limitation is that designers were largely counted as part of the business sector. If they identify with another sector, this would weaken the tendency towards business. Nevertheless, the dominance of actors from academia, business, and civil society over actors from the political and public sectors is considerable, and even if the methodological limitations were removed, the distribution could be different but probably not reversed.

Regarding software used, it was no surprise that MAQDA supported the research process. However, it was an experiment to use the collaboration platform miro for data analysis. With its creative and flexible features and the ability to co-work, miro turned out to be well suited for scientific data analysis.

The sensitising concepts offered both content and process orientation. The CS circularity discourse typology (Calisto Friant et al., 2020) helped to reveal conflicts of interest. At the same time, it was validated to some extent by identifying its elements in the empirics. The literature on visioning and roadmapping for sustainability offered helpful advice on how to conduct the participatory workshops. The literature on transformative research served as a guide for the general research mode.

PART IV: RESULTS

9. People: The perspectives of Circular Society Protagonists

This chapter presents the results of the actor analysis. This includes information on the societal sectors and hierarchical levels of participants at the CSF and their manifold interest in CS in chapter 9.1 and 9.2. Insights on aspects of consent and dissent close the chapter.

9.1. Societal Sectors and Levels of Participants at CSF

During the CSF, over 600 people registered on the conference's online platform. However, since participation in the event was also possible without prior registration, a higher reach can be assumed. Of the over 600 people registered, 116 people responded to a post which invited participants to briefly introduce themselves and explain why they are interested in the CS (s. chapter 6.2). From the responses of 98 people, it was possible to deduce which societal sector (economy, civil society, science, politics, public sector, miscellaneous) and which level (from individual to organisational, from local to international) they belong to in their role at the conference. The other 18 answers were too vague to draw any conclusions. Figure 5 illustrates that most of the respondents were from academia (34 out of 98) and business (32 out of 98), followed by civil society (18 out of 98). Although most sectors were represented, few respondents could be assigned to the public sector, and the social economy and non to politics. Excluding science and civil society, very few high-level decision makers from the other societal sectors responded. Within the societal sectors a variety of professions, branches and disciplines was apparent.

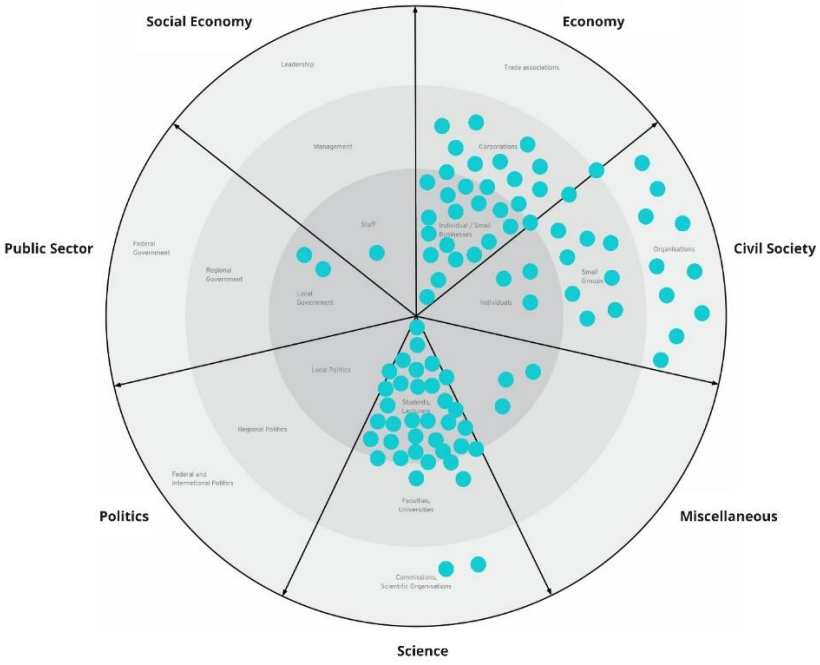

Figure 5 ***Distribution of Actors participating in the CSF according to Societal Sectors and Hierarchical Levels*** *(own illustration, based on HSF, 2021)*

Besides the platform inquiry, participants of the visioning and roadmapping workshops (s. chapter 7) were asked to assign themselves to a societal sector and level. If people gave two answers, they were balanced with each other. For example, if two people identified with the sector of civil society and science, one person was attributed to science and one to civil society. Members of the organisation teams were not counted. Here, by far the most participants were academics (visioning: 13; roadmapping: 10), followed by business actors (both: 6). While no actor from the public sector or politics participated in the vision workshop, two actors were involved in the roadmapping workshop. Likewise, more actors from civil society participated in the roadmapping workshop (visioning: 2; roadmapping: 5). For stakeholder maps from the visioning workshop, see Template 3 and for the roadmapping Template 4, in the appendix.

9.2. Participants' Interest in Circular Society

CSF participants' interest in CS was subject to different reasons. The participants' post comments showed that on the content level there was a particular interest in consistently aligning CE with sustainability goals and focusing on social aspects to achieve the necessary societal transformation towards a CE and sustainability.

Some comments indicated that participants aim for CS because it was a necessary complement to existing CE approaches. For example, the German roadmap for a CE was urged be complemented by a focus on social aspects as a basis for a successful transformation towards a CE:

> *"The Circular Society forms the basis for enabling the transition to a Circular Economy. With a roadmap, we describe a multitude of steps for this transition in the Circular Economy Initiative Germany. The social role has not yet been a focus. We have to change this, because we need a much better understanding of how this comprehensive societal transformation can succeed." (Translated from German)*

Other comments showed that there was an interest in CS as an alternative concept to CE, which was supposed to differ in fundamental criteria and target values. For example, CS was supposed to be a counterweight to the economic growth paradigm often emphasised by CE:

> *"I am interested in the circular society because the circular economy narrative is already being hijacked a bit too much by the people who continue to be obsessed with an outdated economic growth paradigm and (mis)use circularity for such purposes."*

At the operational level, some participants hoped that CS will provide a holistic approach to operational projects, especially at the city level, but also for businesses. Others were not specifically interested in CS, but in sustainability strategies, networking and CE in general.

9.3. Aspects of consent and dissent

The discussions within the CSF and especially the workshops have shown that a common denominator of the proposals for a CS is that many achievements of the CE, such as circular design, are crucial for fostering sustainability. Another point of agreement was that CE transitions are only possible with the engagement and participation of actors from all societal sectors, industries, levels, disciplines, etc. and that circular practices should be aligned with social-ecological goals. The speakers also agreed that efficiency strategies must be subordinate and embedded in consistency and/or sufficiency strategies. Here, too little or no relief of the environmental balance due to subsequent rebound effects was criticised. This critical posture on efficiency is by no means self-evident, as CE is often still understood as efficient waste management.

The major disagreement was between degrowth and sufficiency arguments on the one hand, and green growth arguments on the other. Due to their central importance, the positions of both perspectives as presented at the CSF are presented below with exemplary quotations.

Opponents of sufficiency strategies, including C2C experts, emphasised that associated consumption restrictions would have low savings potential and encounter little socio-cultural resonance (Sonja Eser[12]). The potential of consistency strategies are highlighted: (1) to avoid negative environmental impacts in the early design process (Sonja Eser; Tim Janßen[13]), and thus (2) enable sustainable consumption and green growth without compromising consumption desires and seeing humans as 'pests' (Sonja Eser; Tim Janßen; Niclas Mauß[14]), and hence (3) to offer a compelling vision that appeals to many stakeholders (Tim Janßen; Martin Calisto Friant[15]; Kersty Hobson[16]). Furthermore, the following two quotes from CE experts emphasise the lack of causality between efficiency as well as sufficiency strategies and circularity performance. The second quote, however, points out that regarding sustainability strategies, such as merging climate and resource crises, reduction approaches can be helpful as secondary strategies:

> *'Sufficiency and efficiency are interesting concepts, but they do not help us to achieve circularity, nor do they do much to relieve the overall ecological balance. The consistency strategy achieves this because it starts at the beginning of the production.' – Sonja Eser (translated from German)*

[12] Sonja Eser at CSF on "Thesen zur Circular Society" [conference presentation]; available under: https://www.youtube.com/watch?v=lWD6zX5X2Y4&t=1460s
[13] Tim Janßen at CSF on "Umdenken für eine zirkuläre und klimapositive Welt" [conference presentation]; available under: https://www.youtube.com/watch?v=lWD6zX5X2Y4&t=1460s
[14] Niclas Mauß at CSF on "Multidimensionale Nachhaltigkeitsbetrachtung zirkulärer Unternehmenstransformation" [conference presentation]; https://www.youtube.com/watch?v=lWD6zX5X2Y4&t=1462s
[15] Martin Calisto Friant at CSF on "The history and plurality of circular visions" [conference presentation]; https://www.youtube.com/watch?v=BKknWZr35Ao&t=1126s
[16] Kersty Hobson at CSF on "Circular consumption" [conference presentation]; https://www.youtube.com/watch?v=95dJ6nP2jHQ&t=6s

> *'For a Circular Society, I would like to appeal for an urgent change of perspective; a positive footprint is less achievable through reduction than through the change of design, the change of business models. [...] Efficiency strategies are only of secondary importance. [...] Less material does not make a product more recyclable, nor does durability. This does not mean that efficiency is bad. This colourful bouquet of different sustainability strategies such as longevity, reparability, regionality are in sum decisive, also for bringing together the climate and resource crisis, but if we look at the topic of circularity, we see that [...] there is no causal connection to the circularity of a product.' – Tim Janssen (translated from German)*

Advocates of strengthening sufficiency strategies (e.g., Martin Calisto Friant[17], Gabriela Edlinger[18]; Kersty Hobson[19]; Niko Paech[20]; Lucia Reisch[21]; Andrea Vetter[22], Markus Wissen[23]) agreed on the potential of consistency strategies for circularity and sustainability. However, they criticised the belief in the feasibility of green growth (s. C1) through consistent circularity. Martin Calisto Friant calls this belief a dangerous 'illusion', Kersty Hobson speaks of a 'fairy tale' (Kersty Hobson) that promotes a false sense of safety:

> *'There is [...] a simple, almost fairy-tale story that the circular economy is worry[ingly] starting to foster. It says [...] that we've come up with a simple solution, the MacArthur['s] very famous sort of butterfly diagram. It's symmetrical. It's beautiful. [...] I know [people] want a very straightforward answer. But I don't think that kind of circularity is helpful. I think it lulls us into a false sense of security that we've now got the answer. And I don't think circularity is the answer because [...] the way it's currently framed, it doesn't question some of the fundamental issues that got us here in the first place.' – Kersty Hobson*

These scholars thus called for fundamental debates and the strengthening of sufficiency strategies. Sufficiency strategies were understood to having the potential to support systemic change that can effectively prevent negative socio-ecological impacts and address issues of entropy and biophysical limits through reduction of resource demand:

> *'I think it's also quite important for a circular society that we understand and acknowledge that we are embedded in biological metabolisms and material cycles. So that's the old idea of thermodynamics, which basically means that nature is the limit and not capital. [...] [A] circular society [goes] beyond taking good care of the material cycles and using energy in a very smart way […], which is the consistency. It goes one step further by looking at sufficiency, [seeking other] maybe less material forms of value creation and need satisfaction.' – Lucia Reisch*

[17] Martin Calisto Friant at CSF on "The history and plurality of circular visions" [conference presentation]; https://www.youtube.com/watch?v=BKknWZr35Ao&t=1126s
[18] Gabriela Edlinger at CSF on "Genug in einer Überflusskultur" [poetry slam], https://www.youtube.com/watch?v=eJbhbPOKkzM
[19] Kersty Hobson at CSF on "Circular consumption" [conference presentation]; https://www.youtube.com/watch?v=95dJ6nP2jHQ&t=6s
[20] Niko Paech at CSF [conference statement]; https://www.youtube.com/watch?v=Pxa-kJzvdG0
[21] Lucia Reisch at CSF [conference statement]; https://www.youtube.com/watch?v=n1rGAc9RGAE&t=356s
[22] Andrea Vetter at CSF on "Postwachstum & Kreislaufgesellschaft" [conference presentation]; https://www.youtube.com/watch?v=bIQQzJwzKbk&t=1950s
[23] Markus Wissen at CSF [conference statement], https://www.youtube.com/watch?v=qw362gmlPr4&t=1s

Furthermore, it was emphasised that renunciation does not have to be negative, but that frugality and 'enoughness' can have positive effects on our everyday lives (Gabriela Edlinger). In the visioning workshop, sufficiency and frugality were again key elements of the desirable futures discussed. Governmental sufficiency approaches and everyday life practices have been discussed at every workshop group, not only to secure natural livelihoods but also to a higher quality of life and more distributed wealth. According to the participants, growth is only aspired where it is sustainable, for example, with education. Nevertheless, it was pointed out, both amongst the workshop participants and key speakers, that the concept of sufficiency has so far been difficult to anchor in the mainstream. However, with the increasing socio-ecological crises and the associated growing urgency, this could change (Martin Calisto Friant).

Interim Conclusion

In summary, most participants of the CSF and the visioning and roadmapping workshops belong to academia, business, and civil society, and form a diverse group of actors from different disciplines, branches, and professions. Although most of the sectors were represented, few to no participants could be assigned to politics, the public sector, and the social economy. Also, decision-making power was lacking.

