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SPECIAL FEATURE: ORIGINAL ARTICLE

Leverage Points for Sustainability Transformations

Inner transformation to sustainability as a deep leverage point: fostering new avenues for change through dialogue and reflection

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Abstract

This article provides a rationale for inner transformation as a key and hitherto underresearched dimension of sustainability transformations. Inner transformation relates to various aspects of human existence and interactions such as consciousness, mindsets, values, worldviews, beliefs, spirituality and human–nature connectedness. The article draws on Meadows' leverage points approach, as places to intervene in a system, to reveal the relevance of inner transformation for system change towards sustainability. Based on insights from a series of dialogue and reflection workshops and a literature review, this article provides three important contributions to sustainability transformations research: first, it increases our conceptual understanding of inner transformation and its relevance for sustainability; second, it outlines concrete elements of the inner transformation-sustainability nexus in relation to leverage points; and third, it presents practical examples illustrating how to work with leverage points for supporting inner transformation. In sum, the paper develops a systematized and structured approach to understanding inner transformation, including the identification of deep, i.e., highly influential, leverage points. In addition, it critically discusses the often contentious and divergent perspectives on inner transformation and shows related practical challenges. Finally, current developments in inner transformation research as well as further research needs are identified.

Keywords Inner transformation · Deep leverage points · Paradigm shift · Mindsets · Consciousness · Values · Worldviews · Personal sustainability · Interiority · Personal spheres of transformation · Inner capacities · Human development

Handledby Daniel J. Lang, Leuphana University of Lueneburg, Faculty of Sustainability, Germany.

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Introduction and background

There is growing understanding that the complex sustainability challenges of the twenty-first century cannot be resolved at merely the material, physical or technological planes (Adger et al. 2013; Hulme 2009; Ives et al. 2019; O'Brien 2018). This points to a need to widen the nature and range of pathways that are considered to secure more sustainable futures.

Consequently both, scholars and practitioners increasingly highlight that the techno-scientific (outward) focus of sustainability transformations and transitions needs to be complemented with psychological, cultural, artistic and spiritual dimensions of human life (inward focus) and its future possibilities (see, e.g., EEA 2016, Geels and Schott 2007; Hunecke 2018, Köhler et al. 2019; Leal Filho and Consorte McCrea 2019, Upham et al. 2019). In this context, inner dimensions like consciousness, values, worldviews, beliefs, spirituality and human–nature-connectedness are seen as inevitably important for sustainability transformation at both the individual and societal plane (e.g., Hedlund-de Witt et al. 2014; Horcea-Milcu et al. 2019; Ives and Kidwell 2019; Wamsler et al. 2018). They are sometimes also described under the umbrella term 'mindsets' (Wamsler 2020,2018a, b). At policy level, the failure of information-based approaches has shown the need for deeper and more long-term change. At the local level, civil society movements, faith communities, intentional communities and transition town initiatives have been experimenting with and applying inner transformation approaches. They do so as part of their own everyday efforts towards transitioning to more sustainable lifestyles at small scales (Kunze 2012; Kunze and Avelino 2015; Seyfang and Smith 2007; Veciana and Ottmar 2018).[1]

In sustainability transitions research, the urgent need for addressing inner dimensions has been acknowledged. Scholars highlight that "social nudge, regulatory shaping, and economic incentives are not in themselves sufficient to produce [the kinds of] transformational behavioral change" (O'Riordan and Lenton 2013: 316, cf. Schäpke 2018). Futurists point to similar concerns, stating that our current "external focus has tended to blind us to the shaping power of interior factors" (Slaughter 2012: 122). Scholars exploring the economic drivers of our crises also point towards a neglect of the deepest leverage points, intents and paradigms (Göpel 2016; Raworth 2017).

The emerging field of inner dimensions and transformation shares significant overlaps with the concept of 'leverage points' developed by Meadows (1999, 2008; cf. Abson et al. 2016, Fischer and Riechers 2019). Leverage points are conceptualized as places to intervene in a system with potentially increasing levels of impact towards system change (see Fig. 1). Shallow leverage points relate to material aspects of systems such as incentives and resource flows, as well as feedback-loops between them. Deeper leverage points include the structuring elements of systems, its rules and institutions, and even deeper leverage points include the

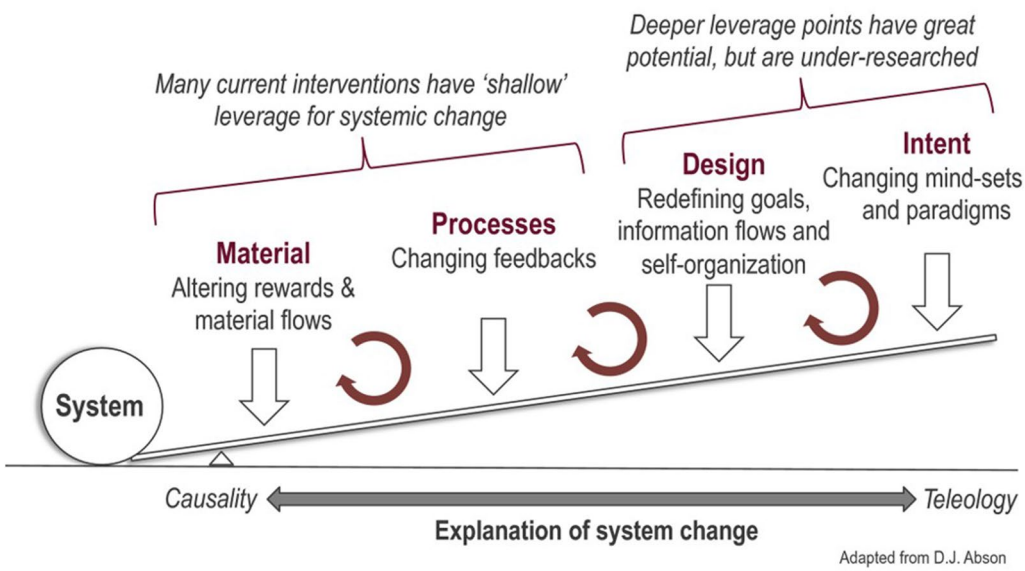

Fig. 1 Schematic illustration of four realms of leverage showing a gradient from shallow leverage points to deep leverage points (Source: Fischer and Riechers 2019, based on Abson et al. 2017, adapted from an ealier version of D.j. Abson)

[1] An overview of initiatives can be found here: https://www.ecoliseu.eu.

design, intents and paradigms (or mindsets) underlying how systems are set up. Inner transformation thus strongly relates to deep(er) leverage points.

