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**Developing Sustainability-Oriented Innovation Cultures:
A Cultivation Approach**

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Abstract

This cumulative thesis introduces cultivation as a novel theoretical lens to analyse the development of sustainability-oriented innovation (SOI) cultures. Moving beyond conventional approaches that focus on micro (individual), meso (group), and macro (organisational) levels of analysis, cultivation offers a holistic perspective on the dynamic interplay between individual subjectivity, social interactions, and organisational artefacts. The thesis draws on three studies: an ethnographic case study exploring tensions between values and values-action gaps in SOI cultures, and two studies combining systematic literature reviews with expert interviews to examine values-based practices and the role of gamification in supporting SOI culture development. Four theoretical propositions highlight the central role of artefacts in reconciling tensions between values and translating sustainability values into innovation practices. In line with the four theoretical propositions, the thesis offers practical implications for the introduction of specific gamification formats as artefacts that facilitate the cultivation of SOI.

1. Introduction

The development of sustainability-oriented innovation (SOI) cultures remains a significant challenge for organisations worldwide. While sustainability has become a strategic priority across sectors, the integration of sustainability values (i.e. values of intergenerational and intragenerational justice and equity of opportunities; Breuer & Ivanov, forthcoming) into innovation practices and organisational culture often lags behind (Bocken & Geradts, 2020; Guldmann & Huulgaard, 2020). For example, a recent study reports that of 1,041 global companies which set greenhouse gas emission reduction targets for the year 2020, 9 percent formally failed their goals and 31 percent quietly abandoned them (Jiang et al., 2025). This discrepancy indicates that formal commitments alone are insufficient unless supported by a holistic cultural transformation that translates sustainability values and strategies into daily practice (Mura et al., 2024).

Alignment between corporate strategy, innovation strategy, and a culture that supports SOI is key for translating sustainability values into SOI practices, and ultimately positive impact on sustainable development. However, alignment between strategy and culture does not imply the absence of tensions between their underlying values. Rather, tensions between competing values (such as ‘private values’ related to the interests of shareholders and ‘shared values’ related to the interests of society and the planet; Wannags & Gold, 2020, p. 4) are inherent in both organisational cultures (Cameron & Quinn, 2011) and sustainability strategies (van Bommel, 2018). Such tensions are not only trade-offs associated with win-lose outcomes but also act as sources of synergies, or win-win outcomes, where contradictory values are reconciled and enacted in consistent practices and organisational performance. Organisational paradox theory

(Smith & Lewis, 2011) underscores the necessity of acknowledging, engaging with, and reconciling these tensions to drive organisational transformation and growth. However, the reconciliation of competing values or divergent stakeholder interpretations of sustainability values remains a major challenge for organisations that undergo a cultural transformation towards SOI.

The case of a German technical inspection company (hereafter TIC), which in 2018 formally adopted sustainability as a core value and strategic priority, exemplifies the persistent challenges of transforming organisational culture towards SOI (Breuer & Ivanov 2024). The TIC's employees report on their first-hand experiences of these challenges. For instance, the corporate responsibility manager, strives to establish a shared understanding of the sustainability concept rooted in frameworks such as the United Nations' Sustainable Development Goals (SDG) or system value creation (Baue, 2021). However, his colleagues express divergent opinions and interpretations of sustainability, some reducing to environmental concerns, others framing it as a balance between environmental, social, and economic goals, while still others arguing that sustainability commitments are covered by the already established organisational values. Meanwhile, Theo, the group's head of innovation, tries to mediate conflicts between subsidiaries on how to share resource investments and project ownership in the pursuit collaborative SOI. At the same time, a corporate venturing specialist, avoids using the official tools and documents designed to assess the sustainability impact of innovation projects. He argues that these organisational artefacts inhibit his pursuit of radical innovations and opts instead for ad hoc methods that better align with his entrepreneurial mindset. These individual stories illustrate how challenges to SOI culture development are provoked by divergent individual interpretations and inconsistent interactions between social actors and organisational artefacts. They reveal how an organisation committed to sustainability values still faces challenges in aligning values, strategy, and innovation practices in a cohesive SOI culture.

Most models of organisational culture assume different layers of culture, for instance the distinction between underlying assumptions, espoused values, and artefacts in Schein's model (Schein, 2010), or the anthropological focus on ideas, practices, and artefacts (Jordan, 2012). These models suggest that misalignments between cultural layers impede cultural development and stress the need to surface and challenge implicit assumptions and values and to align values, practices, and artefacts.

Although research has called for holistic understanding of sustainability culture and its development across all cultural layers (Ketprapakorn & Kantabutra, 2022; Gadomska-Lila, 2024), values, practices, and artefacts are often studied independent from one another, through distinct theoretical lenses and within a specific level of organisational structure: individual (micro), group (meso), or organisational (macro) (see Jordan, 2012, p. 53f). On the micro-level, psychological approaches provide valuable insights on individual subjective interpretations and behaviours. On the meso-level, psychological

and sociological approaches provide insights on group dynamics and the development of subcultures. On the macro-level sociological and economic approaches guide the development of stakeholder engagement and organisational artefacts. However, when taken in isolation these theoretical approaches provide a reductionist perspective on SOI cultures and inform only isolated interventions for cultural transformation. As a result, the dynamic interplay between individual subjectivity, social interactions, and artefacts, which mediates the translation of sustainability values into SOI practices, remains underexplored and underutilised. There is a pressing need for integrative theoretical models that bridge these cultural layers and structural levels to better capture how organisational cultures develop in support of SOI.

The concept of cultivation (Simmel, 1997; Bueno, 2018) offers a compelling lens for understanding how SOI cultures can be developed. The concept of cultivation highlights a deliberate process of cultural development that takes place through the mutually transformative interactions between an individual's subjectivity, social partners, and artefacts. By engaging individual cultural members in co-creating cultural change through ongoing exchanges with their social context and artefacts, cultivation processes bridge the gap across the fundamental cultural layers of values, practices, and artefacts. Thus, they enable holistic and profound cultural change that goes beyond isolated interventions, such as the adoption of unrelated sustainability values, practices, or artefacts. However, to date, cultivation theory has not been applied in the context developing SOI cultures.

Here, I explore how cultivation processes mediate the development of SOI cultures, focusing on the fundamental cultural layers of values and practices. I explore the role of cultivation processes in relation to cultural values through the lens of tensions between values, which either lead to trade-offs or synergies, thus impeding or fostering SOI culture development, respectively. In addition, I explore how cultivation processes influence the translation of values into SOI practices. Thus, I address the following research question:

RQ: How do cultivation processes influence the development of sustainability-oriented innovation cultures by mediating the outcomes of tensions between values and the translation of values into practice?

The remainder of this article is structured as follows. First, I review the conceptual foundations of SOI management, organisational culture, and extant approaches to developing SOI cultures (section 2). In section 3, I outline Simmel's (1997) cultivation concept and its relevance for developing SOI cultures. In Section 4, I outline the methodologies employed in the three constituent studies of this cumulative thesis (Breuer et al., 2023; Breuer & Ivanov, 2024; Ivanov, 2025), highlighting how each contributes to understanding different aspects of SOI culture development. I also explain how I reapplied analytical procedures from these studies to further examine the

role of cultivation processes in developing SOI cultures. In section 5, I analyse the results of the three studies from the perspective of the cultivation concept. First, I present how cultivation processes influence values-action gaps and trade-offs between values in the development of a SOI culture in a TIC. Second, I provide examples of how cultivation processes facilitate the translation of values into SOI practices in different company cases derived from a literature analysis and expert interviews. Third, I explore how different gamification formats facilitate cultivation processes for reconciling specific tensions between values and bridging values-action gaps that impede the development of SOI cultures. In section 6, I discuss the analysis of the three studies against the background of previous research and provide four theoretical propositions on how cultivation influences the outcomes of tensions between values and the translation of values into consistent SOI practices. Furthermore, I suggest practical implications on how gamification can support cultivation processes in the development of SOI cultures. Section 7 concludes with an overview of the findings, research limitations, and future research directions.

2. Conceptual foundations and current approaches to developing SOI cultures

Defining sustainability-oriented innovation and its management

In order to analyse the development of SOI cultures, it is essential to clarify the conceptual landscape surrounding innovation in the context of sustainability management. The literature features a range of overlapping yet distinct terms—responsible innovation, sustainable innovation, and sustainability-oriented innovation—which underscore different theoretical and managerial implications. Specifying the distinct definitions and limitations of these terms is essential for establishing the conceptual foundation for this thesis.

Responsible innovation has been conceptualised in various ways by policymakers and scientists, as highlighted in a literature review by Burget and colleagues (2017). The authors conclude that ‘responsible Innovation is essentially an attempt to govern research and innovation in order to include all the stakeholders and the public in the early stages of research and development. The inclusion of different actors and the public is, in turn, meant to increase the possibilities to anticipate and discern how research and innovation can or may benefit society as well as prevent any negative consequences from happening’ (Burget et al., 2017, p. 15). A key limitation of the responsible innovation concept is that it stems from discourses on the conduct of responsible science and technological development, where the distinctions between research, development, policymaking, and business development are blurred or ignored (Lubberink et al., 2017).

Sustainable innovation has been defined as ‘a process where sustainability considerations (environmental, social, and economic) are integrated into company systems from idea generation through to research and development (R&D) and commercialisation. This applies to products, services, and technologies, as well as new business and organisation models’ (Charter & Clark, 2007, p. 9). Sustainability-oriented innovation (SOI) is widely understood to involve ‘intentional changes to an organisation’s philosophy and values, as well as to its products, processes, or practices, to serve the specific purpose of creating and realising social and environmental value in addition to economic returns’ (Adams, 2016, p. 180). The concept of SOI thus emphasises sustainability not as an end point ‘but rather a (normative) direction which is linked to (directional) risks’ (Hansen & Grosse-Dunker, 2013, p. 2408). Although sustainable innovation and SOI are often used interchangeably, in this thesis I consistently use the term SOI as it highlights a process of ongoing organisational and in that sense cultural transformation.

Within the broader context of sustainability management, two distinct approaches to SOI management can be identified: the business case *of* sustainability and the business case *for* sustainability (see Schaltegger & Wagner; 2017). The ‘business case *of* sustainability’ entails the mitigation of risks from regulatory changes, reputational damage, or physical threats due to climate change, as well as the realisation of business opportunities, such as long-term profitability, social acceptance, or a motivated workforce. This business case logic, however, reduces sustainability to an instrumental lever and does not contradict certain forms of irresponsible behaviour (Hahn, 2022).

Following the ‘business case *of* sustainability’ logic many companies claim high achievements in contributing to sustainable development, accounting for them through reporting on triple bottom line (TBL) or integrated environmental, social, and governance (ESG) performance. However, the use of TBL or ESG criteria for measuring corporate sustainability performance has faced severe criticism (Srivastava et al., 2022; van Bommel et al., 2023). These criteria assume an outside-in, retrospective, and de-contextualised perspective, emphasising environmental impact on companies rather than their own inside-out impact and use historical benchmarks rather than references to environmental and social caring capacities. Missing the contexts of safe and just earth system boundaries (Rockström et al., 2023) and fair allocation of resources, such approaches to sustainability management remain detached from the values of intragenerational and intergenerational equity that define sustainable development (Brundtland, 1987). An alternative, system value approach (Baue, 2021), suggests aligning economic, social, and environmental value creation to meet human needs within the planetary boundaries. Following this approach, companies embrace an extended concept of sustainable value creation and a stakeholder-oriented business case *for* sustainability (Schaltegger & Wagner; 2017; Schaltegger et al., 2019; Schaltegger et al., 2023).