CS participants' interest in CS was manifold. A particular interest was in aligning CE with sustainability goals and strengthening social aspects to succeed in the transition towards a sustainable CE. Some participants aimed for CS because it is a necessary complement to existing CE approaches, others because it differs to CE in fundamental criteria and target values. Some participants hoped that a CS conceptualisation will provide a multi-dimensional approach to operational projects. Moreover, the CSF attracted people interested in CE and sustainability in general and eager for networking in this arena.

A common denominator of the proposals for a CS is that many achievements of the CE are crucial for fostering sustainability, that CE transitions are only possible with the engagement and participation of societal actors from all societal sectors, industries, levels, disciplines, etc. and that circular practices should be aligned with social-ecological goals. The speakers also agreed that efficiency strategies must be subordinate and embedded in consistency and/or sufficiency strategies. The major disagreement was between degrowth and sufficiency arguments on the one hand, and green growth arguments on the other. However, within the transdisciplinary workshops, sufficiency and frugality were key elements of the desirable futures discussed.

10. Principles: A normative Framework of Circular Society

In the following CS principles, strategies and vision themes are presented as derived from the literature and empiric material of the CSF discourse field. Based on that a CS target frame is then proposed.

10.1. Circular Society Principles, Strategies and Vision Themes

This section presents eight CS principles and respective strategies and vision themes. For an overview of the principles see Table 9 or the detailed version in appendix, Table 23.

Table 9 ***Overview of CS Principles*** *– short version (own illustration)*

N°	Description of Principle
P1	**Strengthen Sufficiency Strategies** Narrow resource flows while supporting a good life for all by establishing production and consumption systems that support consuming fewer resources and energy.
P2	**Design out Waste** Close, slow, and narrow resource flows by designing out negative impacts on human and natural well-being.
P3	**Keep Products & Resources in Use** Slow down resource flows and optimise stocks and flows by maximising the lifespan of products and resources, intensifying their rate of use, and preserving or increasing their value.
P4	**Regenerate (natural) Systems & Foster Resilience** Improve the integrity and health of social-ecological systems by sustaining and regenerating them and increasing their resilience.
P5	**Assure Accessibility, Fairness & Transparency** Enable circular agency under equitable conditions by ensuring accessibility, fairness, and transparency. (Assure 'Teilhabe').
P6	**Establish Participation & Co-Creation** Enable innovativeness, democratisation, and an inclusive socio-cultural transformation by establishing processes and structures for participation and co-creation. Be sure to give nature a voice. (Assure 'Teilnahme')
P7	**Advance Circular Literacy** Enable sustainable circular agency by promoting circular literacy. Circular literacy encompasses the knowledge-based capability to understand complex systems, formulate sustainability-relevant goals, and innovate current practices of consumption and production.
P8	**Redefine Value, Progress & its Metrics** Overcome socio-ecological crises by placing social well-being and environmental integrity at the centre of desirable and resilient economies. Find indicators to make these values measurable and guide action.

Each CS principle is introduced by a short résumé highlighted in a yellow text box. It sums up the main idea behind the principle, followed by suggestions and strategies of how to get there. Each strategy is concretised by a set of examples to ease the strategy's application. The examples are structured in a table ranging from the everyday life of citizens (micro level) to the sphere of organisations and companies (meso level) and to paradigm shifts in governance and entire societies (macro level). The division into micro, meso and macro levels refers to the categorical approach of the visioning workshop, where the subgroups worked on different aspects of the individual, social, material, and structural levels of society. (s. chapter 7.1 and the impact matrix by HSF, 2021a).

The principles are then presented in detail. First, it is briefly shown for each principle how it has (not) been addressed in prominent and recent CE literature, referring to respective CE principles from the EMF (2013), the key elements from Circle Economy (2021), the strategies for resource cycling by Bocken et al. (2016) and the 10 Rs by Reike et al. (2018). The core and enabling elements of these approaches are presented in chapter 1.1. However, for the CS principles the terms ‘core’ and ‘enabling’ were not applied. Rather, it was systematically distinguished between the principles of stocks and flows (core) and the principles of system design and intent (enabling). In effort to develop principles for the design and intent of a system, only those enabling elements were included which have the character of principles with an end in themselves or that can contribute to the development of such principles. Omitted were “design for future”, “incorporate digital technology”, “rethink the business model” (Circle Economy, 2021) as well as “new business models” and “favourable investment climate” (EMF, 2013). Table 11 contrasts the CS principles with those approaches.

Second, differentiating and extending the CE strategy, it is demonstrated how the respective principle is understood at the CSF, and in case of divergence, in the critical CE debate. Also, the strategies for each CS principle are outlined and, in some cases, illustrated by vision themes. The CS vision themes are ideal-typical future images of the CS principles, as they have emerged at the CSF. They are mainly based on clustered statements, notes and letters written by participants in the visioning workshop. The wording is like the original or was adopted verbatim to maintain a low threshold character and preserve the original meaning. Likewise to the strategies, the envisioned futures ranged from micro to macro. Some vision themes address all three levels in a structured manner while others only address one or two. At the end of each section, the principle is summarised and embedded in the context of systems thinking according to Meadows (1999). This is to illustrate the principle's potential for systemic change. Table 10 gives an overview on the terminology:

Table 10 ***Terminology*** *(own definition)*

Term	Definition
CS Principle	A CS principle is a proposition that guides behaviour, thinking and evaluation. It represents essential characteristics of a CS. All CS principles combined reflect the intended purpose of the concept and ideal-typically ensure effective implementation and assessment. The CS principles can be approached through different strategies.
CS Strategy	A CS strategy represents a form of application to address its respective CS principle.
CS Vision Theme	A CS vision theme is an ideal-typically image of the future, which makes its respective strategy and underlying principles tangible. It gives an idea of what an outcome of applying CS principles might look like.

As the empirics represent mainly Western contexts, desires, and perspectives, the CS principles are directed to individuals, governance, organisations, and companies in high consumption countries.

Table 11 ***Contrasting CS Principles with existing Approaches*** *(own illustration, based on EMF, 2013; Circle Economy, 2021, Bocken et al., 2016; Reike et al., 2018; Jaeger-Erben & Hofmann, 2019; Jaeger-Erben et al., 2021)*

Approach	**Principles of Resource Stocks & Flows**					**Principles of underpinning System Design & System Intent**			
CS Principles (based on empirical results)	P1: Strengthen Sufficiency Strategies	P2: Design out Waste	P3: Keep Products and Resources in Use		P4: Regenerate (natural) Systems & Foster Resilience	P5: Assure Accessibility, Fairness & Transparency	P6: Establish Participation & Co-Creation	P7: Advance Circular Literacy	P8: Redefine Value, Progress, Prosperity & its Metrics
CS Principles (Jaeger-Erben & Hofmann, 2019; Jaeger-Erben et al., 2021)	Negotiate and strengthen Sufficiency Strategies	Slowing down and Closing Technical and Biological Resource Cycles				Foster Democratisation, Social Innovativeness, Social Justice & Solidarity			
						Accessibility & Transparency	Co-Creation & Empowerment / Foster Agency	Circular Literacy	Challenge and transform Capitalist Value Definitions
Key Elements of the CE (Circle Economy, 2021)		Prioritise Regenerative Resources	Stretch the Lifetime	Stretch the Lifetime Use Waste as a Resource	Prioritise Regenerative Resources		Collaborate for Joint Value Creation	Strengthen and Advance Knowledge	
CE Principles (EMF, 2013)		Design out Waste & Pollution	Keep Products and Materials in Use	Design out Waste & Pollution Keep Products and Materials in Use	Regenerate Natural Systems		Cross-Cycle & Cross-Sector Collaboration	Skills in Reverse Cycle and Circular Product Design & Education	Rules of the Game to quickly reach Scale
10 Rs (Reike et al., 2018)	Short Loops			Medium Loops Long Loops					
	R0 Refuse	R1 Reduce	R1 Reduce, R2 Resell/ Reuse R3 Repair	R4 Refurbish R5 Remanufacture R6 Repurpose R7 Recycle R8 Recover R9 Remine Compost Cascade					
Strategy for Resource Cycling (Bocken et al., 2016)	Narrow Flows	Narrow Flows	Slow Flows	Slow Flows Close Flows	Regenerate Flows				

P1: Strengthen Sufficiency Strategies

Narrow resource flows while supporting a good life for all by establishing production and consumption systems that support consuming less resources and energy.

This requires reflecting on what is needed and what can be **refused** to consume and use. Question and rethink understandings of prosperity and ownership and adapt traditional forms of work, leisure, care, time, and policies that currently accelerate consumption.

Table 12 ***Exemplary Strategies for P1 at the Micro, Meso and Macro Level*** *(own illustration)*

Strategy	Micro	Meso	Macro
Post-Materialism & Frugality	• Refuse conspicuous consumption (e.g., minimalist lifestyle, zero waste) • Search for meaning in immaterial goods • Decelerate everyday life	• Refuse primary and hazardous materials in production • Establish non-consumerist marketing, communication, and business models (e.g., Slow-Approaches)	• Implement policies on degrowth; then hold a steady-state economy • Decouple progress from material use and economic growth • Foster discourses on the benefits of sufficiency strategies
Restoration, Self-Supply & Care Work	• Reduce dependency on money and economic growth while promoting solidarity through care and self-supply	• Reduce working hours • Foster non-monetary exchange of goods and skills (e.g., through time currencies)	• Decouple work and income and secure livelihood and circular stewardship through universal basic income

In CE literature, sufficiency strategies are approached with the concept of ‘refuse’. It implies the avoidance of waste and hazardous materials rather than their minimisation. Consumers are shifting to a post-material lifestyle by refraining from buying products and reducing their usage. Producers refrain from unhealthy and primary materials in the concept and design life cycle (Reike et al., 2018). Corporates with 'slow approaches' adopt a non-consumerist corporate marketing design (Jaeger-Erben & Hofmann, 2018). Yet very few CE concepts indeed incorporate ‘refuse’, ‘prevention’ (Reike et al., 2018) or ‘sufficiency’ (Homrich et at., 2018) strategies.

Unlike the critical CE literature, where sufficiency has recently gained attention, it is emphasised, that sufficiency strategies prevent rebound effects and can help to narrow and slow down resource loops with promising sustainability gains. Thereby, issues of entropy and biophysical limits are addressed (e.g., Hobson and Lynch, 2016; Bocken et al., 2016).

At the CSF, debates on sufficiency and degrowth were centre stage and a point of dissent (s. chapter 1.2 and 9.3). The arguments of economic benefit, consistent design solutions and decoupling, countered those of entropy, biophysical limits and complementary sufficiency strategies. Nonetheless, the CS protagonists agreed that efficiency strategies must be subordinate and embedded in consistency and/or sufficiency strategies.

The participants of the visioning workshop included the three dimensions of sufficiency, consistency and efficiency in their visions. An endorsement of sufficiency strategies was apparent. Each subgroup discussed sufficiency strategies at an individual, corporate, and governmental level. While Zwiers et al. (2020) criticised that in the CE “there is no further questioning of the traditional concepts of work, care or time, and no mention of alternative patterns of consumption and production beyond the market rationale such as sufficiency, de-/post-growth and the commons” (p. 13f.), this was core in the workshops:

> The time spent on paid work has been drastically reduced. Working time does not serve primarily monetary purposes anymore but has to have a lasting impact on the community. Many people experience "meaning" and quality of life in community, subsistence, restorative, and care work. At the same time, these activities reduce dependence on money and economic growth. The time allocation for a typical day looks like this: 20% DIY/DIT & self-care; 20% community work; 20% paid work; 20% care work; 20% sweet nothings. Time for sweet nothings is seen as highly desirable. Life has slowed down and become one with the pace of nature. Many people now live on co-farms outside the city, commute to the centre once a week.
>
> Time currencies are widely established allowing non-monetary exchange of goods and skills. Employers responded to this change in work models with flexible portfolio jobs.
>
> The decoupling of work and income is institutionalised with universal basic income. This gives people the security they need to make a living. As in nature - where nothing and no one is superfluous - there is no unemployment, jobs are shared. All this releases creativity and sustainable impact while decelerating resource consumption and private life.

Vision Theme 1 ***Restoration, Self-Supply & Care Work*** *(based on empirics)*

While the public discourse on sufficiency is often dominated by the question of sacrifice; deceleration and frugality were considered desirable in the workshops. Participants understood sufficiency strategies not only as a means to secure the natural livelihoods but also a higher quality of life and more equitably distributed resources. Stressing both ecological and social benefits. Growth, as stated by the participants, should only be pursued where it is sustainable and makes sense. This is the case, for instance, with education and solidarity. Likewise, when increased economic growth reduces suffering from poverty. The Vision Theme 2 outlines alternative consumption and production models which enable less consumption:

> Immaterial needs, e.g., for an intact environment, for health, happiness, and community, determine everyday life. Social status is no longer expressed through the possession of material goods. Consumption in affluent countries is reduced to the essentials. This way everyone is provided with a universal basic income while staying within planetary boundaries. This is not perceived as sacrifice, but as the shedding of ballast, which leads to contentment. Shopping as a leisure activity and self-reward mechanism is hardly imaginable anymore. Among the elderly, some still strive for "aesthetic" practices and conspicuous consumption, but these are no longer as “fast” as they used to be.
>
> Companies refrain from using unhealthy or virgin materials and offer attractive products and services. Still existing consumption needs can be fulfilled through "good" options. Non-consumerist marketing and business models such as Slow-Approaches play a big role here. We produce and consume less than in 2021, but of higher quality.
>
> At the macro level, the use of natural resources is transparently tracked and managed so that planetary boundaries are not exceeded. Thanks to supporting policies and the frugality of many in the past, while others were still living in abundance, the degrowth path showed success. So today we live in a steady-state economy where sufficiency thinking has brought rebound effects under control. The capitalist growth narrative and its exploitation have been overcome.