Despite the described needs and potential of inner transformation for sustainability, related research warrants further investigation (Fischer and Riechers 2019; Wamsler 2020; Ives et al. 2019). In this context, the possibilities of intentionally addressing inner dimensions as deep leverage points requires particular attention (Manfredo et al. 2017).

This article builds on the assumption that the combination of the leverage points concept and the emerging field of inner dimensions and transformation offers high potential to be mutually beneficial. Consequently, we aim to make three contributions: first, to increase our conceptual understanding of inner transformation and its relevance for sustainability (Sect. "Inner transformation and its relevance for sustainability"); second, to outline concrete elements of the inner-transformation-sustainability nexus in relation to deep leverage points (Sect. "The inner transformation-sustainability-nexus: Towards deep leverage points for system change"); and third, to present practical examples illustrating how to work with deep leverage points for inner transformation (Sect. "Addressing leverage points of inner transformations in practice"). Finally, we discuss related outcomes and present our conclusions (Sect. "Discussion and conclusions").

Approach and methods

In this study, we explore the potential of inner transformation as deep leverage point.

The article is based on a three-step methodology:

The first step involved the systematization of the outcomes of four dialogue and reflection sessions held at three conferences on Sustainability Transitions and Transformations[2] in order to get an overview of current knowledge, approaches and practice. The sessions aimed to foreground concepts, approaches, empirical examples as well as practices of inner transformation work in relation to sustainability and to critically explore them by promoting dialogue among the participants. Each session brought together between 20 and 40 scholars and practitioners primarily from Europe. Participants represented a wide range of disciplines such as sociology, psychology, anthropology, urban planning, philosophy, physics, engineering, ecology, environmental studies, sustainability science and theology. Participants contributed conceptual and empirical, as well as practical expertise on the topic. The sessions combined different methods to elicit expertise, facilitate collective exploration as well as critical reflection. Methods ranged from expert inputs to group dialogues (e.g., world cafés, plenaries, fish-bowl discussions) to various individual and group reflection exercises (such as collective 'harvesting' and guided meditations). All sessions were documented in form of report minutes, visual group work outcomes, and/or audio recordings (see Electronic Supplementary Materials—ESM S1, S2). The authors acted as initiators and session hosts, and participated in two or more sessions, often in facilitating roles.

During the second step, the information from the dialogue sessions was synthesized regarding the following three questions:

1. What is inner transformation and why is it relevant in the context of sustainability?
2. How can the contribution of inner dimensions and transformation to sustainability be conceptually understood in relation to deep leverage points?
3. What are good practice examples of working towards inner transformation?

The three research questions are broadly in line with the questions that were discussed during the dialogue and reflection sessions (see ESM S1, S2). Together, they formed the basis for an inductive approach to our conceptualization of inner transformation in relation to sustainability. Leverage points were raised as one of the important possible frameworks addressing change, at the third and fourth sessions, and proved powerful to synthesize insights. The themes, concepts, and discourses derived from the sessions were analyzed to explore the nexus between inner transformation and sustainability and how its various elements relate to the concept of leverage points. This analysis also involved the comparison to current literature on the issues. More specifically, we conducted thematic clustering of the information from the dialogue sessions by keywords and their relationships/connections to other themes and concepts. The clustering was guided and structured based on the three guiding questions and in relation to the leverage points framework. The methodological steps two and three were thus conducted in parallel.

During the third step, synthesized insights from the sessions were embedded and discussed in relation to existing literature. The aim was to reflect the diversity of session contributions, based on individual author's and conference participant's professional focus, expertise and personal experiences, while seeking to develop a shared understanding and overarching perspective.

[2] Conferences included the International Sustainability Transitions Conference 2016 and 2017, and the Leverage Points conference 2019 (with 2 sessions).

In line with the ethos of our approach and material, we as authors use first person language to acknowledge subjectivity and the authenticity of experiential and empirical knowledge. This is also expressed by the critical, dialogical, discursive and reflective style congruent with the topic. Being both seekers of meaning and meaning makers in this process, our analyses are intersected by emerging new questions, refraining from providing conclusive answers.

Alongside the conference sessions, an 'Inner Transformation to Sustainability' group was created to facilitate exchange between researchers and practitioners, which has contributed to the discussions presented in this article. The authors of this article form part of this growing network and community of practice. It aims to advance research and practice on inner transformation, through action-oriented, transdisciplinary research, and to build knowledge and shared understanding on how to work with deep leverage points for sustainability transformations.

Inner transformation and its relevance for sustainability

This section explores main themes and concepts related to inner transformation that were discussed during the conference sessions and interweaves them with the emerging academic literature on the issue.

Whilst different definitions exist, a common denominator is that inner transformation relates to exploring and addressing people's inner dimensions and their relation to sustainability to support individual, collective and systems change. Based on their professional and academic work, several session participants argued that fundamental change towards sustainability can only succeed through transformation processes that also address inner dimensions at personal and collective levels. In this view, inner transformation is an inevitable part of the Great Transformation from fossil unsustainability to post-fossil sustainable development (WBGU 2011). The question 'who and what does actually have to change?' was vividly discussed by participants. How can we understand concepts related to inner dimensions and transformation (e.g., mindsets, consciousness, self and awareness), and what are the theories and fields of practice that are being applied in relation to these different concepts?

Participants considered inner transformation as a kind of re-orientation of who we are, i.e., as an existential concern. There are different notions of such 'inner change', which some argued may include a transcendental dimension. Participants considered it crucial to unpack the various aspects and layers of such change in order to get a better grasp of the inner transformation concept (e.g., people's values; personal and spiritual growth by way of compassion, empathy, or connectedness; patterns of behavior or attitudes). At the same time, as several participants argued, the diversity of these concepts, their understanding and origin (e.g., disciplinary, cultural) should be acknowledged.[3] Diversity would include various possible subjects of inner transformation (the 'who'), including researchers, practitioners, or 'people' in the broadest sense. This involves a reflection on our own, personal view on inner development and transformation.

In line with the session participants, scholars tend to portray inner transformation as being concerned with the development, growth, and evolution of our 'inner Being' and 'Inner Presence' as part of our physical, materialized, embodied existence (Ulluwishewa 2014). Our Inner Being is a complex, multilayered construct. While humans hold a certain level of awareness on their Inner Being, constant reflection and awareness practice can unravel and enhance this understanding of the innermost source of our self[4] (Dev 2018). Personal sustainability (Horlings 2015; Parodi and Tamm 2018) and personal spheres of transformation (O'Brien and Sygna 2013) are two terms that have been used to describe inner transformation in relation to sustainable development. However, the individual, collective, and thus the cultural are interdependent dimensions of inner transformation processes, which cannot be seen in isolation (Horlings 2015).