Defining organisational cultures

A supportive innovation culture is recognised as a fundamental precondition for sustainable transformation (Quinn and Dalton, 2009; Linnenluecke and Griffiths, 2010) and SOI performance (Abril et al, 2025; Globocnik et al., 2020; Islam et al., 2019). For instance, while investments in research and development (R&D) do not necessarily improve financial performance of companies, their innovation strategy, its alignment with corporate strategy, and a supportive SOI culture has shown to be key to success (Jaruzelski et al., 2011). Culture can be and often is more influential than structural or technical factors in enabling or hindering innovation efforts. For instance, a literature review on the factors of innovation success by Smith and colleagues (2008) identifies culture as the most essential factor with overarching significance and direct impact on all other factors involved in innovation management.

Despite the lack of consensus on a precise definition of organisational culture, there is broad agreement that it ‘refers to something that is holistic, historically determined (by founders or leaders), related to things that anthropologists study (like rituals and symbols), socially constructed (created and preserved by the group of people who together form the organisation)’ (Akpa et al., 2021). Furthermore, most models of organisational culture assume different layers of culture. For instance, Schein (2010) distinguishes three fundamental layers: basic assumptions (the unconscious beliefs and perceptions of employees), espoused values (stated norms and strategies), and artefacts (the visible and tangible elements of culture). Other models have differentiated the layer of artefacts in Schein’s model, distinguishing between material artefacts as human-made objects that bear cultural significance and behaviours or practices as organised forms of activity (e.g. Dauber et al., Homburg & Pflesser, 2000; Schatzki, 2002). The distinction between material artefacts and practices are also emphasised in social practice theories, which highlight the role of practices as a fundamental factor in the formation of cultures (e.g. Bourdieu, 1977; Schatzki, 2002).

Below I briefly review previous research that highlights the role of values, practices, and artefacts as fundamental layers of organisational cultures, along with related concepts and theoretical frameworks that provide a deeper understanding of how these layers impact the development of SOI cultures.

Values and tensions between values

Research highlights the foundational role of values in shaping culture. Schein (2015, p. 9) states that ‘[d]efining values and norms, turning these into shared rules for behavior, is de facto creating and managing culture’. Values can be defined as (1) beliefs linked to emotions, which (2) refer to desirable goals that motivate action, (3) transcend specific actions and situations, (4) serve as standards for evaluating actions, policies, people, and events, 5) form a relatively enduring hierarchical system ordered by importance, and (6) guide action based on their relevant importance (Schwarz, 2006). The integration of

values into a hierarchical system ordered by importance or a 'system of priorities' turns them into criteria for what is important within an organisational culture. Furthermore, values provide companies with a normative orientation that exceeds economic interests and has the potential of stimulating the development of sustainability-oriented products, services, and business models.

While forming systems of priorities, values often reflect contradictory perspectives on how to deal with challenges, which ambitions or goals to pursue, and which criteria to apply to drive innovation. In this way they provoke tensions, which can be defined as the presence of 'two phenomena in a dynamic relationship that involve both competition and complementarity' (Epstein et al., 2014, p. 3). Tensions can impede the development of SOI cultures when they provoke trade-offs or win-lose outcomes (Wannags & Gold, 2020). However, when reconciled, the same tensions provoke complementarity or synergies, leading to a win-win outcome (Haffar & Searcy, 2017; van Bommel, 2018; Wannags & Gold, 2020).

Paradoxical tensions have been classified as related to four core activities of (SOI) management: performing, belonging, organising, and learning (Smith & Lewis, 2011). An example of performing tensions are the trade-offs between values of environmental commitment and competitiveness in the development of circular products, which can be reconciled through various strategies, such as the concurrent certification of product quality and environmental performance from an independent third party (Daddi et al., 2019). An example, of belonging tensions are the trade-offs between private and collective values in the management of intellectual property rights in SOI, that is between restricting or granting access to relevant knowledge. These tensions can be reconciled through strategies, such as the introduction of new terms of licensing conditions that accommodate both private and collective values (Capponi, 2025). Examples of organising tensions are the trade-offs between values of control and flexibility or competition and collaboration in the management of SOI processes, which can be reconciled through practices of ambidextrous leadership (Lyu et al., 2022). Finally, examples of learning tensions are the trade-offs that occur between established organisational values and newly introduced values during sustainability transformations. These tensions can be reconciled by framing newly introduced sustainability values in a language that aligns with established organisational or departmental values (Bertels et al., 2010).

Practices and values-action gaps

Social practice theories, such as Pierre Bourdieu's Practice Theory (Bourdieu, 1977), view culture through the lens of practices. Bourdieu (1977) defines practices the observable outcomes of the interaction between different forms of capital (economic, social, cultural, symbolic), habitus (a collective system of dispositions such as

conventions, rules, and values), and the field (a structured social space in which people enact their dispositions).

Bourdieu's Practice Theory has been used in the context of SOI culture research to explain discrepancies between sustainability values upheld by employees and their contradictory SOI practices in the fashion industry (Andersen, 2017). Such discrepancies can be denoted as 'values-action gaps' (Breuer & Ivanov, 2024), which is an established term in studies on sustainable consumer behaviour, referring to discrepancies between consumer values and actions (Barr, 2005). Gaps between proclaimed values and practices are also studied in the context of corporate sustainability under terms such as claim deceptiveness and greenwashing (de Freitas Netto et al., 2020).

Artefacts

Previous research also highlights the material aspects of culture, that is, artefacts, such as tools, media, reports, documents, templates, narratives, physical environments, and other human-made objects that bear cultural significance. These material cultural elements are the subject of study within pragmatic approaches to cultural analysis (Csikszentmihalyi & Rochberg-Halton, 2012) and Georg Simmel's cultural model (Simmel, 1997). Artefacts reflect written or unwritten values and can facilitate or limit their translation into practices. For example, a company that values internal collaboration may adopt practices that promote interpersonal communication, exchange of ideas, knowledge, and emotions among employees. An artefact that mediates this practice would be a collaborative workspace. If the workspace is suitably equipped it facilitates this collaboration, it isn't it limits the potential of collaboration as a cultural practice.

Individual, group and organisational levels of analysing organisational cultures

Recent publications have underscored the need for more holistic understanding of sustainability culture and its transformation, one that encompasses all cultural layers, such as values, practices, and artefacts (Ketprapakorn & Kantabutra, 2022; Gadowska-Lila, 2024). Although these cultural layers are present throughout all levels of organisational structure, traditional approaches study organisational cultures within the boundaries of specific structural levels, that is within micro (individual), meso (group), or macro (organisational) levels (see Jordan, 2012, p. 53f).

At the individual or micro level, approaches for cultural analysis primarily draw from psychological theory. They focus on the subjective views of culture as perceived by the individual cultural members and expressed through their individual personalities, values, mindsets, motivations, and behaviours. Such approaches are helpful in analysing the development of SOI cultures in that they reveal misalignments between

established sustainability values, guidelines, and standards on the one side and the employees' individual subjectivity and behaviours on the other. However, psychological approaches to studying culture have been critiqued as providing a reductionist perspective (Fuchs, 1989; Ellinas et al. 2017).

Analysing culture solely through the lens of its members' subjectivity and behaviours does not account for the impact of artefacts and social interactions on cultural development. For example, the adoption of organisational values communicated through official communication channels (i.e. artefacts) is mediated through social interactions. As a result of these interactions, the adoption of values can follow a number of possible trajectories, including complete agreement (i.e. every individual shares the exact same values), complete disagreement (i.e. every individual holds different values) and various meta-states (i.e. clusters of agreement of various size) (Ellinas et al. 2017). 'In other words, even though there is an envisioned culture at which an organization abides to, achieving coherence at lower aggregation levels (e.g. individuals) is increasingly challenging due to its emergent nature' (Ellinas et al. 2017, p. 3).

At the group or meso level, cultural analysis approaches focus on social interactions, group formation and structure, shared values and norms, and intra- or inter-group conflicts. These approaches can provide insights into the 'mechanisms through which individuals fit into larger structures and through which social structures shape individuals' (Fine, 2012, p. 159). However, if the analysis neglects the micro and macro levels, it will overlook individual subjectivity and agency as well as the broader institutional forces that shape group dynamics (Fine, 2012). For instance, if we look only at the values and norms of an organisational subculture (e.g. of an innovation department), we might miss how a new sustainability regulation (a macro influence) or an individual's change resistance (micro influence) are shaping cultural transformation towards SOI.

On the organisational or macro level, approaches to cultural analysis primarily draw from economic and sociological theories and frameworks. We can observe a strong emphasis on the development of culture on the organisational level in the current discourses on SOI and sustainability management. First, approaches based on stakeholder theory (Ayuso et al., 2006; Freeman et al., 2010) and responsible innovation (Boenink & Kudina, 2020; Stilgoe, et al., 2013) recognise the need for alignment of SOIs with the values of a broad range of stakeholders beyond the internal cultural members. These approaches demand consideration of societal and stakeholder values throughout each stage of the innovation process (Stilgoe, et al., 2013). Responsible innovation practices of reflexivity also encourage individual organisational members to 'critically think about their own actions and responsibilities, values and motivations, knowledge and perceived realities, and how each of these have an effect on the management of the innovation process' (Lubberink et al., 2017, p. 12), thus acknowledging the need for

alignment between the individual, group, and organisational levels of the organization. However, while stakeholder engagement across organisational levels is essential, it is not sufficient for a comprehensive approach to SOI culture development if the material aspects of culture are overlooked. Material artefacts play a critical role in shaping individual subjectivity and structuring social interactions, and therefore must be considered in any holistic account of cultural transformation.

Prominent approaches to SOI management that focus on the organisational level and on organisational artefacts, draw from economic theories and frameworks, such as TBL and ESG. They emphasise the role of artefacts such as sustainability reports, performance KPIs, and business intelligence systems in facilitating SOI. However, by overemphasising artefacts these approaches may override the employees' subjective interpretations of sustainability values and the social interactions between stakeholders. For instance, sustainability reports, as one essential artefact within SOI cultures, have been criticised for dissolving values-related discussions into a managerial language dealing with risks, opportunities, and costs and marginalising thinking of and discussion on what being a sustainable firm means and what dilemmas accompany the journey toward sustainability transformation (van Bommel et al., 2023). This is an example of how overemphasising isolated organisational artefacts and associated practices as the means for managing SOI leads to the objectification of culture (or the tragedy of culture, to use Georg Simmel's terminology; Simmel, 1997). In this objectification, artefacts lose their real-world reference and constrain cultural development only within the limits of the norms and criteria that they represent.

The above discussion highlights a significant fragmentation in current approaches to developing SOI cultures. Although previous research underscores the need for more holistic understanding of sustainability culture and its transformation prevalent approaches fail to capture the systemic interplay between individual subjectivity, group dynamics, and organisational artefacts. This fragmented view results in partial understandings of how SOI cultures emerge, develop, and can be effectively managed over time. There is, therefore, a clear research gap concerning integrative frameworks that account for the multi-layered and dynamic nature of organisational culture. Specifically, there is a need for conceptual approaches that trace the interactions and mutual shaping of values, practices, and artefacts across individual, group, and organisational levels. Such frameworks would allow researchers and practitioners to better understand and manage the alignment between sustainability values and innovation practices that lead to long-term, positive impacts on sustainable development.

3. Cultivation theory and its relevance for developing SOI cultures

As a scientific concept, the term cultivation was first used by Georg Simmel in his model of culture outlined in the essay 'On the Concept and the Tragedy of Culture' published in

1911 (Simmel, 1997). In Simmel's writings the cultivation concept describes the refinement and development of society that takes place through the dynamic interplay between material culture represented by artefacts of human creativity (i.e. 'objective culture') and individual subjectivity (i.e. 'subjective culture') that unfolds through social interactions. Psychological research has provided an alternative definition of cultivation as 'interpretation and self-control motivated by goals rather than by origins' (Csikszentmihalyi & Rochberg-Halton, 2012, p. 4). According to this definition, cultivation results from subjective interpretations of cultural values and goals and the deliberate focus of attention and efforts towards realising these values and goals (Csikszentmihalyi & Rochberg-Halton, 2012). Integrating these two perspectives, I define cultivation as a deliberate process of cultural development that takes place through the mutually transformative interactions between an individual's subjectivity, social partners, and artefacts.