Vision Theme 2 ***Post-Materialism & Frugality*** *(based on empirics)*

Concluding that, although there was no consensus (s. chapter 9.3), embedding consistency and efficiency strategies in an orientation towards sufficiency seemed attractive and necessary to workshop participants and critical scholars. Here, it was argued with laws of entropy, biophysical limits, the failure of decoupling economic growth and resource use, and the chance for profound systemic change. CE experts pointed out that efficiency and sufficiency do not directly correlate with circularity performance. However, if the CE is to be placed in an overarching framework of sustainability goals – considering the critique of green growth – sufficiency, and efficiency together with consistency are essential. Accordingly, a CS is meant to take advantage of the potential of the three strategies, sufficiency, consistency, and efficiency (in that order), and be neither naïve (pure consistency or efficiency) nor daunting (pure sufficiency). As Donella Meadows (1999) wrote: '[Slowing economic growth is] the same as slowing the car when you're driving too fast, rather than calling for more responsive brakes or technical advances in steering.' In this sense, a motto of a CS could be "on the road to a CS, slow down the pace, find new ways of mobility and make the most of them." In line with that, sufficiency is not based on sacrifice but poses the question of the right balance, as it is common in many non-western traditions (s. Kallis, 2019). This implies that not every nation should be urged to refuse resource extraction in the same way. The participants rather described visions where reflectivity on needs is key. This involves questioning and rethinking understandings of prosperity (s. P7) and ownership (s. P2), redistributing wealth (s. P5) as well as adapting traditional forms of work, care, policies, and time that currently accelerate consumption.

P2: Design out Waste

Close, slow, and narrow resource flows by designing out negative impacts on human and natural well-being.

This requires strategies of **service-based** and **dematerialised systems** as well as **circular and eco-efficient design**: rethink approaches to products and production and replace them with immaterial goods and territorial, community-driven product-service systems (PSS). Where production is needed, design processes and materials sustainable, healthy, circular, and efficient.

Table 13 ***Exemplary Strategies for P2 at the Micro, Meso and Macro Level*** *(own illustration)*

Strategy	Micro	Meso	Macro
Product as a Service	• Engage in community-driven Product-Service-Systems	• Pursue performance business models • Design territorial and community-driven PSS	• Tax consumption instead of work
Design for Circularity, Sustainability & the Commons	• Design your environment accordingly	• Follow and advance circular and sustainable design criteria	• Strengthen circular design standards • Strengthen research on circular design for materials and processes
Dematerialisation & Resource Efficiency	• Extend & intensify utilisation rates	• Increase productivity and use less material per unit of production	• Strengthen standards of dematerialisation and resource efficiency
Production on Demand & Community Supported Production	• Engage in community-supported production alliances	• Produce on demand • Sell production structures (s. community supported agriculture)	• Strengthen pioneer projects through subsidies

A key circular principle in CE literature is ‘design out waste and pollution’ (EMF, 2013). Products, materials, systems, and supply chains are to be designed with materials and processes that ensure appropriate durability and future use in biological and technical cycles. Although explicit principles of circular product design vary from approach to approach, they commonly include disassembly & repair, reliability & durability, emotional connectedness, upgradeability & adaptability, standardisation & modularity, health & joy (Bakker et al., 2014; Braungart & McDonough, 2006; EMF, 2013; Circle Economy, 2021). In addition, waste is to be avoided by pursuing high-performance business models such as product-service systems (PSS) (EMF, 2013). Circular and service-based design is the prerequisite for the value retention hierarchies R1-R9: reduce, resell/reuse, repair, refurbish, remanufacture, repurpose, recycle, recover, remine (Reike et al., 2018). As the efficiency concept ‘reduce’ also contributes to designing out waste and environmental impacts through dematerialisation and resource efficiency (EMF, 2013; Reike et al., 2018), it is complemented here.

The protagonists at CSF agreed on the need for and benefits of circular and service-based design (e.g., Jaeger-Erben & Hofmann, 2019; Niko Paech[24]; Julia Schmitt[25]). Nevertheless, it was stated that circular, service-based, and efficient design strategies need to be embedded

[24] Niko Paech at CSF [conference statement]; https://www.youtube.com/watch?v=Pxa-kJzvdG0
[25] Julia Schmitt at CSF on “Zirkuläres Produktdesign“ [conference presentation]; https://www.youtube.com/watch?v=CvyV_Ddnqro&t=1s

in sufficiency efforts to prevent rebound effects (s. P1). In addition, PSS were understood to be results-oriented, rethinking the product in question, to bring about sustainable change in practice rather than being an add-on offer (Hobson, 2016; Uwe Schneidewind[26]). Likewise, PSS were suggested to have a territorial focus that engages and enhances the collective capacity of stakeholders to innovate in response to local sustainability problems (Estephania Delgadillo Jaime[27]). Community-driven PSSs contribute not only to dematerialisation but also to social cohesion. In line with that, a design that enables frugality, participation, and accessibility was called for (Jaeger-Erben & Hofmann, 2019). Furthermore, a planet-centred design approach (Felix Beer & Jakob Kukula[28]) was introduced at the CSF, which integrates nature as an active stakeholder in the design process (s. P6). The idea is to recognise and respond to the rights and needs of nature in the design process by making them visible. Another concept discussed during the visioning workshop was the reduction of waste through production on demand.

There is only a short vision theme for this principle (Vision Theme 4), as thoughts on aspects such as planet-centric design (s. P4), participation (s. P6), and accessibility (s. P5) were assigned to other principles. In addition, there was not much discussion on circular design and efficiency in the workshop. It is assumed that this is not because designing out waste and pollution was seen as irrelevant, but because there was a broad consensus on its importance as well as many well-developed approaches and solutions to it.

> What we produce and how we produce mimics nature, all is recyclable or biodegradable and goes back into cycles. There are no 'bad' options, as everything is designed to be prolonged or adapted for a different purpose without losing value.

Vision Theme 6 ***Circular Design*** *(based on empirics)*

In conclusion, it is undisputed in the CSF discourse arena that consistency strategies are needed when consumption can or will not be refused (s. P1). Design has the potential to change the system from the root, or as Donella Meadows (1999) stated: ‘Physical structure is crucial in a system, but rarely a leverage point, because changing it is rarely quick or simple. The leverage point is in proper design in the first place.’ This is where the decades of experience of circular and service designers come into play. To secure inclusive, sustainable, and desirable outcomes, circular design needs to be accompanied by design for biodiversity, conservation, and resilience (s. P4), accessibility, fairness & transparency (s. P5), as well as participation & co-creation (s. P6). Finally, the consensus was that consistent products and processes should be designed efficiently.

[26] Uwe Schneidewind at CSF on CS [conference statement]; https://www.youtube.com/watch?v=4hCdPJemVGM
[27] Estephania Delgadillo Jaime at CSF on “Towards territorial product-service systems for the circular society”; https://www.youtube.com/watch?v=y3b7-mKuFlE&t=2s
[28] Felix Beer & Jakob Kukula at CSF on “Planet-Centric Design”; https://www.youtube.com/watch?v=ZcqD1QzijwY&t=1s

P3: Keep Products & Resources in Use

Slow down resource flows and optimise stocks and flows by maximising the lifespan of products and resources, intensifying their use rate, and preserving or increasing their value.

This requires strategies of **repairing, upgrading, reusing, sharing,** and **pooling** products and resources. Only when these strategies are no longer possible or sensible, direct products and resources to **refurbishment** and **recycling** or **composting**. However, since most of our current stock has not been designed for material cycling, first analyse whether it makes sense from an environmental and social perspective.

Table 14 ***Exemplary Strategies for P3 at the Micro, Meso and Macro Level*** *(own illustration)*

Strategy	Micro	Meso	Macro
Reuse (resell, repurchase, swap) *> intensify use rates*	• Swap, gift, resell or repurchase used products and resources	• Support reuse and swapping by platforms, collectors, and retailers • Pursue business models of industrial symbiosis	• Establish binding reuse rates for production
Sharing, pooling & caring *> intensify use rates*	• Share and pool products in good shape	• Pursue performance business models such as renting and leasing • Promote sharing and pooling initiatives and needed infrastructure	• Return to public goods/commons
Repair, upgrade & local sourcing *> maximise lifespan, preserving or increasing value*	• Upgrade, repair, maintain and care for products and resources • Second, use them as sources for reprocessing	• Pursue performance and extended value business models • Promote repair centres and necessary skills	• Assure a right to repair
Refurbish to Recycle (R4-7) / Cascade & Compost *> prolong use rates*	• Refurbish or recycle products from the technosphere • Compost products from the biosphere	• Pursue supply and reprocessing business models • Promote efficiency • Foster nutrient loops	• Improve local infrastructure for nutrient loops

Another key principle in CE literature is ‘keep products and resources in use’ (EMF, 2021). It includes R1-R9: reduce (production and use life cycle), resell/reuse, repair, refurbish, remanufacture, repurpose, recycle, recover, remine as well as cascade and compost and sharing and pooling (Reike et al., 2018). Consumers use products more effectively (sharing & pooling) and longer (reuse & resell; care & repair), intensifying and decelerating their use rates. They sell or buy used products and repair their items on their own or at non-commercial repair workshops. Companies repair as part of a planned repair plan (Reike et al., 2018). Only when this is no longer possible do products and resources become a source for reprocessing and recycling (R4-R9) or cascading and composting.

The critical CE literature urges caution, as the recycling of resources and products is not always sustainable. For instance, additives used in polymers are often harmless when plastics are first used. However, they become harmful to the environment when secondary materials are repurposed. Thus, a multidimensional (social, economic, ecological) assessment of material circularity is demanded (Blum, Haupt & Bening, 2020). Although, for example, the

European and German waste hierarchy prefers the shorter resource, it is criticised that the focus of CE actors in reality is often on the latter.

Within the CSF and especially the transdisciplinary workshops, the short cycles refuse (s. P1), reduce (s. P2), resell/reuse, repair and sharing & pooling were highlighted as key strategies. In this context, non-monetary practices were emphasised, such as the exchange of goods or skills in neighbourhood initiatives. For these strategies to succeed, open and accessible manufacturing facilities and open-source data and knowledge were demanded. A point of discussion was how to make repairing less time consuming, or how to free time for such activities (s. P1):

> People still enjoy using modular, repairable products from the 1920s and 1930s. In fact, kits and repair manuals can still be found online and printed out at the local library or at open workshop.
>
> Repairing and upgrading products is enabled by intensive knowledge and skill sharing, open-source software and hardware, manufacturing facilities and business support through circular design and services. All this promotes emotional connectedness to materials and products and keeps resources in use!
>
> The 'right to repair' and smart infrastructures ensure that it is now less time-consuming and costly to repair things than to buy new. Open workshops in combination with recycling centres have done a good job in the past. But today recycling centres are no longer needed and are turned into museums where we are reminded of the rigid focus on waste management and the associated waste of resources.

Vision Theme 4 ***Repairing, upgrading & local sourcing*** *(based on empirics)*

Furthermore, workshop participants envisioned infrastructure, business models and policies that facilitate collaborative consumption networks where ownership is shared:

> People share means of transportation with friends and neighbours, live in residential communities with community gardens and common spaces. Sharing is thought of as a spatially proximate form of community-based, collaborative consumption. The dream of owning a luxury car and a large homestead is outdated. Products that are only used occasionally come from Libraries of Things (LoT) - like gardening tools. These LoT are used by both individuals and businesses. As learned from handling things in LoTs resources in general are treated with care and returned in good condition.
>
> Organizations and circular spaces such as LoTs, lending stores, and community gardens played a key role in familiarising people with circular practices in the past and enabling circular practices until nowadays. Companies primarily offer products (in LoTs or directly) as a service or loan, taking responsibility for the entire product cycle. Services are continuously aligned with local needs and the result required.
>
> By returning to the benefits of sharing goods, neoliberal privatization is overcome, and the concept of commons/public goods is revisited. Caring really is sharing, now!

Vision Theme 5 ***Sharing, Pooling, Caring*** *(based on empirics)*

In summary, if consumption cannot be refused (s. P1) and the materials and products are designed sustainably and circular (s. P2), there is a consensus that they should be kept in use. However, there are enormous stocks from non-cyclical decades that are sometimes worse to circulate and “changing [this existing physical structure] is rarely quick or simple” (Meadows, 1999). Yet, even if the leverage for system transformation is shallow, dealing with current stocks and flows is crucial. To include the broad society in these tasks, the CS emphasises the need for non-monetary participation and co-creation structures (s. P6), accessible and transparent infrastructures and information (s. P5), and knowledge-based capabilities to keep products and resources in use (s. P7).