This understanding emphasizes the need for the evolution of consciousness through development of a wider perspective and increasing consideration of complexity (Scharmer 2009). This development is described as a move from the self towards the Self,[5] or progressing from ego-system to eco-system awareness (Scharmer and Kaufer 2015). Similarly, other scholars differentiate

[3] The book 'Personal Sustainability' (Parodi and Tamm 2018) provides an overview and a first synopsis of the different core concepts and perspectives.

[4] This expression is based on a particular ontology of the human being and relates to the notion that humans do have a multi-tiered inner reality. To reach down into one's inner source (Scharmer's term, 2009) requires unravelling various layers of one's personality (or self). This is a common concept in transpersonal psychology (e.g., Wilber's (2000) integral theory or Bhaskar's (2002b) multi-planar concept of the person), and eastern conceptions of 'man' (found across Hinduism, Buddhism, Taoism) (see also Combs 1996).

[5] Scharmer and Kaufer (2015) provide a particular, encompassing ontology here: Self is understood as the universal self, embracing and acknowledging interdependence of all beings and the universe. In other words, recognizing the unity of existence.

developmental stages to evolve in terms of individually and collectively held worldviews such as from egocentric, to ethnocentric, worldcentric, and kosmocentric worldviews (Wilber 2007). This view acknowledges the interrelation of the self and societal change, of self-development and socio-cultural transformation in sustainable development (e.g., Hochachka 2005).

The call for more emphasis on the role of inner transformation is inherent in the multidisciplinary field of environmental humanities, emanating from eco-theology, literature studies, ecofeminism, religious studies and the arts (e.g., Leal Filho and Consorte McCrea 2019; Rigby 2017). Environmental humanities highlight the relevance of culturally conditioned meanings, symbols, perceptions, values, ethics and worldviews for sustainable human/non-human relationships. Therefore, scholars from different disciplinary backgrounds increasingly argue that the current multiple crises are due to an alienation from ourselves, others, and the natural world (Bhaskar 2002a). Accordingly, reconnecting to our inner dimensions such as self-awareness, pro-social values or human-nature-connectedness is one way of overcoming this alienation, and subsequently the existing external crises.

This understanding links to Meadows (1999), stating that the deepest leverage points are the power to question and possibly transcend existing paradigms (or mindsets). Being a normative term, 'sustainability' was repeatedly challenged during the conference sessions because of its multilayered, multidimensional and context-dependent nature. While it has become a global development paradigm, critics argue that it is mostly used to fit existing pathways within the growth paradigm, whereas competing paradigms such as growth-critical, local or indigenous models are neglected (cf. Martínez-Allier et al. 2010). In this context, while some participants argued for a declining relevance of the concept which should be replaced, others noted that certain developments and policies, such as the Sustainable Development Goals, have given it 'new life' and potential. Constantly challenging concepts and ideas of sustainability are in fact key to the field itself (e.g., Jackson 2009, Leach et al. 2013, Raworth 2017, Rockström et al. 2009, Blythe et al. 2018). This is also true in relation to inner dimensions and transformation. Do we change the existing understandings of sustainability, or do we invent a new paradigmatic 'reality'?

Session participants argued for the urgent need of a paradigm shift in thinking to prevent catastrophic system change and to reorient development towards sustainable futures. At the same time, approaches to change and associated public discourse need to be considered. Is it more relevant to influence predominating discourses or spur something new 'out at the margins'? One way of resolving this dilemma may be to use language strategically by following a two-pronged approach; that is, to use the term 'sustainability' to enter and connect with the 'mainstream' discourse, but to use a more 'radical' provocative terminology to critically reflect sustainability. This discussion relates to notions of a post-development era (Kothari et al. 2019), degrowth (D'Alisa et al. 2014) and deep adaptation (Bendell 2018) as examples of new paradigms that link to inner dimensions and transformation and that challenge predominant development pathways. They could allow to highlight new dimensions, stir up the academically preconditioned ways of thinking and attitudes, and stress the urgency for deep, profound, transformative change. As discussed in one session, radicality often reflects frustration with existing paradigms, and strives to enable and push for the emergence of new pathways. For instance, civil society movements such as Extinction Rebellion and Fridays for Future combine radical narratives and political action (ESM S2).

One aim of further exploring the role of inner dimensions for transformation is to critically reflect and widen the nature of pathways towards sustainability that are considered. In this context, religion and spirituality were repeatedly debated during the conference sessions since they shape people's and society's values, ethics and worldviews. In addition, scholars have noted the emergence of new paradigms, including a new spirituality (Heelas and Woodhead 2005; Knoblauch 2009), 'religious hybrids' (Berger et al. 2013), inter-religious dialogue (Lockhart 2011) and postsecularism (Habermas 2001). In this context, the notion of 'spirituality' can be seen as part of people's inner dimensions being rooted in a specific religious or non-religious understanding and/or practice of personal growth and transformation (Bucher 2007), which may be used to critically reflect, challenge and expand mainstream understandings of sustainability (Box 1[6]).

[6] As this topic remained contested during sessions and to provide an account of the different viewpoints, we present the discussion including participants' statements in a box complementing the main argumentation line. See as well Box 2, for another important yet contested discussion topic.

Box 1 - Session reflections: Instrumentalization of spirituality for inner transformation? (see ESM S1, IST Conference 2016)

Inner transformation should not be seen as a vehicle of change. For many people, their personal inner world and related spiritual practice (e.g. prayer, meditation, contemplation, fasting, studying of spiritual texts) plays an important part of every-day life and their understanding of sustainability. This goes beyond formal religion. Session participants highlighted the risk and problematic tendency of instrumentalizing spirituality by reducing it to a mere tool for sustainability. As one participant commented:

> "We can do trainings, like in the transition movement, but…Google does it as well, and many others corporations. Here we must be very cautious, you may use practices of meditation of different traditions and other practices for everything, e.g. to become personally stronger and financially more successful. While this might be worthwhile and important, we should also be aware that if we bring this into our transformation issues, it is tricky" .