Simmel's cultural model sees social interactions as integral to cultural development. Seeing individuals as embedded in various groups and networks, each with its own set of expectations and norms, Simmel distinguishes between dyadic and triadic relations (Simmel, 1986). Dyadic relations between two individuals enable confidentiality and support mutual trust but are inherently unstable as they dissolve if one party withdraws. In triadic relations the presence of a third actor transforms the interaction, giving rise to more complex, long-lasting, and objectified social forms (*objektive, überindividuelle Gebilde*; Simmel, 1986).

Simmel's concept of cultivation suggests that cultural development takes place not only through the interaction of individuals with social partners but also through the individuals' interactions with artefacts and the meanings that they attach to them. Vice versa, the specific characteristics of artefacts provide cultural media that engender subjective possibilities and objective opportunities for the formation of the self and the development of social systems (Breuer, 2001). This means that the development of artefacts as 'purposively created objects, settings, and other components of the culturally structured environment' (Fuhrer, 2004, p. 119) can facilitate desirable cultivation processes. In Simmel's words 'by cultivating things, i.e. increasing their value beyond what their natural mechanism provides us with, we are cultivating ourselves: it is the same process of value enhancement that starts from us and returns to us' (Simmel 1977, p. 503 ; translated from the German edition).

To illustrate his concept of cultivation, Simmel (1997 [1908]) uses an analogy with a pear tree. A wild pear tree naturally produces small, sour, woody pears. Cultivation enhances the tree's natural tendency to produce better quality pears according to certain normative or societal standards. In contrast, making a sailboat mast from the pear tree wood is not cultivation, as the tree has no natural propensity to become a mast.

In accordance with this analogy, Simmel describes two forces at work in the unfolding of cultivation: a constructive one, where individual growth is enabled by the material artefacts, and a destructive one where individual growth obeys the logic of the material culture and is limited by its artefacts (Lambropoulos, 2001). On the one hand, human subjectivity can only cultivate itself by in some way shaping the material culture, i.e. by somehow expressing itself in materiality. On the other hand, the more the material culture grows out of proportion to what the inherent potentials of individuals allow (i.e. their 'natural structural conditions or drives'; Simmel, 1997 [1908]: p. 41), the more the material artefacts become remote and inaccessible, and the individuals' participation in cultural development ambiguous and fragmentary (Arditi, 1996). In the resulting 'tragedy of culture', the growing complexity and diversity of artefacts surpasses the individuals' capacity to understand and meaningfully interact with them. Thus, the material culture appears to 'acquire the extent and coherence of a realm with its own kind of independent existence' (Simmel, 1997 [1909], p. 101).

Simmel's concept of the tragedy of culture is reflected in the growing development of quantitative and qualitative cultural constructs which submit individuals to the logics of a hypertrophied material culture, rendering the 'constitution of the modern economy as a realm mechanically estranged from life' (Bueno, 2018, p. 128). It is also reflected in the growing misalignment between technological demands and the skills of employees and other stakeholders, which increases the risks of anticipating unintended consequences and negative impacts of innovation (Groß, 2005).

We can exemplify the tragedy of culture in the context of SOI through the cases of companies where SOI culture development is managed solely through selected artefacts used by a limited and specialised subsection of the workforce. For instance, organisations that introduce accountable narratives of sustainability, highlight compliance with artefacts such as performance metrics and reporting and delegate the use of these artefacts to a specialised sustainability department. In contrast, organisations that introduce aspirational narratives specify notions of sustainability in terms of ambitious objectives for sustainable innovation. Research suggests that the later type of organisations is more likely to support the adoption of innovation-supportive values, such as risk-taking, experimentation, and adaptability and the establishment of corresponding innovation practices (Mead et al., 2022). Of course, employee specialisation is necessary, and cultivation theory acknowledges the need for artefacts to be tailored to specific roles in an organisation. However, cultivation also calls for the introduction of artefacts that communicate shared values and bridge the gaps between contradictory interpretations and applications of values and practices by different individuals or groups in an organisation, e.g. applying a business case of sustainability vs a business case *for* sustainability logic.

In summary, cultivation provides an alternative to one-dimensional approaches to SOI culture development, which focus exclusively on individual employees' subjectivity and

behaviours (e.g. Piwowar-Sulej et al., 2024), stakeholder engagement (e.g. Watson, 2018), or reliance on artefacts such as tools, indicators, and templates (e.g. Guimarães, et al., 2024). Cultivation theory integrates these approaches by explaining how values-based, dynamic, and mutually transformative interactions between an individual's subjectivity, social partners, and artefacts mediates cultural development. Thus, a cultivation approach to SOI culture development emphasises the need for shared values to efficiently collaborate towards common goals and the need for collaborative sensemaking and learning in the interaction with artefacts, as opposed to the use of artefacts within isolated organisational structures and practices.

4. Methodology

In this section, I briefly outline the methodologies employed in the three constituent papers of this cumulative thesis, highlighting how each contributes to understanding different aspects of SOI culture development. While the first study (Breuer & Ivanov, 2024) applies an empirical approach to elicit ethnographic insights from a single case, the other two studies combine systematic literature reviews with expert interviews to collect and aggregate knowledge on values-based practices in SOI cultures (Ivanov, 2025) and on the role of gamification formats to facilitate the development of values-based and SOI cultures (Breuer et al., 2023). Below I explain how I reapplied the analytical procedures from these studies to examine and generate new insights on how cultivation processes mediate the development of SOI cultures.

Cultural Tensions and Values-Action Gaps in Sustainability-Oriented Innovation: An Ethnographic Inquiry (Breuer & Ivanov, 2024)

In this paper we addressed the question '*How do cultural tensions and values-action gaps impede the translation of sustainability-oriented innovation strategies into everyday practice?*'. We adopted a case study and a streamlined ethnographic methodology to address the research question with empirical evidence from a German TIC, which had adopted new corporate values of 'sustainability' and 'innovation' in 2018 and was navigating a cultural transformation towards SOI. Through field interviews, interactive exercises, and participant observation, we collected and analysed data from nine respondents. The respondents' names were replaced with pseudonyms to ensure their anonymity. Through collaborative analysis, we coded the collected data into thematic categories and clustered it into recurring patterns. Then we interpreted the patterns to elicit insights that describe fundamental characteristics of the participants' emotions and activities from their point of view, provide explanations for why they act as they do, and articulate tensions between desires and values on the one hand and opportunities for fulfilment on the other. Ethnographic writing was used to present six overarching insights with thick descriptions (Geertz, 1973, p. 6), reflecting data from the field.

We selected ethnography as the methodology for this study because it had already been effectively used to understand values, cultural tensions, and values-action gaps in the context of SOI (Andersen, 2017; Halme et al., 2016; Langendahl et al., 2016).

Ethnographic research allows the exploration of symbolic forms, experiences, values and layers of cultural meaning that are often not obvious to the participants. It thus provides insights into otherwise implicit values or contradictory behaviours, such as organisational tensions and values-action gaps.

Furthermore, as an interpretative approach, ethnography provides deep contextual insights on the management of values in the context of SOI. This is because it studies values ‘in action’ and treats them as ‘lived realities’ (Boenink & Kudina, 2020, p. 452), intertwined with organisational practices and artefacts. In contrast, substantive and procedural to responsible innovation treat values as ‘ready-made entities’ that can be found in policy agreements or self-reports (Boenink & Kudina, 2020, p. 454). This allows ethnography to elicit findings on how individuals implement and sometimes contradict sustainability values in their everyday practices.

The availability of extensive empirical data from this study allowed me to reiterate its analysis while applying the theoretical perspective of Simmel’s (1997) cultivation concept. To address the research question of the thesis, I collected and structured the coded data in line with the three components of cultivation processes: subjective interpretations of individual cultural members, social interactions, and interactions with artefacts. Then I looked for patterns in the coded thematic categories and their clusters (i.e. recurring patterns) to identify how each of them explained the six identified insights on trade-off tensions between values and values-action gaps. For each insight, I identified at least one triad of subjective interpretations of the informants, social interactions, and interactions with artefacts that influenced the trade-offs between values and the values-action gaps.

Values-based Barriers and Good practices in Sustainability-oriented Innovation Management (Ivanov, 2025)

In this paper, I conducted systematic (Tranfield et al., 2003), integrative (Souza et al., 2010), and backward snowballing (Wohlin, 2014) literature analyses of 89 papers together with 17 expert interviews (Gläser & Laudel, 2009) to address three research questions:

1. *What recurrent barriers impede the management of stakeholder values for SOI?*
2. *How can the management of values support the implementation of organisational practices for SOI?*
3. *What are the conceptual foundations for understanding the role of values in implementing good practices for and mitigating barriers to SOI?*

A key result of this study was the classification of nine categories of values-based practices for SOI. Each category was associated with a particular dimension of responsible innovation practices, a particular function of values according to the values-based innovation management framework (integrative, generative, directive; see Breuer & Lüdeke-Freund, 2017), and illustrative cases found in the data. Based on this classification the study proposed a conceptual model, describing how different value functions support the implementation of SOI practices. The integrative function aligns diverse stakeholders around shared or overarching values and facilitate their translation into consistent SOI strategies and practices. The generative function enables the use of values as heuristics that inform SOI practices such as ideation, specification of new business opportunities, anticipation of threats, and adjustment of innovation efforts. The directive function enables practices of translating stakeholder values into statements and orientations towards ‘desirable end-states’ (Rokeach, 1979, p. 49), thus alleviating uncertainty and facilitating collaboration.

To address the research question posed in this cumulative thesis, I focused on the illustrative cases representing the nine categories of values-based practices identified in the data. I systematically revisited the papers detailing the nine cases, coding and extracting relevant findings concerning the subjective interpretations of stakeholders, their social interactions, and their engagements with artefacts. By thus narrowing the focus to specific cases, I was able to pinpoint concrete examples of how cultivation processes mediate the translation of values into innovation practices.

Management Guidelines to Address Cultural Challenges and Facilitate Values-based Innovation Through Gamification (Breuer et al., 2023)

This study also used the systematic literature review (Tranfield et al., 2003) and expert interview methodologies. We coded and aggregated data from 26 papers and 26 expert interviews (Gläser & Laudel, 2009) to answer the research questions:

1. *What are the core insights and research gaps in the academic literature on gamification dealing with cultural challenges to successfully implementing values-based innovation management?*
2. *How can gamification help to overcome cultural challenges to facilitating values-based innovation management? What actionable management guidelines are suitable for the design and implementation of gamified methods addressing cultural challenges and facilitating values-based innovation management?*

In this paper, we highlighted the role of values in cultural transformations and the relevance of a values-based approach to SOI management. We focused our research on gamification or ‘the use of game design elements in non-game contexts’ (Deterding et al., 2011) as an increasingly adopted and effective approach to drive cultural transformation. For instance, gamification facilitates corporate training (Ruhi, 2015), knowledge exchange (Ahmed & Sutton, 2017), change management (Kumar &

Raghavendran, 2015) and innovation management (e.g., Breuer et al. 2022; Gimenez-Fernandez et al., 2021; Patrício et al., 2018). In the context of SOI, gamification provides a safe space for experimenting with new interaction architectures to tackle grand challenges (Breuer et al., 2022). Gamification formats that become integrated into the day-to-day business processes turn into cultural artefacts, while gamification components—such as formalised social interaction, non-monetary rewards, and storytelling—provide levers for fostering innovation-supportive cultures and the communication of values (Jassawalla & Sashittal, 2002; Hogan & Coote, 2014). By design most gamification formats alter the subjective interpretations and social interactions of cultural members that engage with them. Gamification, thus, presents a viable approach to facilitate cultivation processes that support the development of SOI cultures.