P4: Regenerate (natural) Systems & Foster Resilience

Improve the integrity and health of social-ecological systems by sustaining and regenerating them and increasing their resilience.

This requires using and regenerating **renewable and healthy energy and resources**, fostering natural, socio-cultural and market **diversity**, promoting **context-sensitive, glocal solutions** and integrate **nature as a stakeholder**. Consider global conditions and the needs of ecosystems and stakeholders involved. Recognise humans, with their cultural diversity, as an integral part of natural and circular systems.

Table 15 ***Exemplary Strategies for P4 at the Micro, Meso and Macro Level*** *(own illustration)*

Strategy	Micro	Meso	Macro
Renewable and healthy Resources & Energy	• Use and consume renewable and healthy resources and energy	• Use renewable and healthy resources and energy	• Push the "Energiewende" (German) through taxation and subsidies
Diversity: Solutions for Biodiversity & Ecosystem Health / Nature as a Stakeholder	• Respect the needs of nature and respond to them	• Integrate nature as a stakeholder in the business/design process • Communicate nature's needs	• Assure Nature rights • Benefit efforts to conserve or regenerate ecosystem services
Diversity: A Pluriverse	• Respect others and nature	• Include humans with their different social-cultural backgrounds and needs (s. P6)	• Strengthen policies, e.g., on Gender Diversity
Context-Sensitivity & Glocality	• Think global, act local • Use digital solutions for global desires (travel) • Strive for context-sensitive solutions	• Adapt your strategies to local circumstances • Use digitalisation to strive for global goals	• Foster local innovativeness and decentralisation while supporting global strategies and values

A key principle in CE literature is 'regenerate natural systems' (EMF, 2021). The processes in a CE renew or regenerate the energy and material sources they consume. Diverse and regional systems with connections and different scales are promoted. Such systems are more resilient than uniform ones designed to maximise efficiency and throughput (EMF, 2013).

This principle was approved within the CSF discourse arena (e.g., Jaeger-Erben & Hofmann, 2019). Aspects mentioned in CE literature were highlighted and complemented.

During the visioning workshop, for example, the regeneration and use of renewable and healthy resources and energy were a key topic:

Industry farming was finally fully abolished in 2041 – some of the older co-farmers still remember those days, and it's taken us a while to get back to hens which can walk again, but we did it, and they now roam around content, knowing they may not even get eaten, fertilising the soil. In general, we managed to have healthy soil again by balancing nutrition needs and overload, and completely banning toxins and pollution. Most people live in co-farming models, growing their own food and producing their own energy. The energy is all off-grid and we have found feasible ways to store the energy. Buildings like the energy efficient and self-sufficient CIRCLaus Tiny Houses, anno 2021, made of wood and clay are still in use because of their modular systems and flexible materials. You can no longer go wrong when buying products!

Vision Theme 23 ***Renewable, Healthy Resources & Energy*** *(based on empirics)*

Diversity was emphasized not only in terms of natural systems but also regarding cultural, social and market aspects. A 'pluriverse' was envisaged, in which diverse, context-sensitive

solutions promote resilient regional value creation and ensure that socio-ecological systems benefit, rather than a few authorities (Boch et al., 2020; Calisto Friant et al., 2021; Estephania Delgadillo Jaime29; Andrea Vetter30). This was also an issue in the visioning workshop, together with the interplay between a local material sphere and a global immaterial sphere:

> People think global, act local. Production, consumption, and resource use are (re)localised and decentralised. We have many energy- and food self-sufficient communities that can be connected - but also disconnected if necessary. What remains is a global market for immaterial goods. For example, long-distance travel is mostly virtual, but food needs are met locally. Environmental impacts are mitigated by global governance.

Vision Theme 28 ***Glocal Value Creation*** *(based on empirics*

However, a challenge not yet sufficiently addressed in CE concepts, is the promotion of biodiversity. Calisto Friant et al. (2021) suggested a focus on nature-based solutions that protect and restore ecosystems while serving human well-being and biodiversity. Furthermore, a planet-centred design approach was presented at the CSF (Felix Beer & Jakob Kukula [31]), that addresses the needs of ecosystems by giving them a voice and recognizing them as stakeholders. Within the workshops, also legal rights of non-human species were highlighted:

> More-then-human species and entities such as animals and ecosystems are recognised as an active stakeholder in design and business processes. Ecosystem services and needs are made transparent through technological solutions. For instance, buoys provide information on how healthy the water body is, how we benefit from it and what it needs from us to maintain its integrity. We also found sustainable and yummy meat alternatives, which made it easy to end animal suffering. We hope it can bring you some peace of mind to know that more-than-human species now have legal rights in our world.

Vision Theme 29 ***Nature as a Stakeholder*** *(based on empirics)*

In conclusion, there was consensus at the CSF that 'natural' systems need to be regenerated, conserved, and made resilient. Considering humans as a part of the environment, the term 'natural' is placed in parentheses. By recognizing systems as social-ecological, the needs of the ecosystem and the socio-cultural backgrounds of the actors involved are considered. A "pluriverse" was envisioned in which context-sensitive solutions for global goals exist. Meadows (1999) understood the promotion of diversity as key to innovation and resilience:

> *"Allowing species to go extinct is a systems crime, just as randomly eliminating all copies of particular science journals, or particular kinds of scientists, would be. The same could be said of human cultures, of course, which are the store of behavioral repertoires, accumulated over not billions, but hundreds of thousands of years. They are a stock out of which social evolution can arise. […] Insistence on a single culture shuts down learning. Cuts back resilience.""*

Prerequisites for this principle are to design out waste (s. P2), assure accessibility and transparency (s. P5), promote participation (s. P6) and foster circular literacy (s. P7).

[29] Estephania Delgadillo Jaime at CSF on "Towards territorial product-service systems for the circular society"; https://www.youtube.com/watch?v=y3b7-mKuFlE&t=2s
[30] Andrea Vetter at CSF on "Postwachstum & Kreislaufgesellschaft" [conference presentation]; https://www.youtube.com/watch?v=bIQQzJwzKbk&t=1950s
[31] Felix Beer & Jakob Kukula at CSF on "Planet-Centric Design"; https://www.youtube.com/watch?v=ZcqD1QzijwY&t=1s

P5: Assure Accessibility, Fairness & Transparency

Enable circular agency under equitable conditions by ensuring accessibility, fairness, and transparency (assure 'Teilhabe').

This requires strategies of **open circularity** and **redistribution**: design processes of value creation and destruction open and transparent. Ensure that all people have access to information, resources, and opportunities for action. Redistribute costs (e.g., pollution) and benefits (e.g., wealth) of modern industrialisation.

Table 16 ***Exemplary Strategies for P5 at the Micro, Meso and Macro Level*** *(own Illustration)*

Strategy	Micro	Meso	Macro
Open Circularity: Open… Source Knowledge, Software & Hardware, Design, Manufacturing & Learning Spaces	• Participate in circular systems • Make informed decisions • Share your knowledge and skills with others	• Foster open data solutions, e.g., material passports, transparent supply chains	• Foster subsidies and laws on open data solutions and transparency
Redistribution	• Reflect your needs (s. P1) and share with the disadvantaged	• Foster the redistribution of resources, knowledge etc. between groups, generations, and nations	• Increase tax on high earners and support the disadvantaged

In CE literature transparency is mentioned as an enabling principle to build trust between collaboration partners and with customers and to reduce information asymmetries. This enables the circulation of materials and products (EMF, 2013).

Beyond that, in a CS, access[32] to information and resources, but also to education, health, consumption, and production, is understood as a crucial prerequisite for circularity under fair and participatory conditions (Calisto Friant et al., 2020; Jaeger-Erben & Hofmann, 2019). It was stated, that if accessibility and low power hierarchies are not considered, CE can become a profitable industry for a few companies in a few countries, while many do not benefit (Calisto Friant et al., 2020; Hobson & Lynch, 2016; Jaeger-Erben & Hofmann, 2018; Zwiers et al., 2020). To assure accessibility and fairness, approaches of open circularity and redistribution of costs (e.g., pollution) and benefits (e.g., wealth, capability to act upon something) were discussed in the workshops and beyond (e.g., Calisto Friant et al, 2020).

Fostering equal and fair circular systems meant for CS protagonists to redistribute chances and risks of globalisation between the Global North and South (Calisto Friant et al, 2020). Redistribution was understood to decelerate consumption by reducing the power and wealth of the affluent, lowering incentives to conspicuous consumption. Hobson (2021) highlighted power shifts as key for sustainable circularity, not only to do justice but also as empirical evidence shows, the richest are not expected to voluntarily participate in circular practices.

[32] The term accessibility is used here in an extended sense. According to the Anglo-Saxon understanding, it refers primarily to material and physical proximity. Here the term in used in reference to the German word "Zugang", meaning above all access to participation (Zugang zu Teilhabe).

Within the workshops bottom-up and top-down solutions for redistribution were discussed:

> Participation in social and economic developments is enabled by accessible open-source knowledge, software and hardware, basic income and open manufacturing and learning infrastructures. Indeed, kits, product passports and repair manuals from the 1920s can still be found online. Circular systems are not in the hands of large monopolies that insist on their patents but are shaped by open and inclusive design.
>
> Top-down institutions such as the World Resource Foundation track resources (including health, food) to allow informed and sustainable business and consumer actions. They also manage inequalities through fair and quick redistribution on a global scale. By the way: Transparent ethical supply chains were a big step to where we are today!

Vision Theme 34 ***Open Circularity & Redistribution*** *(based on empirics)*

It can be concluded that in the CSF discourse arena, the demand for transparency was complemented by the demand for accessibility and fairness. The aim is to ensure not only an efficient and effective, but also an inclusive CE. To foster sustainable consumption choices and enable participation in circular systems, open and transparent processes of value creation and destruction as well as redistribution was emphasised. According to Meadows (1999), changing the structure of information flows and accessibility are important leverage points for systemic change. Similarly, the resulting empowerment of companies, governments, and individuals to complement, change or self-organise system structures has transformative force. Ensuring accessibility, fairness and transparency is a prerequisite for the other principles.

P6: Establish Participation & Co-Creation

> Enable innovativeness, democratisation, and an inclusive socio-cultural transformation by establishing processes and structures for participation and co-creation. Be sure to also give nature a voice (Assure 'Teilnahme').
>
> This requires strategies of **transdisciplinary co-creation, glocal democratisation** and **prosuming**: work together across sectors, chains, disciplines, socio-economic backgrounds, and scales to create shared value. Empower citizens to take an active role in circular practices and to have a voice in local or corporate decision-making processes. At the same time, strive for global governance and recognise nature as a stakeholder.

Table 17 ***Exemplary Strategies for P6 at the Micro, Meso and Macro Level*** *(own illustration)*

Strategy	Micro	Meso	Macro
Transdisciplinary Co-Creation	• Engage collaborative production and consumption networks	• Empower citizens and users for circular agency • Implement collaborative production and consumption networks	• Support transdisciplinary research programmes and circular spaces such as real-world labs (s. P7)
Glocal democratisation	• Take part in (local) decision-making processes	• Democratise your organisation, e.g., by worker cooperatives and low power hierarchies	• Foster global binding laws • Foster democratisation, e.g., citizen councils
DIY & Prosuming	• Make yourself independent from the market by producing and consuming on your own	• Enhance prosuming through participatory design, transparency, and openness	• Assure a universal basic income to foster creativity and innovativeness

In CE literature the concepts of co-creation and collaboration are key and linked to value creation and preservation processes as well as innovativeness. The concepts are characterised by diverse interaction of all departments within and between companies in a

cross-industry, cross-chain, and cross-sector collaboration. Beyond the corporate level, a high degree of coordination between local, regional and (inter-) national governments, and the private sector, as well as NGOs and academics is demanded (EMF, 2013; Walcher & Leube, 2017; Zwiers et al., 2020). The concept of consumers is thereby replaced with that of users, urging for new relations between businesses and their customers (EMF, 2013).

Although cultural barriers have been identified as major obstacles to CE transition (Kirchherr et al., 2017), CE approaches do not explicitly consider the diverse cultural and social backgrounds of stakeholders (Calisto Friant et al., 2020) and do not see a role for citizens beyond that of responsive consumers or users (Hobson, 2016). By contrast, within the CSF discourse arena, the need for an inclusive socio-cultural transformation process was emphasized. It was argued that the necessary fundamental change in consumption patterns and a truly sustainable and desirable CS can only emerge and exist if it is broadly supported and continuously co-developed by society (Boch et al., 2020; Jaeger-Erben & Hofmann, 2018). Citizens should therefore be empowered to take an active role by participating in forms of "everyday circular activism" (Hobson, 2016) and circular knowledge production (s. P7; Boch et al., 2020; Jaeger-Erben & Hofmann, 2019), rather than merely accepting or rejecting new business models (Hobson, 2020). Likewise, including non-human species as active stakeholders (s. P4) was demanded.