Instrumentalizing spiritual practice to designing pro-active leverage points in the context of sustainability transformations might lead to superficial practices. It was argued that instrumentalization attempts reflect a paradigm of simple causality, of linear cause and effect, which is not shared by many spiritual traditions and is as well not applicable to solving complex, wicked problems. Such reductionist approach would also correspond to dominant western approaches to time and problem-solving. One participant remarked that we live in a world in which we want everything to happen fast by dividing systems in pieces and addressing them in isolation instead of addressing them comprehensively. This concern is shared by recent studies (e.g. Wamsler et al. 2020), highlighting the need to support inner transformative skills (intead of focusing on actual, simplistic solutions).

Countering the previous argument, another session participant said that instrumentalization of meditation is not really an issue, because the process of meditation facilitates for instance one's inner experience of perceiving oneself as part of a bigger whole. As one becomes aware of that whole, one will also be able to critically reflect associated sustainability problems. Several stressed that it would be an inherent part of inner practice to search for wider change. Accordingly, spirituality can be understood as *one* potential dimension of sustainability (transformation), but not as a vehicle for sustainability.

Literature on the link and relationship between sustainability and spirituality has been growing constantly (e.g., Gardner 2002, Dhiman 2016, Ulluwishewa 2014, Rauschmayer 2019). Spiritual practices are viewed both as inspiration and potential resources for 'The Great Transformation'. There is hardly an eco-social movement without any religious or spiritual underpinnings (Ott and Sachs 2016). In fact, many movements are indirectly influenced by religiously or spiritually oriented individuals like Mahatma Gandhi (Hinduism), E.F. Schumacher (Buddhist economics), or Thich Nhat Hanh (Buddhist). This phenomenon is expressed by terms, such as 'engaged Buddhism', 'practical spirituality' or 'green yoga' (Feuerstein and Feuerstein 2007; Woiwode and Woiwode 2019). It puts an emphasis on "transformative practice which leads to self-transformation, cultural

transformation" (Giri 2018: 14) and transformation of the physical world (see Box 1 for a critical reflection).

Conference sessions did also explore extensively the relation of inner transformation and physical systems change; that is, the connectedness and influence between interiority and exteriority. Participants argued for a directional impetus of influence from the inner dimensions of our life world towards the exterior aspects of the material, outside world. For example, in the Transition Movement the inner and the outer aspects are not viewed separately: 'We assume that what we see in the outside is a reflection of the inside, which also means that we are one with our environment' (Gräff at IST Conference 2016, see ESM S1). Consequently, the relationship of inner and outer transformation would be about inner and outer integration of both the physical and subtle realities of the world, something which has been controversially debated during all conference sessions (see for example Box 2).

Box 2 - Session reflections: Inner Transformation, Human Agency and ´In-Action´ - a paradox?
(based on ESM S2, Leverage Points Conference 2019 session)

How do inner and outer realms of transformation relate to one another was a returning topic during the sessions, that is: where to focus human agency? In order to achieve inner transformation and, as some participants argued, subsequently, outer change, do we have to do ´nothing´, be ´inactive´, i.e. create a void first? As one participant remarked:

> "...if we look at Buddhism, it would say 'if you want to relate to yourself, do nothing; if you want to relate to everything around you, do nothing'. We kind of go the other way around, we try to innovate social technology first, which you can then use to empower other people. We are creating new power relations between experts and non-experts. I think this is really difficult, or even dangerous. In my understanding it is more about creating space so that there is more emergence of connecting and re-connecting. Basically, instead of trying to fill this void, or the space that could be filled with new technology, think about how we can create space with this 'nothing' and see what connections might emerge" (Participant at IST 2016 session, see ESM S1).

From this perspective, the ´void´ may be interpreted as creating a (safe) space for ´things to emerge´ without exactly knowing what will happen. In this context, session discussions identified an inherent tension between sustainability and inner transformation, since sustainability is normative and generally defined by specific goals, e.g. the Sustainable Development Goals. Set goals require action. In contrast, in relation to the field of inner transformation, transformation might be understood as something that will happen if you focus on pursuing a certain practice or certain ethics/values – not on outcomes, e.g. reaching a certain goal. For example, the way Vipassana (a Buddhist meditation technique) is taught may be seen as a practice for change through reflexive processes and increasing self-reflective awareness. As a result, one might redefine relationships and attain fundamental change with oneself and the outer environment. In the face of endless 'urgencies' - how do we practice 'non-action', and should we? Participants' deliberated non-action as one of the paradoxes of sustainability:

> "Meditation teaches us to reduce our reaction tendencies, act when really needed, and helps sharpen awareness that may bring about 'the art of inaction'… how can we widen those spaces of being and letting be… without making them." (Participant at Leverage Points session, see ESM S2)

Yet, as another participant remarked,

> "The strong focus especially in our [western] culture on the doing and on the outer change obstructs the possibilities to have spaces for real change. Hence the question is how to balance better this 'doing mode' with the 'being mode'." (Participant at IST 2016 session, see ESM S1)

Inner change processes should thus not be equaled with non-action. In fact, they may be rather linked to the concept of emergence, as action and the need to act arises from specific circumstances without particular instrumental, forward or goal-oriented planning. This takes us to other ways of knowing. Participants emphasized the need to cultivate our sensitivity, develop intuition, which requires different ways of learning including being able to sense one's inner presence and being. 'Know thyself' then, would be one important imperative. Practices that explore complexities and multi-layeredness of our Inner Being support inner transformation.

This view corresponds to recent studies, as put forward by Ghuman et al. (2019: 51–52):

> "When we are integrated (acting with integrity), within ourselves and with the outside world, we are harmonious with the universe. We are parts of that harmonious whole, which expresses itself within and through us. The meaningful coincidences guide us and validate our thoughts and feelings about where we are and where we are going. And as a by-product, our behavior and decision-making very naturally becomes ethical and sustainable, which are not only of great value to our long-term success as an individual or as an organization but also critical for our survival on this planet."

This understanding is closely linked with studies on leverage points, where deep leverage points are identified as powerful areas for inducing potentially' transformational sustainability interventions' in the external world of processes and materials (Abson et al. 2016).