A key result of this study was the proposition of 11 design and implementation guidelines for gamification to facilitate values-based innovation: on the normative level, in interorganizational networks or in organizational identity; on the strategic level, in business model innovation and strategic renewal; and, on the operational level, in service, product, and process innovations. In addition, we classified 8 gamification format types, which are applied to address different cultural challenges on the normative, strategic, and operational levels of innovation management.

To address the research question posed in this cumulative thesis, I focused on these 8 gamification format types and reiterated the analysis of the articles presenting them. First, I explored how these gamification formats act as artefacts within cultivation processes in relation to the subjective interpretations of their participants and the social interactions that they facilitate. Second, I interpreted the challenges addressed by the 8 gamification format types as either trade-off tensions between values or values-action gaps and labelled them accordingly. Three challenges did not fit either one of these categories and were excluded from my analysis together with their associated gamification format types (business modelling, crowdsourcing platforms, and social collaboration platforms). Third, I explored how gamification participates in cultivation processes that help to address the identified tensions between values and values-action gaps and how this can support the development of SOI cultures.

5. Analysis

The following presents my analysis of data from the three studies of the cumulative thesis to address its research question. A detailed summary of the data informing this analysis is presented in tables 1, 2, and 3 in the Appendix.

Role of cultivation in influencing tensions between values and values-action gaps in the development of SOI cultures

In this section I analyse the six insights on tensions between values and values-action gaps from the case study of TIC (Breuer & Ivanov, 2024) through the theoretical lens of cultivation (table 1).

1. **Sustainability literacy:** As a result of an uneven distribution of sustainability literacy across the TIC's organisational actors the official value and strategy of sustainability are not translated into consistent SOI practices. Social interactions across hierarchical levels and functions are lacking two-way communication on sustainability values, concepts, and SOI ideas. Instead of fostering shared understanding of sustainability, these social interactions engender the values-action gap. On the level of subjective interpretations, Holger, head of auditing, highlights that different departments still do not understand how the environmental, social, and economic aspects of sustainability are interrelated, which has led to missed opportunities for cross-functional collaboration. In parallel, artefacts such as inconsistent corporate value statements (different sets of values are communicated on different company websites) further impede the translation of sustainability values into consistent sustainability literacy and practices across the organisation.
2. **Vertical integration:** This insight reflects a gap between the organisational sustainability values and the often-desynchronised efforts of executive and operational managers to advance SOI. Some operational managers work with little or no regard to official values, while others, although highly engaged with issues related to these values, interpret them autonomously with respect to their local context. In addition, their independent initiatives to improve sustainability from the bottom up, although encouraged by the official values and statements from senior management, do not always receive appropriate recognition and feedback. For instance, Alex (service station manager) is convinced that sustainability improvements depend on his own initiatives. However, he struggled with the lack of a clearly defined idea management process (an artefact) and management support to implement his ideas, such as offering a solar charging station for customers or introducing networked printing to enhance process efficiency at his station.
3. **Horizontal integration:** This insight reflects tensions between different interpretations of the corporate values and associated strategies by the TIC's top executives. While the group's managers prioritise sustainability values and the overall long-term goals of the company, the heads of subsidiaries prioritise their own values and short-term goals. These tensions hamper multilateral collaboration and knowledge exchange to address sustainability challenges and

drive SOI. During board meetings and other social interactions, stakeholders from the subsidiaries often do not reach agreement on how to share resource investments and project ownership in the pursuit of joint SOI projects. Ulrich (corporate responsibility manager) is disappointed with the TIC's 'federal' structure, where subsidiaries strongly influence executive decisions. From his perspective this 'slows down development' and requires 'a lot of coordination' and navigation of 'poker game'-like negotiations.

To reconcile the tensions, the group's head of innovation proposed an innovation portfolio (artefact) where all innovation projects are reported and assessed against various criteria derived from the corporate values, strategy, and the SDGs. However, the introduction of the innovation portfolio was slow and faced resistance as subsidiaries could not agree on which SDGs or competing values such as customer benefits and revenue potential have the highest priority for innovation project and how to assign weight factors to these criteria. The head of innovation suggested to use a Fibonacci sequence (1,2,3,5,8,13,21) to weight the criteria, but some subsidiaries were afraid that this will enlarge gaps between them and make them look bad. After extensive negotiation, they agreed to use the Fibonacci sequence, provided that the scores would not exceed 8.

4. External interfaces: This insight highlights a values-action gap between the TIC's sustainability values and its still unsystematic approach to stakeholder engagement and reputation management. While the value of safety has historically shaped the TIC's strong reputation and enabled the development of innovation ecosystems across various industries, similar strategic efforts have not yet been systematically applied to develop innovation ecosystems based on the corporate value of sustainability. Several employees stressed the strategic importance of engaging in SOI ecosystems, while also pointing to the absence of consistent practices to support such engagement. Efforts to build legitimacy, reputation, and topic-leadership in sustainable business conduct through interactions with external stakeholders remain limited. Ulrich (corporate responsibility manager) recognises that the TIC's engagement in SOI ecosystems, requires more systematic reputation management, including impact measurement and communication. However, artefacts that could support this effort—such as gold medals from a leading sustainability ratings provider—are not yet leveraged effectively.
5. Practices and methods: This insight reflects learning tensions (Smith & Lewis, 2011) between the maintaining the established corporate values and adopting the new value of sustainability. The sustainability value is introduced through normative and theoretical frameworks, such as the SDGs and system-value creation (Baue, 2021), which can increase the scope and maturity of SOI. However, their adoption and operationalisation through corresponding practices,

methods, and supportive artefacts faces resistance due to perceived complexity and distance from the accustomed corporate values and way of work. On the level of social interactions, senior managers and SOI proponents face difficulties in convincing other employees about the advantages of sustainability frameworks and the adoption of associated practices and methods. For instance, Mark (corporate venturing) does not use the official values and artefacts (such as the innovation portfolio) to assess the sustainability impact of his projects but replaces them with his own approaches to stakeholder and data analyses. He justifies this by arguing that standardised innovation processes tend to yield only incremental innovations, whereas his focus lies in driving radical innovation. Other employees also resisted the adoption of an innovation portfolio and associated criteria for impact assessment, emphasising that it increases complexity and workload rather than bringing strategic advantages. These concerns were also acknowledged by the innovation head and other executives who made consistent efforts to adjust the portfolio and streamline the procedures for using it.

6. Personal alignment: This insight identifies a tension between the organisation's formal commitment to sustainability values and employees' resistance to change, which is mediated by the level of formality in their social interactions. The insight shows that informal interactions play a crucial yet underutilised role in developing SOI. While resistance to change may be expressed in formal, hierarchical settings, informal physical environments (an artefact) allow for more open and authentic exchanges that reveal latent support for sustainability initiatives. Ulrich (Corporate Responsibility Manager) was convinced of that when he had firsthand experience of how a colleague who had publicly opposed his proposition for a new sustainability strategy later expressed appreciation for it in a casual conversation in the canteen.

Role of cultivation in facilitating values-based practices for SOI

My study on values-based practices for SOI (Ivanov, 2025) classifies nine categories of practices and exemplifies each one with a company case (table 2). The first category of practices focuses on managing the compatibility of stakeholder values. An exemplary practice and an illustrative case are the management of stakeholder relationships based on shared sustainability values by the Colombian restaurant chain, Wok (Reficco et al., 2018). In its interaction with stakeholders, Wok works with all business model participants to develop a set of shared sustainability values while also restricting access to customers and partners who do not share these values. In this way it integrates the subjective personal values of stakeholders into its organisational culture. To ensure sufficient literacy of stakeholders and source meaningful contributions from them, Wok introduces stakeholders to artefacts such as studies, awareness campaigns, and trainings about sustainable farming and environmental behaviour.

The second category of practices focuses on assessing stakeholder values through contextual interpretations rather than assuming preconceived (mis)alignments of values. An exemplary practice is empathising (Watson et al., 2018), which engages various stakeholders in deliberation on the differences between their values. Instead of seeing these differences as conflicts that require a middle-ground compromise, they are harnessed to prompt ideation from a more holistic perspective. This practice was used in eight cases of corporate and non-profit organisations partnering in the UK, resulting in SOI outcomes (Holmes & Smart, 2009). All eight for-profit companies in this study had established documented policies as artefacts that ensure consistent social engagement and dialogue with representatives from non-profit organisations.

The third category of practices deals with promoting intra-organisational value congruence, that is alignment between the personal values of employees and the official organisational values. An exemplary practice was found in the case of an Oil and Gas company, which introduced a cultural dictionary (an artefact), featuring interviews with employees on how they apply the organisational values. These interviews are uploaded on the corporate website to facilitate exchanges (i.e. social interactions) regarding the employees' personal interpretations of the organisational values and to disambiguate these values.

The fourth category consists of practices to continuously reconcile tensions between conflicting values. An exemplary practice is the formation of positive ethical networks, which Dossa and Kaeufer (2014) illustrate through the case of the Triodos Bank. Although Triodos pursues sustainability values since the 1970s and integrates them into all its financial service innovations, on multiple occasions it partnered with actors with diverging values (e.g. conventional banks that offered higher interest rates) to increase the impact of its green funds. To address potential greenwashing concerns from stakeholders and provide evidence for the positive impact of these partnerships, Triodos leveraged artefacts such as official impact reports and project reports shared on Google Maps.

Practices in the fifth category reflect on the effect of values on innovation governance and outcomes. For example, the Caja Navarra bank engages staff in immersive stakeholder interactions that enables them to revise relations management (Ayuso et al., 2006). Employees work on projects at the bank's customer service branches to gain direct experience of the dynamics of customer relations and the physical environments where they take place. The objective of this initiative is to allow employees to reflect on their subjective interpretations of the dynamics of customer relations and gain dynamic capabilities for improving them through SOI.

Practices in the sixth category consist in prioritising the engagement of external stakeholders. An exemplary practice was applied by a Swedish real estate firm, which explored the opinions of its external stakeholders to avoid investment risks. This was

notable since an assessment of the organisational culture through a questionnaire based on the competing values framework (Cameron & Quinn, 2011) indicated that the personal values of the company's employees (i.e. their subjective perceptions of the corporate culture) prioritise interactions with the internal rather than the external stakeholders. However, the company's official corporate values (artefact), such as equality, integration, and inclusion, motivated employees to also engage in interactions with the external stakeholders and consider their opinions as inputs of SOI.

The seventh category of practices focuses on prioritising sustainability values as heuristics for ideation, evaluation, and corporate policy making. For instance, a Science Conglomerate and a Technical Inspection company from the study's sample had established sets of non-negotiable values to evaluate innovation projects. These values were communicated not only in artefacts such as official values statements, but also in social interactions senior managers and their direct reports, where managers 'strongly' and 'repeatedly' emphasised the values as 'red lines that nobody can cross'.

The eighth category refers to practices that renew corporate values in response to external (e.g. from regulators, suppliers, society) and bottom-up (e.g. from employees, customers) tensions. For instance, Palm, a woodworking company from Italy, monitors stakeholder interactions throughout the value chain to inform the renewal of its corporate values and harmonise the fit between the values pursued by stakeholders and the overall SOI ecosystem goals (Barile et al., 2020). A simulation software is used to monitor the evolution of user opinions, engagement, and behaviours in real time and throughout the entire value chain (from supplier behaviour to the stages of storage and packaging). In this way stakeholder interactions, mediated through a supportive artefact (a simulation software), allow Palm to integrate the subjective perspectives of its stakeholders into its own cultural values.