The three main strategies for ensuring participation and co-creation are summarized here under the terms glocal democratization, transdisciplinary co-creation, and prosuming. In a CS, citizens should be empowered to participate in local political and corporate decision-making processes. For instance, through randomly elected citizens' councils, assemblies or worker cooperatives. In addition to promoting local and organizational democratization processes, global governance should be strengthened to provide guidance and binding regulations (Calisto Friant et a., 2020). These aspects also emerged in the discussions of the visioning workshop. A central motif was again the slogan "think global, act local," (s. also P4):

> Politics, economics and social affairs are largely democratised, as are consumption and production systems. More direct democracy has been established at the local level, strengthened by global governance that protects the fundamental rights of people and nature. An important step on the way to our current glocal politics was the transformation of the United Nations in the 1920s. In the beginning, those who were particularly threatened by future disasters, such as children and ecosystems, were given a say. Today, the UN consists of 150 randomly selected citizens who develop sustainability strategies and pass binding laws.

Vision Theme 43 ***Glocal Democratisation*** *(based on empirics)*

Another approach discussed was the empowerment of prosumers. Former end consumers or users could themselves be an active instance of value creation and value preservation as so-called prosumers (composition of "producer" and "consumer") and contribute to circular material flows (Jaeger-Erben & Hofmann, 2018). Here, CS protagonists warned that prosumers could be "used" or "abused" by companies that outsource work to save costs. In

constellations where prosumers collaborate with companies, it was suggested to ensure that clear benefits are offered to the prosumers, e.g. through context-sensitive solutions. As prerequisites for independent prosuming, open-source software and hardware, open production sites (s. P5), supportive legislation and circular services (s. P5) were mentioned.

> The boundaries between work and private life blurred, social status replaces work status and working time is not primarily for monetary purposes but to create socio-ecological impact. Work and life take place in the same place, with almost no permanent jobs anymore. More and more people have become self-employed as prosuming is enabled by open infrastructure and circular services. Many people engage in co-farming, growing food for the local community; in co-energy production, producing their own energy and feeding surplus capacity into the grid; or co-production, promoting local manufacturing and maintenance. Co-design, repair and partially personalised products become the norm and foster emotional connectedness with materials and products. Building our own material livelihoods in collectively managed value networks makes us independent of previous suppliers, while personal ownership remains superfluous. All this releases creativity and sustainable impact!

Vision Theme 48 ***DIY & Prosuming*** *(based on empirics)*

Transdisciplinary co-creation processes (Jahn et al., 2012; Lang et al., 2012) were highlighted as another strategy to enable an inclusive socio-cultural transformation process towards a circular future and to find innovative as well as socially robust solutions. Transdisciplinary (research) modes and participatory design approaches, as found in real-world labs, were frequently invoked by various actors in the CS literature (Boch et al., 2020; Jaeger-Erben et al., 2021) and at the CSF. Furthermore, Hobson (2016) and Calisto Friant et al. (2020) suggested that with different stakeholders also more diverse and radical debates should be included in CE discourses. This should lead to feasible and realistic perspectives for circular futures that take into account the complexity of the current socio-ecological crisis.

> A big part of why we are where we are is thanks to transdisciplinary co-creation and the circular spaces as well as methods, created for it. Thanks to collaboration and co-creation across different sectors, disciplines, industries, etc., we have been able to find solutions to the most pressing needs and foster (social) circular innovation. In both business and education, we now recognise that collaboration, not competition, is the mode for solving problems, and we are aligning rewards to that.

Vision Theme 49 ***Transdisciplinary Co-Creation*** *(based on empirics)*

In conclusion, there was consensus within the CSF discourse arena that the establishment of processes and structures for participation and co-creation ('Teilnahme'[33]) is crucial to promote (social) innovative solution development and an inclusive socio-cultural transformation. Here, the role of transdisciplinary (research) processes have been emphasised. This type of knowledge production and application has the potential to close the still prevalent knowledge-action-gap (Abson et al., 2016). In line with Meadows (1999), changing social structures and institutions that traditionally produce knowledge are deep leverage points for changing the mechanics of the systemic. Likewise, the empowerment of citizens to change or self-organise system structures and beliefs is a deep lever. A prerequisite for this principle is to ensure accessibility, fairness, and transparency (s. P5) and an inclusive design process (s. P2).

[33] While the German term "Teilhabe" is used in the meaning of access to participation, the German term "Teilnahme" refers to actual participation or the performance of participation.

P7: Advance Circular Literacy

Enable sustainable circular agency by promoting circular literacy. Circular literacy encompasses the knowledge-based capability to understand complex systems, formulate sustainability-relevant goals, and innovate current practices of consumption and production.

This requires strategies of **communication, education, and experimentation** for circularity: create awareness through understandable and tangible communication and promote circular action through education. Establish spaces where cross-sector alliances, involving citizens, can experience and develop circular practices and gain knowledge-based circular capabilities.

Table 18 ***Exemplary Strategies for P7 at the Micro, Meso and Macro Level*** *(own illustration)*

Action Item	Micro	Meso	Macro
Awareness for Circularity through tangible communication	• Talk to your peers about your experience with circularity	• Raise public awareness • increase attractivity through marketing	• Raise campaigns and lobbying for circular literacy
Education for Circularity	• Be curious about circularity	• Promote vocational training • Establish school & university programmes	• Adapt curricula in education
Experimentation for circularity	• Engage in circular experiments	• Establish transdisciplinary circular spaces	• Promote spaces for experimentation, e.g., real-world labs for CS

In the CE literature, the promotion of knowledge and skills for circularity is considered an essential enabler for the CE (EMF, 2013; Circle Economy, 2021). The skills needed mainly include those that facilitate the establishment of reverse loops and cascades, and that improve the design and production of circular products (EMF, 2013). Several ways to raise the level of knowledge and skills are mentioned: education, including vocational training, school and university programs, research, and development for coherent knowledge management, as well as the use of marketing and communication perspectives to make circular products more attractive (EMF, 2013; Circle Economy, 2021).

While in the CE literature the knowledge required for circularity is typically focused on technical skills, the concept of Circular Literacy[34] (CL), as it has emerged in the CS discourse field, also includes political and socio-cultural aspects. It encompasses knowledge: '(1) about how the current systems of production and consumption work and how the biosphere, technosphere and sociosphere interact, interrelate and co-evolve (system knowledge); (2) about (normative) goals of human and societal evolution and about indicators for their evaluation (target knowledge); and (3) about how transformation on a systemic level can be initiated, shaped or (co-)designed (transformation knowledge).' (Zwiers et al., 2020, p. 4). It is thus about action knowledge, or knowledge-based capabilities for circularity.

[34]The term literacy commonly refers to the ability to read and write, which does not imply action knowledge. Thus, the term knowledge-based capabilities might be more appropriate. Nevertheless, it is apt in its meaning of "knowledge and skills in a particular area" (Oxford Dictionary) and has been quickly adapted in the CS discourse field.

To strengthen CL, strategies of communication, education, and experimentation for circularity were discussed. A frequently asked question at the CSF was, how to move CS from the niche to the mainstream. While no explicit answers where developed, there was agreement on the need for tangible and understandable communication. Another strategy for achieving CL was to foster education on circularity in educational institutions and accessible circular spaces. Indeed, circular spaces were a key topic in CS literature (e.g., Boch et al., 2020) and at the CSF. Circular spaces are conceptualised and realised as locations where people can develop knowledge-based capabilities and experience and develop alternative patterns of consumption and production beyond market logic. This is intended to foster openness among citizens and the ability to change practices in other areas of life (Hobson, 2020; Zwiers et al., 2020).

> Finally, in the 2020s, public spending agendas such as the New Green Deal not only focused on technical innovations, but also promoted the unconditional, long-term funding of circular spaces. The approach to these spaces today is still based on the old concepts of real-world labs, living labs or social labs that became so popular in the 2020s. Thanks to accessible training in open learning and experimentation spaces, tangible campaigns and a completely changed education system, people today have attained a high level of circular literacy. And did you know that exnovations became the innovations of the 1920s? It was hard to leave the unsustainable paths - but we did it, thanks to creativity, systems thinking and an acceptance of responsibility!

Vision Theme 58 ***Circular Spaces*** *(based on empirics)*

The knowledge-based skills for circularity include, for example, the ability to historicize, anticipate, be creative and think in systems and in reflexive ways. The importance of exnovation as a contrast and complement to innovation processes was also highlighted.

> The old ideas of a more sustainable future from the decades before the 2020s are the basis of our collective mindset and the reason why we are still here. We always look back to see what efforts previous generations have made for us to achieve prosperity. This helps us to remain appreciative and ensure that there is no reversion to a destructive state. Historic infrastructures such as waste incinerators have been turned into museums to remind us of the 'old way' of doing business. Although we have reached a state of global contentment, we still have long-term visions and missions that guide our actions, policies, and business strategies. Today, almost everyone gets it that short-term thinking causes more problems than it solves.

Vision Theme 59 ***Long-term Thinking*** *(based on empirics)*

Furthermore, Calisto Friant et al. (2020) and Hobson (2021) pledge for integrating diverse and non-western knowledge in current CE debates to sharpen their theoretical foundations and ensure desirable outcomes.

Concluding that the necessary knowledge described in CE literature is limited to a systemic understanding of resource flows in the biosphere and technosphere, economic visions, and technical skills. Beyond that, the concept of CL encompasses political and socio-cultural aspects as well as change processes. To promote CL, communication, education, and experimentation strategies for circularity are demanded. It was emphasised to establish transdisciplinary research agendas (s. P6) and circular spaces. Rethinking how knowledge is created, shared, and used, is a critical lever for sustainable transformation and can influence system parameters, feedbacks, design, and intent (Abson et al., 2016; Meadows, 1999). Only when these knowledge-based skills are strengthened can the other principles be achieved.

P8: Redefine Value, Progress & its Metrics

Overcome socio-ecological crises by placing social well-being and environmental integrity at the centre of desirable and resilient economies. Find indicators to make these values measurable and guide action.

This requires permanent **negotiation of guiding values and their metrics, social-ecological value creation and assessment, and stewardship**: negotiate and reconceptualize key concepts such as wealth, poverty, progress, value, work, scarcity, and abundance. For instance, replace egoism with caring, consumerism with frugality, uniformity with plurality, ignorance with responsibility, etc. Finally, substitute indicators such as gross domestic product (GDP) with metrics that reflect circularity as well as social and environmental value creation.

Table 19 ***Exemplary Strategies for P8 at the Micro, Meso and Macro Level*** *(own illustration)*

Strategy	Micro	Meso	Macro
Negotiation of guiding Values and their Metrics	• Confront yourself and others with value questions	• Strive for sustainable, circular, and resilient organisational/ corporate visions and missions	• Lead global negotiation of universal values for economies and societies and implement indicators
(Circular) Stewardship	• Take responsibility for your actions	• Take responsibility for the entire Life Cycle	• Take responsibility by supporting local action programs
Social-ecological Value Creation and Assessment	• Base your decisions on social-ecological standards	• Access impact and success based on social-ecological metrics	• Promote research on the further development of social-ecological metrics

In CE literature, primarily economic and secondarily ecological benefits and goals for CE are mentioned (Kirchherr et al., 2017). The most frequently highlighted are the following: Economic growth, material cost savings, potential for job creation, conservation of natural capital, security of supply and reduced volatility, profit and innovation opportunities, and reduction of carbon emissions (EMF website; Zwiers et al., 2020). Social aspects are mostly mentioned in the context of new jobs and business models (Calisto Friant et al., 2020).

In the CSF discourse arena, CE is criticised for its orientation as an ecological modernisation project that follows capitalist growth narratives and insufficiently addresses (irreversible) social and ecological value destruction (Hobson, 2016; Jaeger-Erben et al., 2021). In contrast, it is suggested that striving for a CS, environmental and social value creation are considered as essential indicators. The main strategies discussed were the negotiation of guiding values and their metrics, consistent social-ecological value creation and valuation, and environmental stewardship. Regarding the former strategy, key CS advocates called for an ongoing negotiation of key concepts such as wealth, poverty, progress, value, scarcity, abundance, and prosperity in collaboration with actors from the global North and South. Based on this, key political and economic metrics, such as GDP, were called to be adjusted (Hobson & Lynch, 2016; Calisto Friant et al. 2020; Hobson, 2021; Jaeger-Erben et al., 2021).

> Just as for people success is no longer defined by a high salary and material goods, for society progress is no longer defined by increasing GDP. Instead, happiness, access to a good life and sufficiency guide policy making. Even the economy no longer strives for higher, faster, further, but rather for sustainable impact. Instead of labour, material and energy consumption is now taxed. This accelerated circular business models and innovation. Not only is value created, but it is also ensured that it is kept in the cycle to the highest possible degree.

Vision Theme 67 ***Sustainable Value Creation and Assessment*** *(based on empirics)*

Likewise, the workshops called for a shift in mindsets, paradigms, and societal values. As indicated in P1, new forms of work were envisaged that do not conflict with life and that curb consumption and wealth while promoting well-being and solidarity. It was also proposed to replace human-centred egoism with care for others and nature, and competition with cooperation. The importance of solidarity, social justice and frugality is to displace consumerism and materialism, and the tendency towards uniformity and separation replaces the pursuit of plurality, etc. Refuse and frugality were seen positively.