The inner transformation–sustainability-nexus: towards deep leverage points for system change

This section describes the inner transformation-sustainability nexus, i.e., the elements and mechanisms through which inner dimensions and sustainability are interrelated, and how they relate to leverage points of change. The section draws on the systematization of the sessions and the identified linkages to recent academic literature and reviews on inner transformation and sustainability (cf. Sect. "Approach and Methods"). In sum, results show that the inner transformation–sustainability nexus includes the following interrelated elements:

1. Subjective well-being and physical health
2. Self-reflection and awareness[7]
3. Activation of (intrinsic/non-materialistic) core values
4. Pro-environmental and pro-social attitudes (e.g., consumption choices and social activism)
5. Deliberate, flexible, and adaptive attitudes (e.g., to climate change, conflict resolution)
6. Sense of inter-connectedness, compassion, equity and social justice
7. Human–nature connectedness
8. Sustainability-oriented social learning and innovation (including integration of different ways of knowing) (cf. nexus elements presented in Wamsler et al. 2018 and Wamsler 2018a, b)

All elements of the nexus relate to people's values, beliefs, worldviews and associated emotional/cognitive and relational capacities that, when activated can influence different sustainability outcomes and elements. Examples are the design of sustainability innovations, rules to structure system set up, or certain patterns of behavior (cf. Ives et al. 2019; Schäpke and Rauschmayer 2014; Wamsler et al. 2018). The identification of such elements allows for a differentiated understanding of areas and mechanisms through which inner transformation can support societal change towards sustainability (cf. Wamsler et al. 2018; Ives et al. 2019). They also show that the inner transformation–sustainability-nexus is manifold, relating to different scales, the individual, collective/social, and systems level (Wamsler 2018a; Wamsler et al. 2018). Deepening the understanding of this nexus may provide highly informative for attempts to govern sustainability transformations. In the following text we will provide some illustrative examples of the identified elements of the inner transformation–sustainability nexus and their interrelations.

Inner transformation strongly relates to individual and collective, subjective well-being and health, which is one key element of our quality of life (cf. Ives et al. 2019; Brown and Kasser 2005). In combination with a sense of justice, quality of life is a key aim of anthropo/eco-centric understandings of sustainability—and related policy making (cf. Rauschmayer et al. 2015).

Inner transformation is also closely related to inner capacities, such as self-reflection and awareness, which influences our worldviews (cf. Wamsler et al. 2020, O'Brien 2020). Concrete examples are the relatedness of humans and nature and mindfulness, which can for instance support conscious choices and behavior by minimizing automatic reactions or routines (cf. Wamsler et al. 2018; Brown and Kasser 2005).

Increased self-reflection and awareness can also relate to the activation of core values (such as pro-social, pro-environmental or transcendental values) and the narrowing of value-action gaps, leading to more sustainable individual and collective behavior (cf. Wamsler 2018b; Schäpke and Rauschmayer 2014; Horcea-Milcu et al. 2019; Brink and Wamsler 2019; Raymond and Kenter 2016).

Inner transformation thus does not merely relate to psychological, cognitive or emotional processes, but can translate into concrete behavior in various domains (e.g., consumption, social activism, conflict resolution) (cf. Wamsler et al. 2018, O'Brien 2018). It relates to a sense of interconnectedness to one's self, others and nature, and

[7] Wamsler separates the elements of the nexus that are expressions of certain values, beliefs and worldviews from the emotional/ cognitive and relational capacities (also called transformative qualities or skills) that enable them, such as self-reflection and awareness, compassion, etc. Together they form part of the concept of mindsets (cf. Wamsler et al. 2018, Wamsler 2020, 2018a, b).

Table 1 Conceptualizing the depth of leverage of various elements, exemplary of the inner transformation-sustainability-nexus (Source: own, conceptualization of realms of leverage points based on Abson et al. 2017 and Fischer and Riechers 2019)

Realms of leverage	**Intent** Mindsets, values and goals and the capacity to change them, shaping the emergent direction of the system	**Design** Social structures and institutions, including rules and information flows of a system, related (self-) organization and change capacities	**Processes** Interactions and feedbacks between various elements that shape internal system dynamics	**Material** Constants, parameters, rewards, flows and stocks of a system, their creation and change
Orientation	Leaning more towards teleology	Interlinking teleology and causality	Interlinking teleology and causality	Leaning more towards causality
Exemplary elements from the inner transformation sustainability-nexus, related primarily to individual actors	Integrative/integral, multi-perspectival, pluriversal worldviews Reflective awareness of self and self-realization Perceived human-nature connection Intrinsic/non-materialistic/ pro-social/pro-environmental values Sense of belonging and interconnectedness, compassion	System and design thinking capacities Experimentation capacities Envisioning and ideation capacities	Subjective wellbeing and physical health Personal resilience and burnout prevention Coherence of values, attitude and behavior Disruption of routines and automatic behaviour	Individual elements guiding actions effecting the "material", including: Pro-environmental/ pro-social attitudes and consumer choices Pro-environmental/ pro-social attitudes and overall behavioral choices
Exemplary elements from the inner transformation sustainability-nexus related primarily to collective actors (e.g., organizations)	Integrative/integral, multi-perspectival, pluriversal worldviews Reflective awareness of collective (regarding culture, rules, paradigms) and relationality Social learning (e.g., triple-loop learning)	Sustainability-oriented innovations Deliberate, adaptive and flexible group attitudes Social learning (e.g., double-loop learning) Value-based organization (based on intrinsic, universal and relational values, including social justice and equity)	Conflict resolution Social learning (e.g., double and single-loop learning) Communication tools and methods	Collective elements guiding action effecting the "material", including: Sustainable consumption practices (shared) Social activism

an orientation towards justice, as central principle of sustainability (Pfattheicher et al. 2016; Jacob et al. 2009). A variety of religious and spiritual worldviews and related practices, often of eastern or indigenous origin, do include and strengthen a sense of interconnectedness and compassion with the human and non-human world as well as an active engagement to change/work on oneself (cf. Dhiman and Marques 2016; Hedlund-de Witt et al. 2014; Ives and Kidwell 2019; Ives et al. 2018; Rauschmayer 2019).

The identified elements show that inner transformation can play an important role regarding sustainable behavior, including responses to complex and persistent problems, such as climate change (cf. Wamsler and Brink 2018; Wamsler 2018b; Ives et al. 2019, O'Brien 2018). It involves the facilitation of social learning and innovation as a key driver of transformation. Social learning leads to new understandings of the rules and structures underlying persistent problems and how to change these ´root causes´ (e.g., double loop learning, cf. Reed et al. 2010; Armitage et al. 2008). Additionally, it relates to recognizing and improving the performance of existing structures (single-loop learning, cf. Fazey et al. 2018 based on Waddell 2016; Reed et al. 2010). Last, it includes to collectively understand and open up sense making and purpose development, thereby creating formerly unimagined possibilities to resolve problems (e.g., triple loop learning, cf. Fazey et al. 2018 based on Wadell 2016, cf. Johanessen et al. 2019). The integration of different ways of knowing (e.g., scientific, tacit and indigenous) can benefit the development of such new perspectives (cf. Fazey et al. 2020; Armitage et al. 2008; Raymond et al. 2010).