Finally, the ninth category of values-based practices for SOI formalises stakeholder and sustainability-oriented values within future-oriented statements. For instance, a start-up accelerator firm from the study's sample introduces entrepreneurial teams to different values that define the critical areas for future SOI developments. Entrepreneurs interpret the suggested values and implement them in their own startup projects. They learn more about the values, their implications for future market developments, and SOI through a 'startbox' entrepreneurship toolkit (an artefact) that is based on the more traditional Adobe Kickbox and resembles other toolkits for values-based entrepreneurship (Kruszelnicki & Breuer, 2021).

Gamification formats to facilitate cultivation processes for SOI culture development

In this section, I review how different types of gamification formats classified to address cultural challenges and facilitate values-based innovation (Breuer et al, 2023) are also relevant for addressing tensions between values and values-action gaps in the context

of SOI (table 3). These formats are introduced as organisational artefacts that enable social interactions and reflection on one's own values and actions within a gamified context, thus facilitating cultivation processes for SOI culture development.

The first type of gamification formats are agile retrospectives. Jovanović and colleagues (2016) identify 85 retrospective games to support different challenges in group development and teamwork. A typical challenge to the institutionalisation of open innovation and team development in its early phases (forming and storming) is the lack of shared understanding and tensions between conflicting personal interpretations of values and project objectives. To address these tensions, agile retrospective formats such as energizers, ice-breakers, warm ups, and building teams engage teams in social interactions to establish basic values to be used in the future and get to know each other on personal and technical level. In addition, agile retrospectives, such as check in, self-managed sheet retrospectives, building teams, looking back retrospectives, and looking ahead (futurespectives) engage teams in discussions on potential tensions and conflicts and values, ground rules, and group roles to be defined or redefined.

Second, gamified workshop facilitation formats use 'modular card decks, guide through the collaboration process and ensure that initial (e.g. values-based) framing informs subsequent decision-making' (Breuer et al., 2019, p. 10). They can be used to facilitate cultivation processes to address SOI challenges such as those related the integration of stakeholder perspectives to address wicked problems (Sick et al., 2018), the institutionalisation of a shared vision (Giménez-Fernández & Abril, 2020), and the reconciliation of conflicting organisational values (Ivanov & Breuer, 2021). For instance, wicked problems entail a wide range of stakeholders with opposing values and ensuing tensions that need to be reconciled. Therefore, innovation efforts to address wicked problems need to leverage the integration, social interactions, and collaboration among diverse actors. WickSprint (Sick et al., 2018) is a structured gamified workshop that addresses this need by engaging stakeholders in multidisciplinary co-creation, where they explore and address wicked problems such as plastics pollution or sustainable mining, from divergent viewpoints.

Third, ideation games address tensions in companies that promote values such as collaboration, experimentation, and risk taking but lack commitment to corresponding behaviours and capabilities within their workforce. To address these tensions, ideation games, such as ideaChef (Patrício, 2016; Patricio et al., 2020), support social interactions and co-creation in a more open and safer environment, stimulating dialogue, team building, collective experimentation, and risk taking. Thus, ideation games help to achieve alignment between personal and organisational values related to risk, failure, and sustainability.

Fourth, dilemma games (Gudiksen & Sørensen, 2017; Breuer et al., 2019) are used to address tensions between employees' personal interpretations of the organisational

values as well as values-action gaps that occur in everyday work situations, stakeholder interactions, and innovation management. Dilemma games engage employees to reflect on and enact their subjective perspectives on how to resolve tensions and implement the organisational values in hypothetical situations or factual situations from the past. They also prompt social interactions between participants by engaging them in discussions and collective interpretation of their decisions. This allows employees to develop shared understanding as well as capabilities to translate values into consistent decisions and actions.

Fifth, traditional business simulation formats (see Dubina, 2015) can be used to address values-action gaps in companies that face challenges in translating their values and strategies that promote inter- and intra-organisational collaboration into corresponding SOI practices. Such gaps can be attributed to the perceived social exclusion of individual employees and teams, which threatens their sense of belonging and impedes collaborative SOI efforts. To mitigate the negative effects of social exclusion, Bhimani and colleagues (2018) developed a business simulation game that simulates social interactions and knowledge exchanges in a hypothetical open innovation process.

In sum, when strategically introduced as cultural artefacts, gamification formats have been shown to facilitate cultivation processes and cultural transformation. In particular, they have been applied to enable the reconciliation of tensions between values of team members (Jovanović et al., 2016), between values of stakeholders involved in wicked problems (Sick et al., 2018), and between values of risk taking and risk aversion (Patrício, 2016; Patricio et al., 2020). In addition, gamification formats, such as dilemma games (Gudiksen & Sørensen, 2017; Breuer et al., 2019) and simulations (Bhimani et al., 2018) have been applied to enhance employee awareness and capabilities in confronting values-action gaps.

6. Synthesis and discussion

In this section, I discuss the analysis of the three studies against the background of previous research and provide four theoretical propositions on how cultivation influences the outcomes of tensions between values and the translation of values into consistent SOI practices. I also suggest practical implications on how gamification can support cultivation processes in the development of SOI cultures.

First, the TIC case demonstrates how cultivation processes influence the outcomes of tensions between values, such as the tensions between different interpretations of sustainability values (insight 3) or between sustainability values and already established organisational values (insights 5 and 6). Cultivation processes influence these outcomes by reinforcing a feedback loop between the employees' subjective interpretations regarding sustainability values, the interactions among these employees when discussing sustainability values, and their interaction with artefacts that operationalise the sustainability values. In the TIC case, an innovation portfolio was

proposed by the head of innovation to align innovation efforts across the entire group and reconcile trade-off tensions in the management of SOI. Although the initial adoption of the portfolio faced resistance and provoked more conflictual interactions among stakeholders, it played a crucial role in establishing common ground and reconciling the tensions. The innovation portfolio (artefact) revealed the implicit and divergent ways in which cultural members interpret values and provided a basis for social interactions to reach consensus.

Rather than operationalising and communicating sustainability values through an artefact that was strictly defined and not subject to discussion or change, the artefact, in this case the innovation portfolio, provided a frame of reference for discussions between the involved parties and enabled them to formalise their consensus (e.g. using a shorter Fibonacci sequence to weigh factors). This indicates that the reconciliation of tensions between values in the development of SOI cultures can be mediated by artefacts, such as documents, media, templates, tools, indicators, narratives, and physical environments, when these trigger social interactions to discuss the competing values, to identify and agree on synergetic outcomes, and can be readjusted to accommodate the resulting consensus. When artefacts are embedded in dynamic social interactions and remain adjustable in response to stakeholder interpretations and inputs, they foster synergetic outcomes. However, when artefacts communicate or operationalise values are not embedded in social interactions and are not subject to individual interpretations, they are more likely to support trade-off outcomes (fig. 1).

Proposition 1: Artefacts mediate individual interpretations and collaborative sense-making processes in the reconciliation of tensions between values.

Proposition 2: The effectiveness of artefacts in mediating tensions between values is determined by their embeddedness in ongoing social interactions and their adjustability to stakeholder requirements.

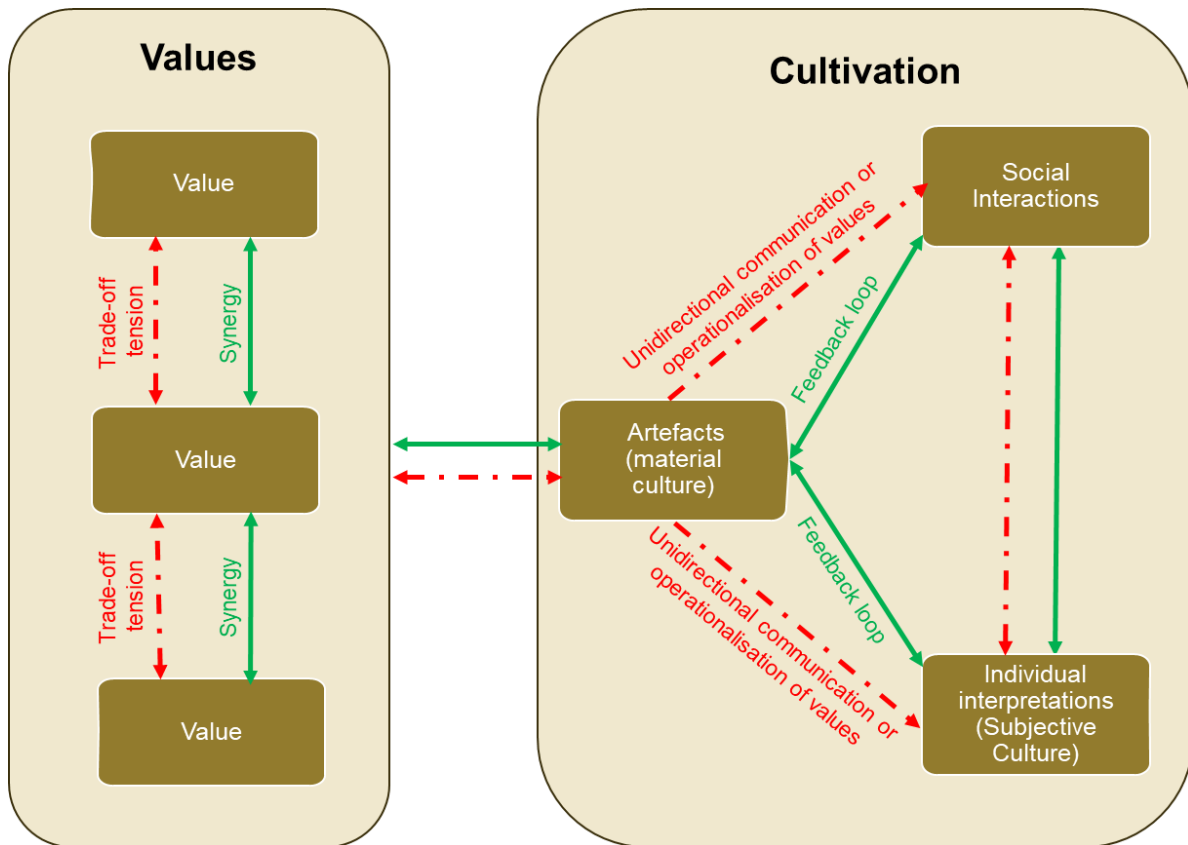


Figure 1. Conceptual model illustrating the mediating role of artefacts and cultivation on the reconciliation of tensions between values. Illustrating Propositions 1 and 2, the figure shows how cultivation processes that create a feedback loop between individual subjectivity, social interactions, and artefacts that communicate or operationalise values facilitate synergetic outcomes from tensions between values.

A practical implication from these propositions is that to leverage the mediating role of artefacts, organisations need to enable employees to interact with and adjust artefacts that instantiate tensions between values. Through repeated engagement with these artefacts, employees can refine their subjective interpretations about the competing values and associated conflicts with social partners. Gamification formats such as agile retrospectives, gamified workshops, ideation games, and dilemma games demonstrate high potential to serve as mediating artefacts for the reconciliation of competing values. These formats prompt employees to reflect on their subjective interpretations of values and discuss and collectively interpret competing values in a safe environment, without the constraints of formal hierarchical structures. Insight 6 in the TIC's case study suggest that such informal interactions play an important role in reconciling tensions between values and overcoming employee resistance to change. Gamification formats introduce a new architecture for interaction that differs from the social contexts of routine activities and meetings. 'They turn individuals with their unique history and identity into players with different roles and submit them to the game's rules governing actions and turn-taking. These rules can cut across the formal hierarchies and structures and unwritten customs of an organisation. Historically and often

hierarchically defined rules about turn-taking and speaking up can be replaced and lead to unforeseen forms of interaction among participants, who now find themselves on a level playing field' (Breuer et al., 2022).