Furthermore, the assumption of responsibility and accountability was emphasised. As part of the environment and circular systems, people should assume natural and circular "stewardship" (Boch et al., 2020; Hobson, 2021).

> Finally, the much-needed shift to responsibility took place! People understood the urgency and their personal responsibility to make a difference. They now feel part of something bigger and have a great sense of collectively and respect for all species and resources. Companies took responsibility for the whole life cycle of products and the ethical issues involved. Governments took responsibility for providing and securing the circumstances needed.

Vision Theme 63 ***Stewardship*** *(based on empirics)*

Concluding, while the CE literature primarily emphasises economic and secondarily ecological benefits and goals for CE, a strong understanding of sustainability is central to the CS discourse field. According to CS protagonists, accelerated economic growth and the resulting socio-ecological crises are to be overcome by placing social well-being and ecological integrity at the centre of desirable and resilient economic activities and policy choices. This requires constant negotiation of guiding values and their metrics, consistent social-ecological value creation and assessment, as well as responsibility and accountability. A central value and goal in the CS discourse field is sufficiency, which is addressed in the firs principle (P1). With the change of core values, a paradigm shift and thus a change of the whole system is possible. Meadows (1999) described paradigms as the 'sources of systems': From them, from shared social agreements about the nature of reality, come system goals and information flows, feedbacks, stocks, flows and everything else about systems. Therefore this principle underlies all other principles.

10.2. CS Target Framework

CE approaches rarely cover all three dimensions of social, environmental, and economic sustainability and instead focus on the latter (as evidenced, e.g., by Kirchherr et al., 2017). CS, as conceptualised in the CS literature (s. chapter 2.1), aims at ecological integrity and individual and societal well-being. Well-being thereby includes the ability to participate in societal processes and to unfold identity and quality of life. During the CSF, it was emphasised that the conservation of the natural life-support systems should be pursued not only to safeguard human livelihood, but also because it is an end itself. Based on the CS literature, the WGBU flagship reports (2011, 2016) and empirical evidence, the target framework shown in Figure 6 is proposed. This framework considers a strong sustainability approach, where the economy is seen as part of society that is based on and part of a larger natural ecosystem. The goal of a CS could be formulated and illustrated as follows:

***Fairly distributed prosperity and human well-being**,*
which includes the capability to unfold identity, autonomy and quality of life,
while preserving the natural life-support systems.

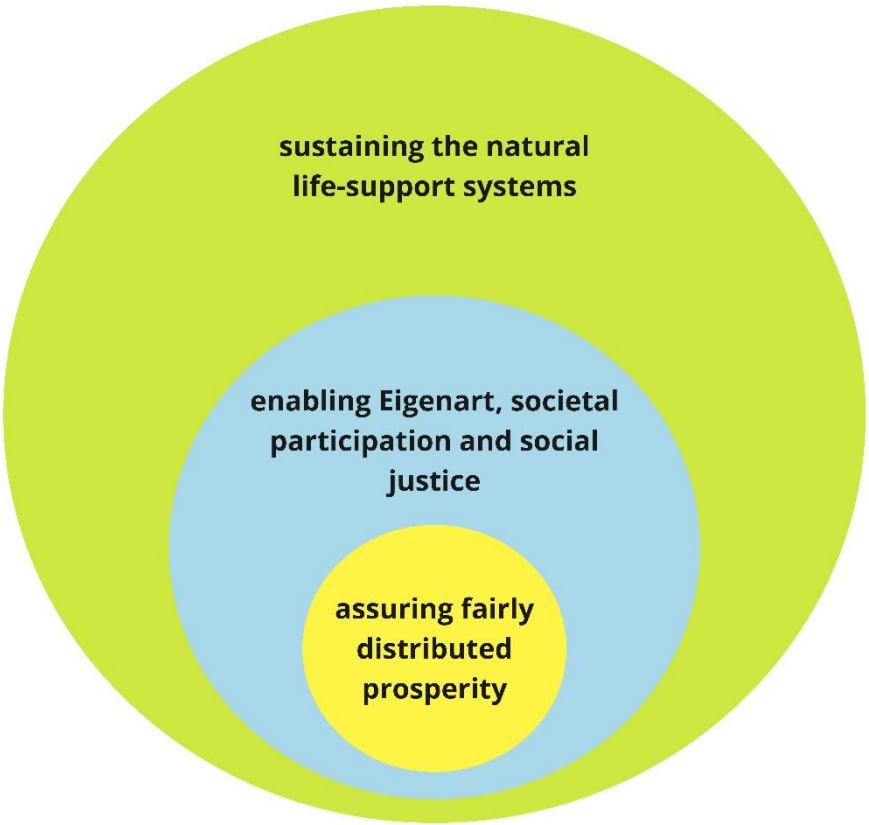

*Figure 6 **CS Target Framework** (own illustration, based on Calisto Friant et al., 2020; Jaeger-Erben & Hofmann, 2019ab; WGBU, 2011; WGBU, 2016)*

11. Practices: Roadmapping towards a Circular Society

In the following, recommendations on formats and process design for future transdisciplinary roadmapping activities are presented. In addition, key topics are outlined that serve as possible starting points. The recommendations were derived from the debates of the CSF discourse arena and especially from the results of the visioning and roadmapping workshops.

11.1. Recommendations on Formats and Process Design

Stakeholder Engagement & Consensus Building

Most participants of the CSF came from academia, business and organised civil society, while politicians, citizens and civil servants were hardly represented. To ensure that the results are relevant to a broad society, it is therefore important to test the visions, principles and roadmaps with people from the underrepresented sectors and from different socio-economic backgrounds and nationalities. For these stakeholders, a local focus of CS that is more relevant to their daily business could be interesting (as evidenced by Bergmann et al., 2021). Whereas there was broad agreement on the visions and goals of a CS, the means were perceived as less shared. In order to find common ground, the process of negotiating the measures, needs to be strengthened.

> ***Engage diverse actors (in local contexts):***
> To develop visions, principles and roadmaps that are relevant to and supported by different actors, involve a broad range of people in transdisciplinary work groups. Engage political and corporate decision makers as well as citizens with different socio-economic backgrounds, political views and nationalities. Embed roadmapping practices in local contexts to increase the interest of these actors.

> ***Organise controversial panel debates:***
> Foster disputes of different CE and CS actors as well as with advocates of other radical and traditional concepts for sustainability to sharpen the concepts' shortcomings, potentials and implementation strategies.

Communication

A frequently asked question was how to reach new target groups with the CS. In order to make CS understandable and tangible for a wider audience, new ways and channels of active communication need to be developed (as evidenced by Bergmann et al., 2021). Especially Visualisations can play a role in this. While the usual CE visualisations have been criticised, the development of an alternative graphic is still pending.

> ***Foster tangible and understandable communication*:**
> To make CS more tangible, translate scientific terms into simple language. Define new terms jointly between scientists and practitioners. Test different communication channels that appeal to a wide audience and develop visualisations. However, keep communication as complex as necessary to work towards a systemic vision.

Visioning and Roadmapping Techniques

By working on the societal levels presented in the HSF impact matrix (2021a), visions were developed that consider the whole societal structure. Thus, the visions express clear differences from CE approaches and offer systemic representations. However, a more integrated approach focussing on practice fields, such as food and mobility, might work better for future visioning and roadmapping. Future visioning and roadmapping practices could also use the formulated CS principles as a framework and the vision themes for ideation. In general, early-stage prototyping was experienced as engaging and helpful for synthesis.

> ***Test an integrated approach (CS principles):***
> Fest an integrated approach focussing on practice fields, such as food or mobility, or consider the CS Principles as a framework for future visioning and roadmapping.
>
> ***Stimulate visionary thoughts & prototyping (CS vision themes):***
> Include more provocative and inspiring inputs (e.g., with concrete examples), and time for discussion. Also, encourage early prototyping to engage participant's reflection and to ease analysis and synthesis of workshop material. Test the formulated CS vision themes for ideation or creativity tasks.

Digital Collaboration

To support further digital roadmapping and visioning practices, participants suggested to expand the existing CSF platform[35]. To ease the complex task of visioning and roadmapping, workshop and template design as well as a digital collaboration tool and format should be selected thoroughly depending on the target group.

> ***Expand the collaboration platform:***
> Expand the existing CSF platform into an open-source platform that supports participation in the further development of the CS Roadmap and provides useful material for CS pioneers.
>
> ***Keep workshops simple:***
> Visioning and roadmapping are tough practices and CS is a complex topic. Thus, keep the workshop and template design as simple as possible.
>
> ***Choose the appropriate workshop tool:***
> Tools with creative functions can support the visioning, but also overwhelm the participants. Offer personalised support, ensure that loading times are reasonable and promote the use of creative features, or use easier tools.
>
> ***Increase group size and choose the right time:***
> As digital work is quieter, assign more people to each group than in face-to-face events. Choose a productive time of the day and the conference to make sure participants have the eagerness to collaborate.

[35] See https://www.circularsociety.de/feed

Framing & Consolidation

Evaluating the workshop outcomes, it became evident that two workshop formats alone are not enough to make progress in the scientific conceptualisation and practical application of CS; long-term funding for transdisciplinary research and experimental spaces is needed (as evidenced by Bergmann et al., 2021).

> ***Provide long-term funding for CS (research) projects:***
> Establish long-term funding for transdisciplinary research and innovation program for CS to support research on and implementation of CS.
>
> ***Do quality processes for quality outcomes:***
> To meet all quality criteria for sustainability visions and roadmaps, a (research) process is needed that goes beyond a two-hour workshop. It seems promising to alternate moments of analysis (plausible, coherent, nuanced) and participation, constantly involving different target groups (relevant, shared).
>
> ***Establish CS real-world labs:***
> Promote CS experimentation, research and learning spaces, to test, develop and experience new practices, organisational forms, processes, and rules. Establish spaces with easy and free access to all and an unconditional long-term funding.

11.2. Recommendations on thematic Foci

Most of the thematic foci for roadmapping a CS related to the CS principles of system design and intention (P5-P8), the ones that differ most from CE principles. One reason for this could be that the greatest need for action was seen here. Table 20 gives an overview of possible thematic starting points for further roadmapping. These include developing open source and open design structures, prototyping collaborative value creation and strengthening CS pioneering, developing CL curricula and ways of tangible communication as well as iterating the CS principles and developing indicators for them.

Table 20 ***Starting Points for Roadmapping towards a CS*** *(own illustration, based on empirical results)*

CS Principle	**P5: Assure Accessibility, Fairness & Transparency**	**P6: Establish Participation & Co-Creation**	**P7: Advance Circular Literacy**	**P8: Redefine Value, Progress & its Metrics**
Starting Points for Road-mapping	*Open Source & Open Design:* Create structural and organisational conditions for open-source infrastructures (e.g., Open-Source Hardware Fund) and open design processes.	*Collaborative Value Creation:* Experiment with organisation and business models for collaborative CS value creation. *CS Hubs:* Mobilise and stabilise CS innovations locally, by making them visible and providing support.	*Circular Literacy Curricula:* Develop CS curricula, both at school and university level. *Communication:* Translate terms of CS into simple language, and test low-level communication channels.	*CS Principles & Indicators:* Test and iterate the CS principles, sharpening the relation to other sustainability concepts. Develop indicators to measure and approach each principle.

Unexpectedly, hardly any concrete starting points for roadmapping processes for "P1: Strengthen Sufficiency Strategies" were formulated, even though it was a central topic at the CSF. There was also little mention of concrete fields of practice beyond cities and companies.

PART V: DISCUSSION & CONCLUSION

12. Challenges & Potentials for Conceptualisation and Implementation

In the following, challenges as well as potentials for the conceptualisation of a CS and its implementation are discussed. The first section focuses on the (in)radical nature of CS conceptualisations and their multidimensional character (chapter 12.1). This is followed by an overview of the potentials and challenges for the diffusion of CS (chapter 12.2) and considerations on its theoretical foundation (chapter 12.3).

12.1. An integrated Sustainability Concept vs. a Contested Radicality

CS has the potential to be a concept that integrates circular strategies into a framework of social, environmental, and economic sustainability and that incorporates the three strategies of sufficiency, consistency, and efficiency. Empirical evidence has shown that there is great interest in an integrated sustainability concept that thinks of CE not only at the material level but also in its social-ecological context (s. chapter 9.2).

Within the CSF discourse arena there is a consensus that the transition to a CE is only possible with the commitment and participation of all parts of society. This refers to the possibility for all social groups to take part in the socio-ecological transformation. Furthermore, CS protagonists agreed that a CS should be focused on environmental and social goals (s. chapter 9.3). Based on literature and empirics, a CS target framework (s. chapter 10.2) was proposed that includes social, ecological, economic, and empowering goals. It thereby aligns with the proposition of the WGBU for a social-ecological transformation (2011) and a normative compass (2016). The target framework considers a strong sustainability approach, where the economy is seen as part of society, embedded in the natural environment. The CS Principles are a concretisation of the target framework into guidelines and strategies (s. chapter 10.1). They combine aspects of circular materiality with well-being, social justice, empowerment, and ecological integrity. Some of them do not refer directly to the CE, but more generally to sustainability. This is intended to (re)embed the CE in the societal context and sustainability goals. Sufficiency strategies, for example, do not correlate directly with circularity performance. However, if the CE is to be consistently aligned with sustainability goals, sufficiency strategies are promising. Indeed, actors involved in the CSF saw in CS the potential to link sustainability approaches that focus on consistency, efficiency, and sufficiency (s. chapter 10.1, P1). If the concept of CS and the CS principles are further conceptualised, revised, and validated, it could be a framework that can combine approaches such as C2C and the common good economy.