Sustainability oriented innovations include the ideation of new structures and rules, orienting the reorganization of systems towards sustainability (cf. Schot and Steinmueller 2018; Avelino et al. 2019). In this context, learning and innovation benefit from groups of actors holding deliberate, adaptive and flexible attitudes easing information exchange, reflection and ideation. On the individual level, these processes catalyze and benefit from competencies of ideation, experimentation and system and design thinking[8] (cf. Wamsler et al. 2020).

Overall, the systematization of the dialogue sessions and associated literature show that many of the elements of the inner transformation–sustainability nexus belong to the realm of deep leverage points (such as mindsets, paradigms, beliefs, worldviews), either directly or indirectly. Related discussions emerged mainly during the third and the fourth dialogue sessions. There was broad agreement that exploring these elements further helps to identify and adequately address root causes and key underlying factors of persistent unsustainabilities. These are crucial to develop targeted interventions that may lead to large overall system change (Abson et al. 2016). In this context, Abson et al. (2016) emphasize the 'nested hierarchy' of leverage points whereby "deeper system characteristics constrain the types of interventions possible at shallower realms of leverage". Fischer and Riechers (2019) clarify that while shallow leverage points thereby follow a causal, materialistic logic, deeper leverage points belong to the realm of teleology providing aim and direction (see Fig. 1). This logic can also be applied to differentiate the depth of leverage of different elements of the inner transformation–sustainability nexus.

On the basis of these results, we developed a tentative clustering of the elements forming the inner-transformation–sustainability nexus into the four basic realms of leverage (Table 1). This clustering and differentiation allows for a discussion of the interrelation of causality and teleology related to different elements. Furthermore, and corresponding to the elaboration on the nexus elements above, we differentiate in this context individual and collective scales.

As shown in Table 1 and Fig. 1, the elements of the inner-transformation–sustainability nexus can be associated with all four realms of leverage, from the material to processes, design and intent, both on individual and collective scales. For instance, individual and collective self-awareness may include awareness of paradigms and is located at the ´deep´ end of the leverage points spectrum: the intentional. This is true as well for core values and their activation. In the realm of systems design, primarily collective activities are found. This underpins the role of innovations as well as social learning and adaptive and deliberate approaches for system transformation via their capacity to change system design. Elements in the realm of feedbacks relate to the interplay between inner transformation and sustainability in form of for instance well-being, health and conflict resolution. Individual and collective behavior, in form of consumption choices or social activism based on pro-environmental or pro-social attitudes, can contribute to altering, e.g., the parameters of the respective (social-ecological or socio-technical) systems.

This differentiation reveals that inner dimensions and related transformation do not go equally deep (cf. Table 1). For instance, consumption-related attitudes are on a relatively shallower level than values ('what matters') or worldviews that frame our view of the world and encompass values and attitudes (Hedlund-de Witt et al. 2014).

However, the presented systematization is not aimed to make judgements about the interrelation of elements from the different realms; that is, between causality and teleology. Yet, it may guide investigations on these interrelations, for instance on how certain values and self-awareness relate to a deliberate approach to sustainability challenges, conflict resolution capacities and/or social activism.

[8] Here the discourse on inner transformation relates to that on sustainability competencies (e.g., Wiek et al. 2011) and transformative skills (e.g., Wamsler et al. 2020), which are not considered in depth due to space limitations.

Furthermore, the differentiation might allow assessing planned interventions regarding the depth of the leverage point they approach and how they take interrelations between leverage points into account. Which policies could for instance foster self-awareness and activation of intrinsic/pro-environmental values? Which approaches could facilitate that self-awareness and value-activation transmit into the design of systems change, feedback-loops and finally material parameters of the system in question? Part of such investigations needs to be a clarification of what the system in question is and which elements it includes. System elements and related interventions require differentiation as well.

Addressing leverage points of inner transformations in practice

This section illustrates the conceptual elaborations of the previous two sections in practice. It presents concrete practice examples of working with elements of the inner transformation–sustainability nexus that were brought up during the reflection and dialogue sessions. In this context, current challenges and benefits are highlighted.

As part of the so-called TRANSIT project, more than 100 related local initiatives and 20 global networks were studied (transitsocialinnovation.eu; Wittmayer et al. 2019). It showed that it is crucial to address inner dynamics to both respond to challenges whilst supporting a thriving society and planet. About a third of the analyzed initiatives under study had experienced internal crises, for instance around leadership, power, finances, aims or values. TRANSIT showed that social learning, including processes of self-reflection, emotional learning and inner transformation more broadly were of high value to deal with such crises in support of sustainability (Kunze and Avelino 2015; Dumitru et al. 2016). Many of the analyzed social innovation initiatives have developed specific approaches to work with inner transformation on the individual and collective level. The two examples[9] presented below are ecovillages that form part of the Global Ecovillage Network and the Transition Movement.

[9] The illustrative examples are chosen on the basis of the expertise, experience and research conducted by co-authors of this paper. We are aware of the limitations of the examples with regards to their scale and specific context, and do not claim comprehensiveness nor broad representativeness. Further relevant initiatives exist, e.g., platforms created for policy makers and other change agents to allow them developing their cognitive/emotional and relational capacities, to increase democratic governance and sustainability.

The Global ecovillage network

Ecovillages are living examples of self-organized social systems that have experience with linking inner and outer change for sustainability at a local level (e.g., Kunze 2012; Kunze and Avelino 2015; Veciana et al. 2020). There are diverse key drivers for ecovillagers self-organizing in projects to create a sustainability culture in their own and neighboring villages (cf. Veciana and Strünke 2018). Among the motivations mentioned by the interviewed villagers is the wish to support a culture of consciousness and self-reflection, e.g., by discussing common values and associated actions. Additional motivators are a sense of belonging and togetherness, and the longing to solve conflicts together, for instance by using effective communication methods.

Many ecovillagers believe that sustainability involves addressing individual mindsets and the support of personal development for agency towards more responsible, cooperative behavior. As a villager living in Findhorn states:

> "We do a lot of sharing: Being heard, sitting in a circle; the sharings can go very deep… Some people and guests say it is the first time they feel really heard… an atmosphere, very open hearted… it is mind-blowing and heart-blowing… a lot of people go away completely transformed." (Interview GEN2 in Kunze and Avelino 2015).