Furthermore, gamified ideation formats provide a safe space for interaction where personal and organisational values related to risk, failure, and sustainability can be effectively aligned. Such alignment is shown to act as a key enabler of business experimentation (Lee et al., 2004) and sustainable business experimentation (Weissbrod & Bocken, 2017). Recently, gamified ideation formats have been applied specifically to foster the identification of shared values (through structured fishbowl discussions between employees), subsequent mapping of value creation and destruction potentials, and co-creation of SOI ideas (Bellosi et al., 2023).

Regarding the influence of cultivation processes on the values into SOI practices the analysis of the three papers shows that the degree to which artefacts are leveraged can facilitate the translation of values into practices. For example, in the TIC case the official values statements were inconsistently communicated on the corporate website with different sets of values presented on different pages. The absence of clear communication about values can reinforce the values-action gaps and has been shown to lead to more severe gaps, such as greenwashing (Burnes & Jackson, 2011; Sull et al, 2020).

Conversely in the case of the oil and gas company, values were not only communicated through official statements but through a cultural dictionary that disambiguated the values and featured interviews about how these values are enacted by different employees and in different situations. Similarly, in the case of the start-up accelerator firm, the communication of values to entrepreneurial teams was enabled with a values-based entrepreneurship toolkit which supported the translation of values into entrepreneurial practice (Kruszelnicki & Breuer, 2021).

Furthermore, in the TIC case organisational sustainability values did not translate into organisation-wide practices of stakeholder engagement and reputation management despite considerable experience and topic leadership in leading innovation ecosystems based on values of safety and the managements' recognition of the opportunities to reapply this strategy based on sustainability values. This was in part attributed to the underutilisation of artefacts for communication with external stakeholders, such as gold medals from an international provider of sustainability ratings.

Conversely in the case of the green Triodos Bank and its practices of forming positive ethical networks (Dossa & Kaeufer, 2014), artefacts were used to support the bank's reputation, which protected itself from potential criticism due to cooperating with conventional banks to increase the impact of its green funds. Impact reports as well as details about green fund-sponsored projects on the Google Maps platform ensured full financial transparency and informed stakeholders about all sponsored project. In other

cases, companies not only utilised artefacts for external communication to avoid outside-in reputation risks but also to inform SOI strategies and the specification of their own sustainability values (i.e bottom-up integration of stakeholder values; Breuer & Lüdeke-Freund, 2017). One example are the documented policies that govern wider societal involvement and engagement with non-profits in the cases of partnerships between for-profit and nonprofit organisations in the UK (Holmes & Smart, 2009). Another example is the Caja Navarra bank (Ayuso et al., 2006) and its initiative to immerse employees in the physical environments of customer service branches, where they can reflect on their subjective perceptions of the dynamics of customer relations and gain dynamic capabilities for improving them through SOI. A third example is the case of Palm (Barile et al., 2020) and its use of a simulation software to monitor the evolution of stakeholder opinions, engagement, and behaviours throughout the entire value chain in order to inform the renewal of corporate values and adjust the fit between stakeholder values and the overall SOI ecosystem goals.

Overall cultivation processes appear to play an important role in translating values into SOI practice by mediating the communication of values with internal stakeholders and the management of reputation and engagement of external stakeholders. First, artefacts and social interactions that communicate sustainability values as official statements but do not support employees in interpreting and understanding their practical relevance are likely to endanger values-action gaps in SOI. Second, artefacts mediate effective reputation management and engagement of external stakeholders and may engender values-action gaps if they do not allow transparent, two-way communication with external stakeholders about the organisational sustainability performance and values.

Proposition 3: The translation of values into SOI practice is mediated by the degree to which artefacts and social interactions support stakeholders in interpreting and learning about the practical relevance of those values.

Proposition 4: The translation of sustainability values into stakeholder engagement and reputation management practices is mediated by artefacts that enable transparent, two-way communication with external stakeholders about the organisational sustainability performance and values.

Gamification formats such as dilemma games can be especially effective in enabling communication of the practical relevance of values. Dilemma games confront employees with controversial hypothetical situations or situations from the past and prompt them to apply the organisational values in decision-making. Through consequent collective discussion and interpretation of the decisions taken employees can align their subjective interpretations of the official organisational values and increase their capabilities to apply values in practice and bridge values-action gaps.

Previous research suggests that gamified formats play an important role in enhancing psychological safety and thereby fostering ‘several work processes on which innovation rests, namely engendering new ideas, finding collaborators, intensifying effort, and addressing difficult conversations and conflict’ (Mukerjee & Metiu, 2022, p. 1). The latter aspect of addressing difficult conversations and conflict is especially relevant for revealing and bridging gaps between values and SOI practices. By creating environments of psychological safety, i.e. environments where employees feel safe to take risks, voice their opinions, and learn from mistakes (Edmondson & Bransby, 2023), gamification formats encourage employees to speak up with suggestions for adopting new or improving existent practices. Employees that feel psychologically safe are also more likely to reveal their disagreement with practices and values-action gaps that appear counterproductive for the organisation’s priorities (Liang et al., 2012).

Furthermore, gamification formats such as business simulations can help employees to overcome cultural challenges to the interaction with stakeholders. Formats, such as the Open Innovation Game proposed by Bhimani and colleagues (2018), can simulate knowledge exchanges to raise awareness about and address social exclusion barriers to stakeholder engagement. Successful global organisations such as Hewlett Packard, IBM, and DHL have used simulation games to convince stakeholders about the value of innovation projects and to achieve the buy-in and ‘cultural change often required for successful implementation’ (McClay, 2007). Simulation games have also been successfully used to support stakeholder engagement and deliberation on sustainable development challenges and policies (Mochizuki et al., 2018).

Simmel’s emphasis of reciprocity, and the role of artefacts in the mediation of SOI practices and the outcomes of tensions between values yield relevant insights on how to conceptualise SOI culture development. We should not misconceive the development of a SOI culture as a one-way street or process where employees are expected to unquestioningly adopt the values and goals of their organisation, to adopt corresponding practices, to align with one another across hierarchical and functional levels, and to produce corresponding innovations as an outcome. The TIC case provides a vivid example of unresolved tensions between values and values-action gaps that even a mature, sustainability-oriented company is facing.

Instead, organisations should enable reciprocal and mutually transformative interactions between the organisation’s members and objectifications, where individuals actively interpret, negotiate, and sometimes challenge cultural values, practices, and artefacts. This resonates with Bourdieu’s Practice Theory, which emphasises that the relationship between habitus (the collective system of dispositions such as conventions, rules, and values) and practice is reciprocal rather than one-directional (Rowlands & Gale, 2016). In *Outline of a Theory of Practice*, he observes that habitus is ‘determined by the past conditions which have produced the principle of their production, that is, by the actual outcome of identical or interchangeable past practices’

(Bourdieu, 2019, pp. 72–73). This means that while habitus influences practices, the past engagement of social actors with practices (e.g. interactions with artefacts and social actors) also plays a role in shaping and refining their habitus over time. Such a perspective reframes the development of SOI cultures as a participatory process, one that evolves through continuous interaction between social actors as they interpret and make use of organisational artefacts.

7. Conclusion, limitations and future research directions

This thesis introduced the concept of cultivation as a novel theoretical lens for understanding the development of SOI cultures, offering a holistic model that addresses the dynamic interplay between individual subjectivity, social interaction, and organisational artefacts. Unlike approaches that study SOI cultures from the perspectives of isolated organisational levels, i.e. micro (individual), meso (group), or macro (organisational) the cultivation concept accounts for their dynamic interplay and reciprocal interactions. The four theoretical propositions presented in the previous section suggest that artefacts play a central role in enabling cultivation processes that contribute to the reconciliation of tensions between values and the alignment of values and practices in cultural transformations towards SOI. First, artefacts that communicate or operationalise values can enable individual interpretations and collaborative sense-making to reconcile competing values. Second, artefacts enable such reconciliation when they are sufficiently embedded in social interactions and remain open to interpretation and adjustment to the requirements of stakeholders. Third, artefacts play an important role in enabling the translation of values into consistent SOI practices by communicating the practical relevance of those values. And fourth, artefacts that enable transparent, two-way communication with external stakeholders support the effective translation of sustainability values into stakeholder engagement and reputation management practices. Practical implications were suggested for the introduction of specific gamification formats as artefacts that facilitate social interactions and individual interpretations in line with the four theoretical propositions.

While this cumulative thesis has contributed to a deeper understanding of how cultivation processes mediate the development of SOI cultures, it is important to acknowledge several limitations that open opportunities for further investigation.

First, the conceptual propositions and practical implications about tensions between values and values-action gaps presented in this thesis were derived from limited data, primarily from the ethnographic study of the TIC. Further empirical studies across varied organisational settings, industries, and cultural contexts are needed to validate and refine the theoretical propositions.

Second, the empirical re-analysis conducted in this thesis focused on previously coded data which was collected to address research questions that differ from the question addressed in the present research. While this allowed for a theoretically informed

synthesis, it constrained the potential to explore cultivation processes in an organisational context. Future research should consider adopting mixed-methods approaches to examine the causal effectiveness of cultivation processes in bridging tensions between values and translating values into SOI practices.

Third, while gamification was highlighted as a promising tool to facilitate cultivation processes—especially in promoting psychological safety, encouraging interaction across hierarchies, and aligning subjective interpretations of organisational values—this study did not include primary empirical testing of these propositions in applied organisational settings. Future empirical research should explore the actual effectiveness of various gamification formats (e.g. dilemma games, simulation games, ideation games) in supporting the cultivation of SOI cultures. Such studies might involve pilot implementations of gamified formats, participant observations, and pre/post assessment of cultural variables and SOI performance outcomes. In addition, studies can explore the potentials of designing gamification formats for addressing SOI and aggregate knowledge from this field. A forthcoming publication (Breuer & Ivanov, 2025) is addressing these potentials by applying a design patterns approach.

Additionally, while the concept of cultivation provides a compelling theoretical framework for understanding the interplay between individual subjectivity, social interactions, and artefacts, further theoretical elaboration is needed to delineate the mechanisms by which cultivation leads to cultural change. This includes exploring the boundaries of cultivation processes—what conditions enable or constrain them, and how they may interact with broader institutional, regulatory, or societal factors in shaping SOI cultures.

Finally, this thesis strongly recommends ethnographic methodology as the most promising approach for future research on SOI cultures and cultivation processes. Ethnography focuses on interpreting the subjective interpretations of its informants, which enables the elicitation of findings about how individuals make sense of their experiences, values, and roles within the organisational culture. Ethnographic writing then renders these findings into descriptions about the emotions and activities of informants, as expressed from their subjective point of view. Furthermore, participant observation, as an essential method of the ethnographic methodology, enables the elicitation of findings about how individuals engage in social interactions and interactions with artefacts. Thus, ethnography is well-suited for capturing the dynamic interplay between the personal, social, and material dimensions of culture. Notably, Georg Simmel developed his sociological perspective on culture ‘through engagement with ethnography, psychology, and philosophy’ (Scaff, 2011, p. 242).

In conclusion, while this thesis contributes novel insights into the role of cultivation processes in the development of SOI cultures, it also opens promising avenues for future research. Further empirical validation and theoretical refinement will be crucial to

advancing the understanding and practical application of cultivation processes in fostering the development of SOI cultures.

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Appendix

Table 1. Analysis of the role of cultivation processes in explaining insights on tensions between values and values action gaps in a case study of a technical inspection company (Breuer & Ivanov, 2023).