A hurdle for CS, however, is that the degree of radicality of transformation or reform is contested. Opinions differed on whether it is more effective to embed consistency strategies in green growth or sufficiency efforts. Based on the relevant literature, chapter 1.2 argues that the debates on the necessary (non-)radicality of societal transformation for a sustainable CE, and thus the question of the economic models underlying CS, represent the greatest dissent and theoretical vacuum in and between CE and CS discourses. This has been confirmed in the empirics of the CS (s. chapter 9.3). Considering the circularity typology of Calisto et al. (2020, s. chapter 2.2), the spectrum of positions at the CSF ranges from the "reformist CS" to the "transformative CS". Yet, in developing the CS principles, the normative decision was made to integrate all three sustainability dimensions. This is since the call for a sufficiency orientation was predominant at the CSF. However, in other CS discourse arenas, other foci may prevail that conflict with the CS principles and a common roadmapping process.

12.2. High Resonance, Pioneers & Momentum vs. Trapped in the Niche

A potential for the further development of CS and its implementation is the high resonance it receives and the current momentum for sustainability strategies. Moreover, there are pioneers whose experiences and aspirations can be built upon. Comparing the results of the CSF with the recent CE debates, it is evident that science and civil society are currently more represented in the CS discourse field (s. chapter 9.1). At the CSF, especially young academics pushed for a social-ecological and transformative CS. The great response to the CSF with over 600 participants and numerous contributions illustrated the existing interest in the topic. In general, due to increasing pressure for sustainability solutions, the momentum for sustainability strategies is currently increasing at different levels and in different sectors. CE is seen as an important building block for sustainability in this context but is increasingly coming under criticism in its conception (s. chapter 1.2). Criticism comes not only from edge disciplines of science, but also established science academies and science advisory councils for policy, are calling for an expansion of the CE debate to include social aspects and a sufficiency orientation. For example, the European Academies' Science Advisory Council (EASAC) (2016) call for progress towards CE to be complemented by indicators of happiness, social justice, ecological integrity, and sustainable development (similar to the debate on GDP). The WGBU (2020) emphasises the need for CE concepts that focus on eco-sufficiency and changing consumption patterns. Despite the risk of increased conflict potential due to threats to existing business models, the WGBU sees such approaches as necessary to reduce overall resource demand and thus also to limit biomass demand. The CS has the potential to leverage the dynamics of the CE while addressing its pitfalls. Furthermore, the high resonance in the scientific community and civil society holds the potential to theoretically underpin and practically test circular practices, currently driven by the private sector.

On the other hand, CS has not even emerged into an established niche and faces the challenge of raising its political and public profile without weakening its transformative character. While CE agendas are gaining momentum in (inter)national and local politics, in the private sector and in academia, the visions of CS might be disregarded in mainstream debates as it would require a complete societal and economic restructuring. For example, scientific institutions and governmental funding agendas still mainly focus on technical CE approaches (e.g., Fraunhofer Institute, Max Planck Gesellschaft etc.). As described by Calisto et al. (2020), "transformational CS" discourses are based on a rational analysis of the current planetary boundaries and the structural contradictions of the capitalist system that are responsible for today's crisis and propose a radical vision in response. Their demands for fundamental socio-cultural change and a post-growth future would mean enormous changes to our current life and economic and social system. This hurdle was frequently discussed during the CSF: How can the public arena and decision-makers be reached with the idea of transformative CS, and how can this transformation be initiated without falling into weak action patterns? Another challenge is to find a tangible and understandable communication of CS that reaches different target groups without becoming superficial. While it is important to include theoretical foundations and complex socio-cultural contexts in the concept of CE, complexity bears the risk of being overwhelming. In contrast to CE, CS also lacks a public and political profile (e.g., European Commission, 2015). Although perspectives and approaches of non-academic origin were included in the empirical material of the conference, most literature and empirical data in this study come from academia (s. chapter 9.1). Due to the limited scope of this work, it was also not possible to obtain a sufficiently diverse sample of actors and to consider further discourse arenas and discourses, e.g., from the Global South.

12.3. Conceptualisations based on Rich Roots vs. Theoretical Vagueness

The CS principles have been developed in line with and in distinction to prominent CE principles and thus build on CE experiences (s. chapter 10.1). They also incorporate various theoretical and conceptual ideas from other concepts and projects that consider complex socio-cultural contexts of the CE and understand social, economic, and environmental systems as embedded. Rather than simplifying the CE discourse, CS complements the principles of stocks and flows with principles of system intent and design. According to Meadows (1999), the latter have the greater leverage for transformation. Particular attention is not given to issues such as circular design, a core principle of CE, but to aspects that currently fall short in CE. This work does not aim to introduce a new concept with CS, but to highlight the pitfalls of prominent CE definitions and align them with strong sustainability goals and their own previously ambitious social and environmental goals (Calisto Friant et al., 2020; Kirchherr et al., 2017) (s. chapter 10.2). Most of the challenges and limitations of CE (s. chapter 1.2) are

addressed within the CS. By highlighting prominent CE principles and contrasting them with CS understandings, the differences between CE and CS understandings become clear to researchers and practitioners alike, offering multi-dimensional perspectives and approaches to a sustainable CE. The integrated perspective on environment and society breaks down the dualism between the two and continues the tradition of CE within other scientific discourses such as social ecology, posthumanism and post-anthropocentrism (e.g., chapter 10.1, P4). In addition, the discussions have been enriched by numerous perspectives from other scientific and cultural concepts, e.g., degrowth, post-growth, commons, sharing economy, postcolonialism, feminist economics, etc. This provides a first, albeit immature, basis for further theoretical conceptualisation in this field (e.g., Calisto Friant et al., 2020).

On the other hand, the transformation narratives, CS principles and the approach of experimental implementation of alternative models within CS, need to be reviewed, revised, and extended in terms of their socio-scientific grounding, plausibility, and effectiveness. Revisions should be made where CS criticises CE but fails to provide answers itself. For example, challenges of CE, such as the nexus between energy and biodiversity, are not solved in the discourse field of CS. Though it is often claimed that global considerations are crucial for a CS, the concept mainly refers to the living conditions of the Global North. The perfect and thus misleading image of the circle as a motif of CE is criticised in the CSF discourse arena, without being contrasted with any other proposal yet. Furthermore, discussions on a deeper theoretical foundation of the principles are necessary. Findings from the degrowth movement (e.g., Latouche) and feminist theory (e.g., Winkler, Hofmeister) could provide insights into aspects of solidarity and sufficiency. Approaches from alternative economies and value theories (e.g., Marx; Sen & Nußbaum) could deepen the understanding of time use, work, and the empowerment of knowledge-based skills. Ideas from posthumanism (e.g., Haraway, Barad, Bennet, Tsing) and complex systems theories (e.g., Bateson, Meadows) could help understand the connections between society and nature and identify further leverage points. There are also many overlaps with the principles of the 8Rs by Latouche (2009) and a sustainable CE by Velenturf and Purnell (2021), which are not discussed here as they are not part of the discourse arena under study. Moreover, principles and their strategies are not always sharply delineated, and many strategies cut across multiple principles. Therefore, the principles require a more nuanced and coherent design. Another challenge is that transformation narratives and experimental implementation of alternative models should be tested for their sociological grounding and effectiveness (Blühdorn, 2018). Particularly in the case of visioning, the narratives partly aimed at romanticising practices of pre-modernity and rely on either the mere empowerment of local actors or a strong state. Power relations, constraints and structures of unsustainability are only marginally addressed.

13. Closing Remarks

Future roadmapping processes can revert to methodological recommendations and key topics for roadmapping towards a CS (s. chapter 11) and the challenges and potential identified in chapter 12. Implications for both, scholars and practitioners are summarised in the following.

13.1. Conceptual Implications

For the thesis to unfold its potential to establish a multi-dimensional approach to a sustainable CE and to motivate action, conceptual work is necessary. The CS principles and vision themes are to be further developed, adapted, and tested in practice. Thereby, the CS principles need to be underpinned by empirical examples, theoretical models and pilot projects. This revision should take place in different contexts within and outside the CS discourse field under study. For example, the principles developed by Velenturf and Purnell (2021) could be used for comparison. An elaboration on how these principles can provide insights for non-Western actors and how non-Western concepts can contribute to their further development is suggested. Furthermore, controversial discussions between CS actors with opposing views and representatives of contrary approaches can help to clarify definitions. Here, the CS principles can serve as a basis for discussion. At the same time, the CS principles should be prevented from being misused for green- and blue-washing. Therefore, it is proposed to develop indicators for each principle to measure success at all levels and to concretise promising strategies for different sectors such as business or cities. However, the proposed principles are not a blueprint for sustainable action but need to be complemented by other approaches and adapted to specific contexts. Furthermore, it is the task of the scientific CS community to improve science policy and science society communication through tangible communication and a new visualisation that does justice to the multi-dimensional approach of a CS. Also, while sufficiency strategies are emphasised within the CS visions, no suggestions for next steps were made within the roadmapping workshop. Yet, the other recommendations on roadmapping towards a CS (s. chapter 11) can guide future research on the CS. Therefore, long-term funding opportunities for transdisciplinary CS research projects are required. Furthermore, further research on the use of miro in participatory and transdisciplinary research is promising.

13.2. Implications for Practitioners

While the strengthening of the academic sector can lead to a consolidation of the theoretical claims of the CS debate, representatives of the political and public sector are crucial for its implementation. This also applies to civil society, which was represented at the CSF but mainly through initiatives. For further CS developments, there is considerable potential to gain practicality and political strength by involving citizens and decision-makers from politics and the (social) economy. The systems, target and transformation knowledge on the CS discourse field produced in this thesis and especially the recommendations on CS practices (s. chapter 11) offer a foundation for future roadmapping projects of the CS. Here, the CS principles and vision themes have the potential to support CS ideation and literacy processes. Furthermore, the CS principles can support the design, implementation, evaluation, and improvement of CS projects in different phases:

> ***Research phase:***
> What is already happening in the project (context) with respect to each principle?
>
> ***Strategy Development:***
> Where are there starting points for change and where does the project want to, and can, make a difference?
>
> ***Impact Assessment:***
> Where is the project's greatest impact? In relation to which principles can the CS performance of the project be improved?

However, the geographical focus of this study on the Global North limits the principle's applicability to regions worldwide. Practitioners from different nationalities and societal sectors are invited to iterate on the CS principles, testing and refining them in their specific contexts such as companies, public institutions and non-profit-organisations.

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Appendix

Miro Boards

- Visioning workshop: https://miro.com/app/board/o9J_lTG5hko=/?invite_link_id=251946299047
- Roadmapping workshop: https://miro.com/app/board/o9J_lS6IvTQ=/?invite_link_id= 783529077813
- Research workshop: https://miro.com/app/board/o9J_llQwgkE=/?invite_link_id=611694547732
- Documentation of the workshops, including the postcards and a combined vision: https://media2-production.mightynetworks.com/asset/21403300/CSF_Documentation_Visioning_Roadmapping_Workshops.pdf

Tables

Table 21 ***Vision Quality Criteria and Corresponding Methods and Sources*** *(Wiek & Iwaniec, 2013)*

Vision quality criteria	Visioning methodology	Source
[General]	Meaningful sequence	Okubo (2000)
[General]	Iterative procedure	Robinson and Tansey (2006)
[General]	Participatory settings	Robinson and Tansey (2006); Weaver and Rotmans (2006); Loorbach (2010); Quist et al. (2011)
Visionary	Vision review	Iwaniec and Wiek (2012)
Sustainable	Sustainability assessment	Gibson (2006); Weaver and Rotmans (2006)
	Creative techniques	
Systemic	System analysis	Vester (1988); Videira et al. (2010); Vervoort et al. (2010)
	Visualization techniques	
Coherent	Consistency analysis	Wiek and Binder (2005); Eskelinen and Miettinen (2012)
	Priority assessment	
Plausible	Plausibility appraisal	Wright (2010); Wiek et al. (2012)
	Creative techniques	
Tangible	Targets/thresholds	Rauch and Newman (2008); Rockström et al. (2009)
	Visualization techniques	
Relevant	Actor-oriented analysis and construction	Ostrom (2009); Wangel (2011); Wiek and Larson (2012)
Nuanced	Priority assessment	Robèrt (2005); McDowall and Eames (2007)
Motivational	Creative techniques (storytelling, games)	Vidal (2004); Shneiderman et al. (2006); Eickhoff and Geffer (2009); Varum and Melo (2010)
Shared	Participatory settings (mapping diversity, negotiation, building agreement)	Fischer (1993); van Kerkhoff and Lebel (2006); Krütli et al. (2010); Lang et al. (2012)