A recent study found that people tend to feel frustrated or overwhelmed by theoretical information and approaches towards sustainability, e.g., about Sustainable Development Goals (Veciana et al. 2020); In contrast, they feel inspired by visiting ecovillages. The direct experience and mutual exchange about inner and outer aspects of sustainability is crucial not only to gain real-world examples and information, but also to develop inner motivation and orientation.

This inspirational power of ecovillages raises the question of how ecovillagers' perspectives, values, beliefs, emotional and habitual patterns, and bodily experiences relate to their daily practice in shaping sustainable lifestyles. In their daily lives, ecovillagers continually challenge existing paradigms by experimenting and testing new patterns for a sustainable lifestyle through both, inner and outer practices and approaches (Fig. 2).

There are thus diverse practices and approaches to address elements of the inner-transformation–sustainability nexus to learn from. Many of these can be related to deep leverage points, fostering being open 'to not knowing' and to continuously question own worldviews with a self-reflexive attitude. The aim of the different practices and approaches is to address elements of the inner-transformation-sustainability nexus at an intra-personal, inter-personal and community level (Veciana and Ottmar 2018). At all these levels inner barriers towards change may emerge during the

Fig. 2 Connecting inner and outer sustainable fields of self-organized action—the case of ecovillages, (S. Veciana for the conference Leverage Points 2019, Lüneburg)

process of developing a new sustainable lifestyle. To overcome inner barriers and foster agency, ecovillagers actively learn through different individual and collective methods to express themselves in group processes regarding any social, ecological, economical or cultural matter (Veciana and Ottmar 2018). The resultant creative engagement of self-empowered individuals reportedly shapes the group processes, together with a willingness to focus on achieving the 'best solution for the whole'.

The transition movement

The Transition Movement is another initiative which recognizes and develops what members call ´inner transition´ (Longhurst 2015; Prentice 2012). Even though there are now more than 1000 such transition initiatives worldwide, it is still a young movement that originated in 2006. One of the inner transition trainers noted the following during a session:

> "There are many great people, but what we haven't actually learned in our society is working together. Finding a way for creating a learning community is a salient dimension in the inner transition approach. We are trying to work with existing hierarchies to bring the inner understanding out in communication, for example in a 'circle culture'. When people come together, and they are open, something new can be created, which is more than the sum of the pieces."
> (Gräf, expert at IST 2016, ESM S1).

This notion of inner transition ideally permeates all activities of the Transition Movement:

> "Everything we do, e.g., building up new structures in economies, in every area inner transition is always present. The head, the heart and the hands are all together".
> (Gräf, IST 2016, ESM S1).

Similar to the Global Ecovillage Network, this approach also intends to empower people through self-reflection, self-organization and facilitating personal development to tap into everyone's full potential. The aim is that people start acting, not only as individuals but also jointly, by taking responsibility and work together in interconnected ways:

> "The individual and the collective position are both variable and have to be connected with something we call 'inner source'" (Gräf, IST 2016, ESM S1).

The work of the Transition Movement suggests that the 'heart dimension' or this 'inner source' can naturally emerge when people work together in projects. Here, people face conflicts, crises and emotional challenges, which often require them to redefine their perspectives and personal

relationships (Power 2016). This is also one of the reasons why the so-called 'Heart and Soul Groups' were initiated early on as part of the Transition Movement to explore the psychology of change (Hopkins 2011). As observed by Gräf (IST 2016, ESM S1):

> "[…] no matter how you start, it [the inner dimension] always comes in. It is important when people are encountering the diversity of life in projects. In the local workshops and trainings, people themselves always come up with it [the role of inner dimensions]."

Consequently, various methods and levels to address inner dimension and transformation are used (see ESM 3).

A key issue and challenge for addressing the inner transformation-sustainability nexus in practice is the diversity of potential approaches and practices, many of which are rooted in ethical/psychological, spiritual or religious traditions. Experience of participating transition trainers has shown that what brings people together is that they engage together in certain practices that do not have a connotation of only one particular tradition or school. Those that are more universal and uniting are more accessible to everybody.

Finally, it has to be noted that there are many other emerging initiatives that aim at developing inner capacities or qualities to foster change towards sustainability at collective and systems level, including the development of new methods, tools and technologies. At the same time, research regarding the effectiveness of different approaches to support transformational skills and sustainability outcomes at different scales is still in its infancy (Wamsler 2020; Ives et al. 2019).

Discussion and conclusions

Inner transformation–sustainability nexus and the leverage points perspective

Our study shows that inner dimensions and transformation are essential to understand and facilitate personal and collective processes of change in terms of our awareness and relationship to ourselves, others, and the environment. In addition, we identify the key elements of the inner-transformation–sustainability nexus, which are today discussed in disperse studies and fields that deal with inner transformation and/or sustainability more broadly. The identification of these elements allows for a differentiated understanding of areas and mechanisms through which inner dimensions and transformation can play a role in societal change towards sustainability. This includes, amongst other things, processes related to self-reflection and awareness at individual and collective level, and the activation of core values, universal principles (such as equity and social justice) and associated behavior, a sense of human–nature connectedness, as well as sustainability-oriented social learning and innovation towards sustainability.

Furthermore, this paper links the inner transformation–sustainability nexus to the leverage points concept. This offers a powerful perspective to understand and potentially facilitate societal transformation. Inner dimensions as leverage points for transformation put emphasis on the role of the individual, while not ignoring the necessity for collective and systems change (Schäpke 2018; Wamsler 2020). Ethical arguments suggest that the most legitimate ways to address inner dimensions and transformation may come through transformative education and voluntary changes by individuals or groups interested in expanding their agency (O'Brien and Sygna 2013; Rauschmayer et al. 2015; Wamsler et al. 2020). Potential approaches include the development of spaces and methods that can support self-awareness and –reflection, perspective-seeking, values-based engagement and care for oneself, others and the environment (Sect. "Addressing leverage points of inner transformations in practice"; cf. Wamsler et al. 2020; Pereira et al. 2020). An expansion of individual agency, awareness and broadening of perspectives, is likely to facilitate the emergence of a new paradigm or worldview, which is considering wider circles of care and impact from individual human action to a broader consideration of human and non-human life (see Sect. "The inner transformation-sustainability-nexus: Towards deep leverage points for system change", cf. O'Brien 2020, Hedlund-De Witt 2012). According to the leverage points framework (Fig. 1), interventions targeting such deep leverage points can (potentially) create a strong impulse for overall systems change.