Tension between values (TBV) or a values-action gap (VAG)	1. Sustainability literacy (VAG)	2. Vertical integration (VAG)	3. Horizontal integration (TBV)	4. External interfaces (VAG)	5. Practices and methods (TBV)	6. Personal alignment (TBV)
Short description	The official value and strategy of sustainability is not translated into consistent practices due to an uneven distribution of sustainability literacy across organisational actors.	Misalignments between executive and operational managers' understanding and implementation of the core values desynchronise mutual efforts to advance SOI.	Divergent interests and interpretations of values hamper multilateral collaboration and knowledge exchange to address sustainability challenges.	TIC's sustainability values do not translate into organisation-wide practices of stakeholder engagement and reputation management.	Tensions between the established corporate values and way of work and the adoption of new sustainability values and associated normative and theoretical frameworks, practices, and methods.	Engaging the workforce in the process of cultural transformation (i.e. reconciling learning tensions) requires leveraging of the employees' informal interactions.
Social interactions, influencing the TBV or VAG	Insufficient two-way communication on sustainability values, concepts, and SOI ideas between hierarchical levels and functions		Conflicts between top executives about which values to prioritise and how to share resource investments and project ownership in the pursuit of long-term, joint innovation projects.	Insufficient communication with external stakeholders to gain and maintain legitimacy, high reputation, and topic-leadership in sustainable business conduct.	SOI proponents face difficulties in convincing other colleagues about the advantages of sustainability frameworks and associated practices and methods.	Mutual persuasion through informal interactions influences employees' resistance to cultural change.

<p>Informant interpretations about the TBV or VAG</p>	<p>Holger (head of auditing) believes that comprehensive understanding of the environmental, social, and economic aspects of sustainability is still lacking at TIC. He highlights the importance of cross-departmental involvement, noting missed opportunities when his social auditing team was excluded from an innovation project on sustainability reporting verification.</p>	<p>Alex (service station manager) is convinced that sustainability improvements depend on his own initiatives. However, he struggled with the lack of a clearly defined process and management support to implement his ideas, such as offering a solar charging station for customers. He was also criticised for his initiative to improve the operational efficiency of his station through networked printing.</p>	<p>Ulrich (CR manger) is disappointed with TIC's 'federal' structure, where subsidiaries strongly influence executive decisions. This 'slows down development' and requires 'a lot of coordination' and navigation of 'poker game'-like negotiations.</p>	<p>Ulrich (CR manger) recognises that TIC can become a leader of SOI in its business ecosystem, but this requires TIC to engage in more systematic reputation management and communication of its impacts.</p>	<p>Mark (corporate venturing) has replaced TIC's official innovation strategy and associated artefacts with his own methods for assessing the sustainability impact of projects. He justifies this by arguing that standardised innovation processes tend to yield only incremental innovations, whereas his focus lies in driving radical innovation.</p>	<p>Ulrich (CR Manager) felt surprised when a colleague, who had previously opposed Ulrich's sustainability strategy in a formal meeting, expressed appreciation for it during a canteen conversation. Ulrich was convinced that informal interactions reveal support that can remain hidden in hierarchical settings.</p>
<p>Interactions with artefacts associated with the TBV or VAG</p>	<p>- Stakeholders are introduced to an incomplete and inconsistent <u>set of core values on the corporate website</u> (different sets of values are communicated on different company websites).</p>	<p>- Operational employees lack a clearly defined <u>idea management process for SOI</u>. - Stakeholders are introduced to an incomplete and inconsistent <u>set of core values on the corporate website</u>.</p>	<p>Subsidiaries lack agreement on how to weigh factors for the assessment of projects in an <u>innovation portfolio</u> introduced by the group's head of innovation.</p>	<p>Documented achievements, such as <u>gold medals from an international provider of sustainability ratings</u>, are not systematically communicated with external stakeholders.</p>	<p>Some employees resisted the adoption of an <u>innovation portfolio</u> and associated criteria for impact assessment, emphasising that it increases complexity and workload rather than bringing strategic advantages.</p>	<p>Informal interactions are mediated by <u>physical environments</u>, e.g., conversations in the canteen or during a workshop.</p>

Table 2. Analysis of the role of cultivation processes in facilitating values-based practices for SOI derived by Ivanov (2025).

Categories of values-based practices for SOI (Ivanov, 2024)	Managing compatibility with stakeholder values	Assessing stakeholder values through interpretive methods	Promoting intra-organisational value congruence	Continuous reconciliation of conflicting values	Reflecting on the effect of values on innovation governance and outcomes	Supporting stakeholder engagement through external focus of organisational values	Prioritising sustainability values as heuristics for ideation, evaluation, and corporate policy making	Renewal of corporate values in response to external and bottom-up tensions	Formalising stakeholder and sustainability-oriented values within future-oriented statements
Exemplary practices and cases derived from the literature and expert interviews	Associating stakeholders around shared sustainability values (case of restaurant chain Wok; Reficco et al., 2018).	Empathising (cases of UK corporate and nonprofit firms; Watson et al., 2018; Holmes & Smart, 2009)	Cultural dictionary, featuring interviews on how to apply values (case of an oil and gas company)	Forming positive ethical networks (case of Triodos Bank; Dossa & Kaeufer, 2014)	Immersive stakeholder interactions to revise relations management (case of Caja Navarra; Ayuso et al., 2006)	Considering stakeholder opinions to avoid investment risks (case of real estate firm; Anderson, et al., 2018)	Evaluation based on non-negotiable values (cases of a science conglomerate and a technical inspection company)	Proactive monitoring of stakeholder behaviour (case of Palm; Barile et al., 2020)	Values as criteria for identifying critical areas for future SOI developments (case of start-up accelerator firm)
Social interactions, mediating the implementation of values-based practices for SOI	Wok works with all business model participants to develop a set of shared sustainability values while also restricting access to customers and partners who do not share these values.	For-profit firms engage with non-profit firm representatives to deliberate on the differences between their values and identify potential synergies for innovation.	The oil and gas company's employees, from different hierarchical and functional backgrounds, share how they understand and apply the corporate values in interviews.	Triodos Bank on multiple occasions partnered with actors with diverging values (e.g. conventional banks that offered higher interest rates) to increase the impact of its green funds.	The Caja Navarra bank engages staff in projects at its customer service branches to help employees gain direct experience of the dynamics of customer relations.	A Swedish real estate firm avoids investment risks by exploring the opinions of its external stakeholders and integrating them in its otherwise internally orientated culture.	The science conglomerate's top managers communicate the corporate core values as non-negotiable requirements that all participants of the innovation process must comply with.	Palm, a woodworking firm, monitors stakeholder interactions across the value chain to inform the renewal of its corporate values and adjust the fit between stakeholder values and the overall SOI ecosystem goals.	The start-up accelerator firm engages startup teams in innovation projects that address SOI challenges and opportunities related to predefined values.

Subjective interpretations of stakeholders	Personal values of customers and business model partners	Personal stakeholder values	Employees' personal interpretations of the official organisational values	Positive individual ethics	Personal experience of customer service interactions and reflection on how to improve them	Opinions of external stakeholders	Employees' interpretations of the corporate values as non-negotiable criteria for SOI management	Personal values of customers and business model partners	Entrepreneurs' interpretations of the start-up accelerator's suggested values
Interactions between stakeholders and artefacts, mediating the implementation of values-based practices for SOI	Internal and external stakeholders are introduced to <u>studies</u> , <u>trainings</u> , and <u>awareness campaigns</u> about sustainable farming and environmental behaviour.	<u>Documented policies</u> govern wider societal involvement and the engagement with non-profits.	A ' <u>cultural dictionary</u> ' featuring interviews with employees is published on the corporate intranet to raise awareness among the workforce, disambiguating and effectively communicating values and how to enact them.	<u>Impact reports</u> as well as details about green fund-sponsored projects on the <u>Google Maps platform</u> ensure full financial transparency and inform stakeholders about all sponsored projects.	Employees gain direct experience in the <u>physical environment</u> of customer service.	A <u>set of core values</u> , such as equality, integration, and inclusion, motivate interactions with external stakeholders.	A 'very strong and clear' <u>set of core values</u> informs stage gate decisions throughout the innovation process.	A <u>simulation software</u> monitors the evolution of user opinions, engagement, and behaviours in real time and throughout the entire value chain (from supplier behaviour to the stages of storage and packaging)	Teams are presented with a 'startbox' <u>entrepreneurs hip toolkit</u> that is based on the more traditional Adobe Kickbox (Kruszelnicki & Breuer, 2021).

Table 3. Analysis of the role of gamification formats (Breuer et al., 2023) in facilitating cultivation to address tensions between values and values-action gaps in SOI.

Tension between values (TBV) or a values-action gap (VAG)	Gamification format type (artefact)	Subjective interpretations of participants	<u>Social interactions enabled through the gamification format</u>
Lack of shared understanding and tensions between conflicting personal interpretations of the values and project-related objectives in the early (forming and storming) phases of small group development (TBV)	Agile retrospectives	Personal interpretations of group values and ground rules	Agile retrospectives (Jovanović et al., 2016), such as energizers, ice-breakers, warm ups and building teams help teams to <u>establish basic values to be used in the future and get to know each other on personal and technical level</u> in the forming phase. Agile retrospectives, such as check in, self-managed sheet retrospectives, building teams, looking back retrospectives and looking ahead (futurespectives) engage teams in <u>discussions on potential tensions and conflicts and values, ground rules, and group roles to be defined or redefined in the storming phase.</u>
Wicked problems entail a wide range of stakeholders with opposing values, necessitating the integration of and collaboration among diverse actors. (TBV)	Workshop facilitation	Personal stakeholder values	WickSprint (Sick et al., 2018) is a structured gamified workshop format that engages stakeholders in <u>multidisciplinary co-creation</u> to explore and address wicked problems from divergent viewpoints.
SOI cultures that promote values such as collaboration, experimentation, and risk taking may lack commitment to corresponding behaviours and capabilities within their workforce. (TBV)	Ideation games	Risk aversion	Ideation games, such as ideaChef (Patrício, 2016; Patrício et al., 2020), support <u>co-creation</u> in a more open and safer environment, stimulating <u>dialogue, team building, collective experimentation, and risk taking.</u>
Organisational inertia hinders the development of a shared, long-term vision that aligns stakeholders in the institutionalising stage of open innovation. (TBV)	Dilemma games; Agile retrospectives; Workshop facilitation	Personal interpretations of group shared values and vision	Dilemma games, retrospective games, and gamified workshop formats facilitate the development of a shared vision in the institutionalising stage of open innovation by incentivising participants to <u>exchange information and align and collaborate around shared values</u> (Giménez Fernández & Abril, 2020).
Official organisational values may be conflicting and disconnected from daily practice, preventing their adoption in everyday work situations and stakeholder interactions, as well as their potential to drive SOI. (TBV and VAG)	Dilemma games; Workshop facilitation	Personal interpretations of the organisational values	Dilemma games (Gudiksen & Sørensen, 2017; Breuer et al., 2019) and gamified workshops (Ivanov & Breuer, 2021) prompt employees to <u>discuss, collectively interpret, and apply values through direct interaction with hypothetical or factual tensions and values-action gaps.</u>
Despite being part of an organisational culture that values collaboration, individual employees and teams may experience social exclusion, which threatens their sense of belonging and impedes collaborative SOI efforts. (VAG)	Business simulation	Social exclusion	An Open Innovation Game (Bhimani et al., 2018) simulates <u>knowledge exchanges</u> in a hypothetical open innovation process to raise awareness about and address challenges of social exclusion.