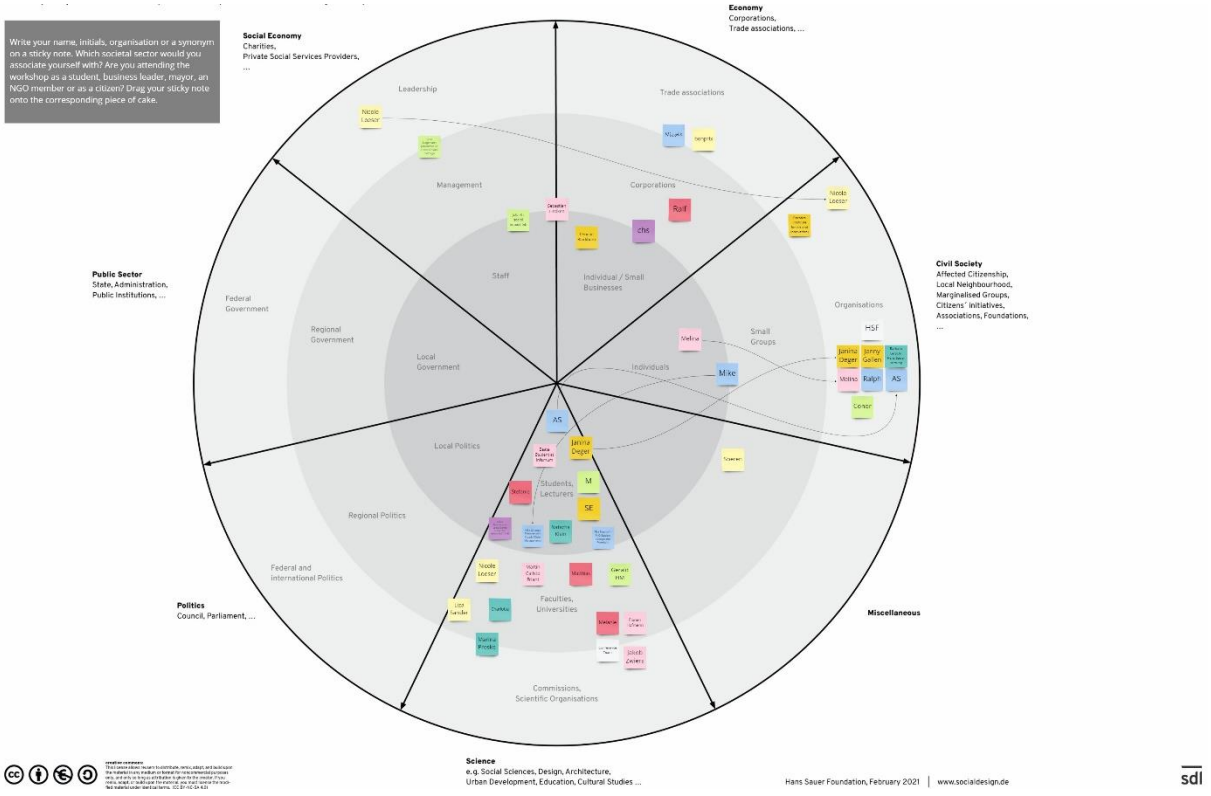
Table 22 ***Vision Elements derived from Impact Matrix*** *– long version (own illustration, based on HSF, 2021)*

Level	Category	**Vision Element**	Guiding question *We are now in the year 2087 and live in a Circular Society...*
Individual Level	Behaviours, Attitudes	**Values, Mindsets & Goals**	... what are our core societal values, mindsets, and goals? What are the values and goals of the government & economy? What do people identify with? What is important to people? What are the things which influence how decisions are made? How is value created? How is value defined?
	Practices, Routines	**Actions & Practices**	… what do we do? Which circular actions and practices are integrated into our daily lives? How do we live, work, consume, eat, and travel? How do we use our time? On what do we spend most of our time? What are differences between now and the year 2021?
	Skills, Knowledge	**Actors & their Capabilities**	… who are the driving actors (people / organisations) among us? What are the important roles within the circular society? What are the most crucial societal sectors? Which stakeholders have the most influence? How do people interact or work with each other? What skills, knowledge and competencies do we have? Is there a 'homo circularis' and if so, what characterises them?
Social Level	Relationships	**Ways of Organising**	… in what way do we organise ourselves? What are common forms of organisation and organisational principles? What are the formal and informal ways people connect to each other? What are the new organisational structures and how do new groups form? What are common decision-making processes? How do we deal with power and hierarchy?
	Organisations		
Material Level	Resources	**Resources, Infrastructure & Places**	… how do we deal with energy, soil, water, food, and other natural resources? What materials circulate in the system and how do they circulate? How are resources used in products and in their production? How has globalisation changed? What infrastructure and logistics enable the system? What are the important places which support the circular society? Which places, which were important for the linear system, have been replaced, and how?
	Infrastructures		
Structural Level	Discourses	**Rules, Norms & Discourses**	... what do we talk about? What political, scientific, and economic discussions are happening? What are central discourses and topics? What are the laws, rules and norms shaping it? What are defining standards and theories of this new paradigm?
	Policies, Governance		
	Laws, Rules		
Based on Calisto Friant et al. (2020)		**Drivers of Transformation**	…what drove the transformation to our ideal circular society? Was it technology, regulation, collective effort, hope or something else? How far and in what ways was societal reorganisation necessary to reach a circular society? Was the system modernised, reformed or completely transformed? How incremental, radical or disruptive were the innovations to get to a circular society? What are the consequences in our ideal circular society?
Based on experience form previous events on CS		**Related Concepts**	What are related concepts to the Circular Society? How do they differ from each other? How can the approaches benefit from each other?

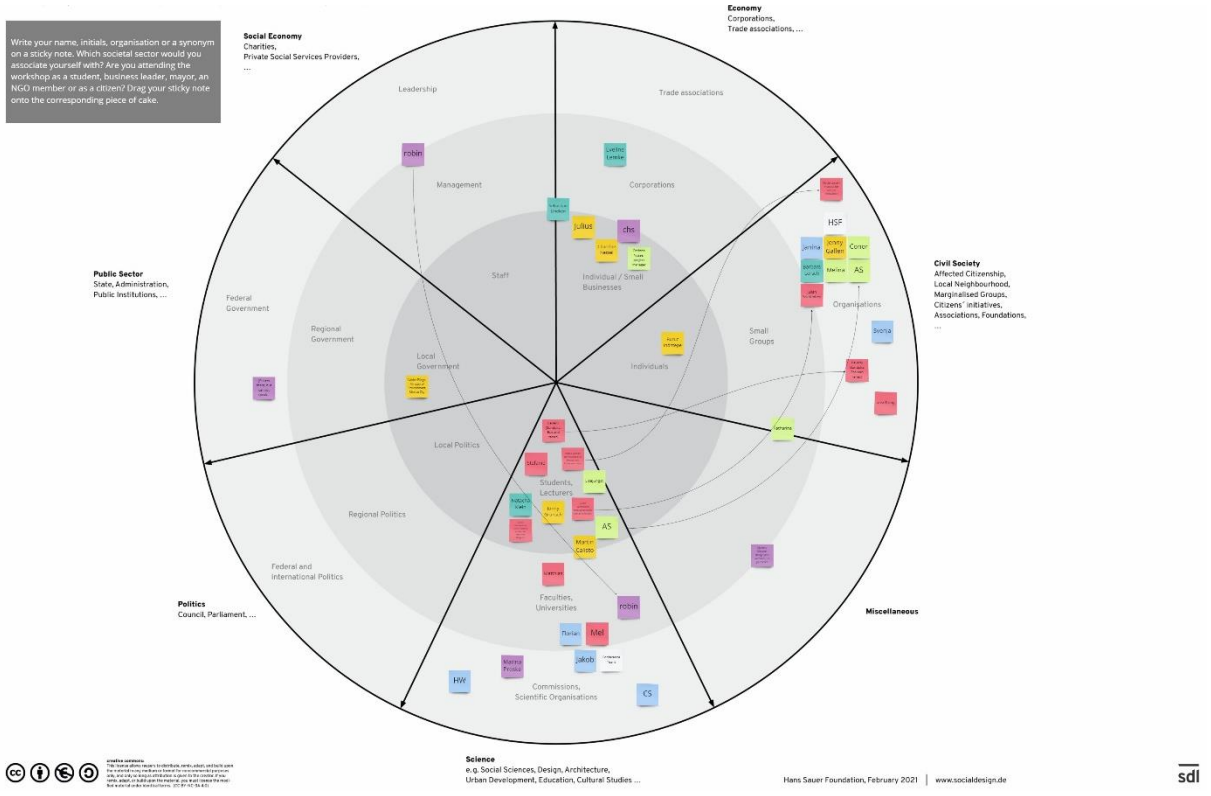
Table 23 ***Overview of the CS Principles*** *– long version (own Illustration)*

Principle	Description
P1 **Strengthen Sufficiency Strategies**	Narrow resource flows while supporting a good life for all by establishing production and consumption systems that support consuming less resources and energy. This requires reflecting on what is needed and what can be refused to consume and use. Question and rethink understandings of prosperity and ownership and adapt traditional forms of work, leisure, care, time, and policies that currently accelerate consumption.
P2 **Design out Waste**	Close, slow, and narrow resource flows by designing out negative impacts on human and natural well-being. This requires strategies of service-based and dematerialised systems as well as circular and eco-efficient design: fundamentally rethink approaches to products and production and replace them with territorial and community-driven product service systems (PSS) and immaterial goods. Where production is needed, design processes and materials sustainable, healthy, circular and efficient.
P3 **Keep Products & Resources in Use**	Slow down resource flows and optimise stocks and flows by maximising the lifespan of products and resources, intensifying their use rate, and preserving or increasing their value. This requires strategies of repairing, upgrading, reusing, sharing, and pooling products and resources. Only when these strategies are no longer possible or sensible, direct products and resources to refurbishment and recycling or composting. However, since most of our current stock has not been designed for material cycling, first analyse whether it makes sense from an environmental and social perspective.
P4 **Regenerate (natural) Systems & Foster Resilience**	Improve the integrity and health of social-ecological systems by sustaining and regenerating them and increasing their resilience. This requires using and regenerating renewable and healthy energy and resources, fostering natural, socio-cultural and market diversity, promoting context-sensitive, glocal solutions and integrate nature as a stakeholder. Consider global conditions and the needs of ecosystems and stakeholders involved. Recognise humans, with their cultural diversity, as an integral part of natural and circular systems.
P5 **Assure Accessibility, Fairness & Transparency**	Enable circular agency under equitable conditions by ensuring accessibility, fairness, and transparency (assure 'Teilhabe'). This requires strategies of open circularity and redistribution: design processes of value creation and destruction open and transparent. Ensure that all people have access to information, resources, and opportunities for action. Redistribute costs (e.g., pollution) and benefits (e.g., wealth) of modern industrialisation.
P6 **Establish Participation & Co-Creation**	Enable innovativeness, democratisation, and an inclusive socio-cultural transformation by establishing processes and structures for participation and co-creation. Be sure to also give nature a voice. (Assure 'Teilnahme'). This requires strategies of transdisciplinary co-creation, glocal democratisation and prosuming: work together across sectors, chains, disciplines, socio-economic backgrounds, and scales to create shared value. Empower citizens to take an active role in circular practices and to have a voice in local or corporate decision-making processes. At the same time, strive for global governance and recognise nature as a stakeholder.
P7 **Advance Circular Literacy**	Enable sustainable circular agency by promoting circular literacy. Circular literacy encompasses the knowledge-based capability to understand complex systems, formulate sustainability-relevant goals, and innovate current practices of consumption and production. This requires strategies of communication, education, and experimentation for circularity: create awareness through understandable and tangible communication and promote circular action through education. Establish spaces where cross-sector alliances, involving citizens, can experience and develop circular practices and gain knowledge-based circular capabilities.
P8 **Redefine Value, Progress & its Metrics**	Overcome socio-ecological crises by placing social well-being and environmental integrity at the centre of desirable and resilient economies. Find indicators to make these values measurable and guide action. This requires permanent negotiation of guiding values and their metrics, social-ecological value creation and assessment, and stewardship: negotiate and reconceptualize key concepts such as wealth, poverty, progress, value, work, scarcity, and abundance. For instance, replace egoism with caring, consumerism with frugality, uniformity with plurality, ignorance with responsibility, etc. Finally, substitute indicators such as gross domestic product (GDP) with metrics that reflect circularity as well as social and environmental value creation.

Templates



Template 3 ***Multi-Stakeholder-System-Map of all Participants at the Visioning Workshop*** *(own illustration, based on HSF, 2021b)*



Template 4 ***Multi-Stakeholder-System-Map of all Participants at the Roadmapping Workshop*** *(own illustration, based on HSF, 2021b)*

Statutory Declaration

„Ich versichere, dass ich diese Master-Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt habe. Ich versichere, alle Stellen der Arbeit, die wortwörtlich oder sinngemäß aus anderen Quellen übernommen wurden, als solche kenntlich gemacht und die Arbeit in gleicher oder ähnlicher Form noch keiner Prüfungsbehörde vorgelegt zu haben."

Nürnberg, 30.11.2021