Interventions also include the acknowledgement of inner dimensions for social change towards sustainability by developing more comprehensive approaches in various fields, for instance in urban development (Woiwode 2012 and 2016). This is key for complementing current technology and information-focused approaches by systematically considering and integrating/mainstreaming inner dimensions in project design, implementation and communication. The leverage points perspective is a useful lens to locate elements of the inner transformation-sustainability nexus along the spectrum of teleology and causality or, in other words, deep and shallow leverage points (ESM 3). We developed such a tentative positioning of the different elements to help guide the analysis of approaches aimed at addressing inner dimensions and transformation for sustainability, e.g. regarding policies.

Further analyses are needed to look into the interplay between different elements related to teleology (intents) and causality (parameters and feedbacks) and to elaborate on the role of certain elements for larger system change. As a

consequence of such enhanced frameworks and understanding, it would be easier to assess and anticipate the implications and impact of specific interventions as discussed in Sect. "The inner transformation-sustainability-nexus: Towards deep leverage points for system change". Yet, it is challenging to establish empirical connections between people's inner dimensions and transformation, and the impact on actual behavior, because such dimensions are ideational cultural expressions. Research on how to support inner qualities or skills for transformation is thus crucial and increasingly emerging, for instance in the context of activating climate negotiations and actions (Wamsler et al. 2020).

Practices and challenges of current inner transformation approaches

The presented illustrative examples point towards the diverse approaches and practices that are currently used to support individual and collective processes of transformational change. They highlight the boundedness of such practices in specific spatial and social contexts.

Approaches and practices which address inner dimensions and transformation influence changes that relate to all levels of the spectrum between the teleological and the causal (e.g., in the 'Collaboratory' when visions are transferred into designs of prototypes and decisions on actions, Muff 2014). While the influence can be associated more with individual or collective levels, approaches and practices relate to both levels.

Furthermore, from the various discussions in the conference sessions on current practices, a number of challenges emerged. One repeatedly mentioned challenge is the time factor in terms of both overall time scale and pace. Whilst there is a feeling of urgency to enact (inner and outer) transformation, e.g., for responding to climate change, it requires time to develop personal integrity, reflection and openness to oneself, others and nature. Yet, at first sight this seems to collide with the fast pace of life which leaves no or insufficient time for regular personal inner practice. This is also increasingly mentioned as an issue within the research environment, forcing academics to rush from one project and grant to the next, restricting the possibility to reflect and engage with ideas in a 'Goethean' way over longer periods of time. At the same time, this situation further supports the importance of simultaneously addressing inner and outer aspects of sustainability for more 'effective' action.

As demonstrated by the practice examples, creating 'safe spaces' for reflection and joint action is needed to enable individual and collective change. It is crucial to support individuals and groups in a process of connecting to the 'whole', including issues of personal values, beliefs, worldviews, religion, spirituality, or to talk about emotions, including joy and happiness or fear and anger. Talking about these aspects is not common ground in sustainability research, practice and education (Ives et al. 2019; Hendersson and Wamsler 2020). However, they are part of people's everyday lives and influence sustainability at all levels. Addressing such issues requires a protective environment, where differences are more likely to be accepted, conflicts can be addressed, and the main goal is to connect for the common good. Relatedly, we argue for practices that support relationality in the context of inner dimensions and transformation (Walsh et al. 2020).

Inner transformation in research and academia

Based on the authors' experience of convening the conference sessions, forming a network of a community of practice, and their academic enquiries, it is clear that there is an increasing number of scholars that engage in transformative research, inner dimensions and transformation towards sustainability. Often, these scholars are engaged in both research and practice, with a distinct biographical narrative interweaving these two realms. Consequently, many of them actively go beyond a rigorous subject–object distinction as typical for positivist science (see Fazey et al. 2018). We can observe an increasing openness regarding the issue of inner transformation (e.g., conferences that host related sessions, special issues of academic journals on the issue). Yet, the traditional approaches and structures of research institutes and universities—at least in Europe—still hamper the integration of transformative learning and inner transformation in sustainability-related education programs (Wamsler 2020). This skepticism is, amongst other things, rooted in how the academic world defines and conceptualizes knowledge (Fazey et al. 2020). In fact, the field of inner transformation challenges traditional approaches and structures by arguing for the inclusion of different modes of knowledge in a transdisciplinary way (Woiwode 2020 forthcoming). At the same time, the emergence of the environmental humanities as well as innovative courses and approaches that integrate inner and outer sustainability (cf. Wamsler 2020) is pointing in the right direction.

The present study does not allow deriving generic recommendations for how to address inner dimensions and transformation in research practice, due to both the limited scope of the study and the high context dependency of inner transformation practices. However, approaches to research that encompass co-creative and reflexive forms of knowledge creation (such as transdisciplinary, action-oriented and transformative research; Lang et al. 2012; Fazey et al. 2018) appear generally suitable for both the analysis and the (potential) engagement with inner dimensions. These forms of knowledge creation often go hand in hand with changed roles researchers take, with (self-)reflection and dialogue

being core activities (Wittmayer and Schäpke 2014). Such innovative approaches combine knowledge co-creation tools with specific facilitation methods acknowledging the importance of inner dimensions of participants and researchers alike (e.g., 'art of hosting' [Quick and Sandfort 2014], 'co-creative relfection and dialogue space' [Wamsler et al. 2020]).

Areas for further research on inner transformation

Finally, our results and the discussions during the conference sessions and amongst the inner transformations group members brought forward several research areas, which need to be developed further to critically explore the role of inner transformation for sustainability:

1. Conceptual and theoretical understanding of inner transformation and how its various elements relate to different theories and practices of change, including sustainability transitions and transformations research (theoretical point of view);
2. Linkages between the identified dimensions of inner transformation and transdisciplinarity, action-oriented, transformative or other methods and approaches to support sustainability;
3. Place based empirical studies to learn from the diversity of existing approaches and possibilities of inner transformation for collective and systems change;
4. Domain- and culture-specific empirical studies to learn from the diversity of aspects and contents of transformation to honour the myriad of relevant dimensions of 'inner' that can and should be studied at both individual and cultural/collective levels;
5. Cross-cultural studies to understand the 'bigger picture' in terms of impact, commonalities and differences (e.g., socio-political, historical, philosophical-ethical, religious circumstances);
6. Identification of the inner capacities, qualities or skills that can foster certain elements of the inner transformation–sustainability nexus and the methods and tools that can best support them;
7. The role of governance (variety of players, stakeholders at different levels and in different domains) regarding the development and impact of certain methods, approaches and tools;
8. Relationship to policy and project planning in an intentional, purposeful approach of mainstreaming or integrating inner transformation into sustainability and across all sectors, and how to address related barriers, constraints and conflicts that may arise (future pathways).

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