Management guidelines to address cultural challenges and facilitate values-based innovation through gamification

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Abstract: Gamification has developed into a methodology of its own to drive innovation and to foster values-based innovation cultures within organisations. However, there are no clear management guidelines, nor any overview of the different gamification approaches that will help organisations to facilitate values-based innovation and to successfully address cultural challenges through gamification. This paper explores this new field through a review of the literature and gathering managerial insights from 26 in-depth interviews with innovation managers from European companies. Based on the findings, we synthesise knowledge and formulate management guidelines for designing and implementing gamification processes to foster values-based innovation cultures within organisations. Our findings reveal the potential for the gamification of innovation and outline pathways for future research on the gamification of values-based innovation and organisational culture development.

Keywords: innovation culture; values-based innovation; innovation management; gamification; facilitation; literature review; design guidelines.

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1 Culture still eats strategy for breakfast

Gamification has developed into a methodology of its own to drive innovation. When the term was coined in 2002, gamification was initially used in business to boost workforce performance. Then, innovation managers discovered its potential to facilitate innovation-related activities, mainly in the early stages of product and service innovation processes. Recently, the potential of gamification to contribute to building an innovation culture in the organisation and to address great societal challenges through values-based and sustainable innovation have been discovered (Breuer et al., 2022a). Several games and gamified interventions in this area have been tested. However, an overview of

gamification approaches that facilitate values-based innovation in different (normative, strategic and operational) management dimensions is still missing. Moreover, there is a lack of management guidelines on how to address the challenges in organisational culture to facilitate values-based innovation through gamification.

Organisational culture and values are becoming increasingly important for innovation management theorists and practitioners. Organisational values can stimulate and direct, but they can also inhibit innovation activities when they remain difficult to manage. Both developing an innovation culture and building the capability to innovate share the insight that values are a common foundation for the beliefs and actions of those working in organisations. Values are recognised as the underlying assumptions of organisational culture (Schein, 2010). They are notions of what is desirable, and they capture what different stakeholders care about. As executives increasingly acknowledge and adopt a purpose beyond increasing shareholder value, this raises the question of which values shape innovation activities. For example, sustainability managers who pursue a triple bottom line of ecological, social, and economic value creation need to reevaluate and reinterpret their organisational values, what Schwartz (2012) calls ‘ordered systems of priorities’.

While values are acknowledged for their potential to foster innovation-supportive cultures and to facilitate innovation, they are difficult to access and to translate into appropriate behaviour and practices. This is because values are often only implicitly effective [Rindova and Martins, (2018), p.329f], are entrenched in organisational routines (ibid, p.330f), and are linked to rigid cognitive [Wade-Benzoni et al., (2002), p.51] and emotional barriers (Seo, 2003). Therefore, top-down leadership or other traditional teaching and training methods fall short in shaping and embedding organisational values in daily practices [Warren et al., (2014), p.106f]. Moreover, as interactive and dynamic constructs, values both influence and are influenced by the organisational cultures in which they are embedded (Boenink and Kudina, 2020). This suggests that values-based innovation management needs to consider values from a practice-oriented perspective, that is, using stakeholder input and deliberation to understand values as the ‘evolving results of valuing processes’ rather than conceiving of them as stable entities (ibid). Thus, novel facilitation methods are needed to work with values in a more profound and holistic way, providing a collaborative, experiential, and practice-oriented modes of intervention.

Gamification is one particularly well-suited approach to address culture-related innovation challenges and to facilitate values-based innovation. As sources of motivation, creativity, collaboration, and social interaction, gamified methods are gaining increasing importance for organisations that want to improve their innovation capabilities (e.g., Patricio et al., 2018). Beyond facilitating innovation activities with a traditional focus on product and service innovation, gamification methods can be used, for instance, to specify global values and directives (such as a new sustainability strategy formulated by top management), sensitise employees to their implications, and translate global values into field-specific innovation activities [e.g., for the Envisioning Cards toolkit, see Friedman and Hendry (2012)]. However, scientific research on gamified methods for addressing cultural challenges and facilitating values-based innovation is still scarce. A number of companies have experimented with heterogeneous formats, but these are usually not well documented, comparable, or evaluated. Available academic articles and business white papers tend to contain anecdotal reports of local applications and evaluations. Overarching insights on cultural and values-based challenges to innovation

as well as management guidelines to design and implement gamification that would address these challenges are missing. Comprehensive literature reviews that systemise existing knowledge and suggest areas for future research are also missing.

To address these gaps, this paper explores the potential of gamification methods as a potent means for overcoming cultural challenges and for facilitating values-based innovation management. We conduct a literature review along with 26 in-depth interviews with innovation management experts. We offer a list of actionable guidelines for the design and implementation of gamified methods to address cultural challenges to managing (values-based) innovation and discuss potential application areas for gamification formats. We conclude with a proposal for a future research agenda.

2 Literature review

2.1 Organisational culture and values

The innovation literature agrees that organisational culture is a major factor in both stimulating and inhibiting innovation (e.g., Duygulu et al., 2015; Gedvilaitė and Pădurariu, 2014; Shanmuganathan, 2018). Past research has identified various cultural factors that support innovation efforts (Asmawi and Mohan, 2011; Tidd and Bessant, 2018; Dombrowski et al., 2007). For example, Dombrowski et al. (ibid) distinguish eight elements of organisational innovative culture: innovative mission and vision statements, democratic communication, safe spaces, flexibility, collaboration, boundary spanning, incentives and leadership. Still, despite the widely acknowledged importance of culture for innovating, executives often treat the symptoms of innovation deficiencies through structural and institutional interventions, rather than addressing their root causes, which are deeply embedded in organisational culture [Gedvilaitė and Pădurariu, (2014), p.9].

One essential lever for managing organisational culture is clear communication of the organisational values. In Schein's (2010) model of organisational culture, values represent one of the three layers of culture, along with basic assumptions and artefacts. They provide organisational members with reference points that guide their attitudes and actions with respect to the organisation's interests and goals (Büschgens et al., 2013; Pivec and Potočan, 2015). Clear communication of values allows senior managers to establish norms manifested in artefacts (e.g., rituals, stories and physical arrangements) that serve to support innovative behaviours and contribute to enhanced innovation performance (Hogan and Coote, 2014). The values at stake in innovation are, according to stakeholder theory (e.g., Freeman and McVea, 2001; Freeman et al., 2018), those of the different stakeholders who affect or are affected by an organisation's activities and suggests. Companies must thus attend to the values of their stakeholders, especially if they pursue sustainability-oriented innovations (Hörisch et al., 2014). However, aligning stakeholder values with the normative directions, strategic decisions, and daily practices of an organisation is an ongoing challenge. For instance, since the values of internal stakeholders are often implicit, accessing and aligning them with organisational goals and/or desired outcomes of cultural change can be difficult. Yet, if management communication about organisational values fails to reflect what is really important to the employees they are addressing, these messages become vague 'cultural stamps' that cannot translate into a framework for action [Lemon and Sahota, (2004), p.3].

2.2 Values-based innovation management

Companies can achieve long-term success by aligning their innovation efforts with their core values and purpose (Breuer et al., 2022b; Henderson, 2021; Rindova and Martins, 2018). Values-based innovation management “understands and applies individual, organisational, societal, and global values, and corresponding normative orientations as a basis for innovation” [Breuer and Lüdeke-Freund, (2017), p.59]. Previous empirical research (Hogan and Coote, 2014; Meissner and Wulf, 2021; Manohar and Pandit, 2014; Rauter et al., 2017) and case studies (e.g., Mehta and Shenoy, 2011; Gerkens et al., 2017) demonstrate how attention to values fosters innovation success, not only financially, but in having a positive impact on social and ecological sustainability.

Schein (2015, p.9) observes that “defining values and norms, turning these into shared rules for behaviour, is de facto creating and managing culture.” Accordingly, a values-based approach to innovation management reviews, defines, and introduces new or reemphasises existing stakeholder values, turns them into guidelines and rules for innovation practices, and thus develops a particular innovation culture. Attending to stakeholder values in innovation-related activities, it addresses drivers and barriers across different management dimensions, going beyond the traditional focus on process, product and service innovations.

Breuer and Lüdeke-Freund’s (2017) values-based innovation management framework builds on the integrated management framework developed by Bleicher (2011). It distinguishes between:

- 1 normative management to deal with overarching ethical guidelines extending beyond economic interests
- 2 strategic management to ensure market differentiation and competitive advantages
- 3 operational management to create processes and tasks that meet the strategic objectives, e.g., throughout the innovation funnel’s phases of ideation and search, selection, implementation, and capture and evaluation of innovation results.

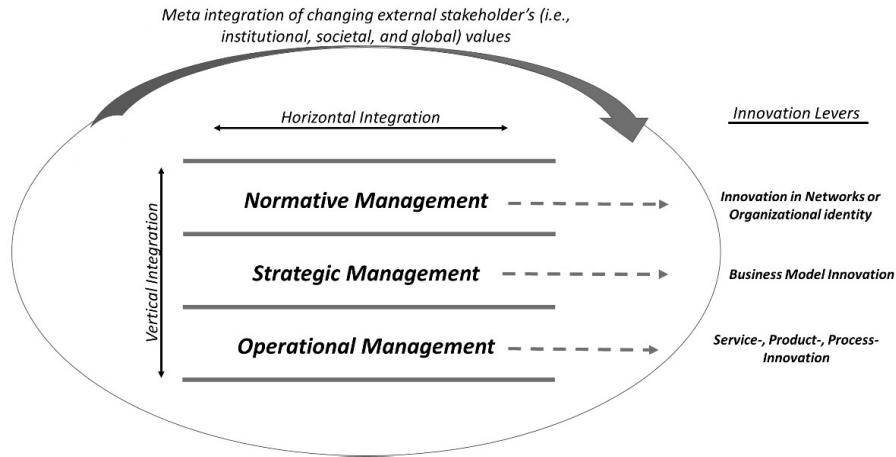
Furthermore, the framework emphasises that an organisation’s effectiveness depends on the degree of its meta-alignment with changing stakeholder values external to the organisation, vertical alignment across its normative, strategic, and operational levels of management, and horizontal alignment across its structures, activities and behaviours.

Breuer and Lüdeke-Freund (2017) propose that the management (i.e., integration) of values on each of the three management dimensions contribute to corresponding forms of values-based innovation (Figure 1):

- 1 On a normative level in interorganisational networks or in organisational identity, it is facilitated through the recognition and integration of often implicit stakeholder values in official corporate statements, policies, and/or desired outcomes of cultural change.
- 2 On the strategic level in business model innovation and strategic renewal, it is facilitated through the integration of stakeholder values into business model components, organisational structures, management systems, activity-guiding programs, and role definitions or guidelines for problem solving.

- 3 On the operational level in service, product, and process innovations, it is facilitated through the integration of stakeholder values into innovation process stages, administrative systems, operational tasks, and performance and cooperation practices.

Figure 1 The values-based innovation framework, with integration mechanisms, management levels and innovation levers



Source: Based on Breuer and Lüdeke-Freund (2017) and Bleicher (2011)

2.3 Innovation challenges

Innovation challenges can be viewed as factors that inhibit innovation (see Hjalmarsson et al., 2014). Previous research has proposed various frameworks for categorising the multitude of factors that inhibit innovation, including external vs. internal (Hadjimanolis, 2003), revealed vs. deterring (D'Este et al., 2012), systemic, behavioural and political (Baum et al., 2014). A literature review by Smith et al. (2008) distinguishes nine major categories of factors that impact an organisation's ability to manage innovation. One of these categories refers to cultural factors as "the values and beliefs of the organisation and how these impact the management of innovation within the organisation" (ibid, p.9). Their analysis suggests that "culture is a key factor in the management of innovation ... that impacts all others and is also impacted upon by changes in the other factors" (ibid, p.14). The culture of the organisation is reflected in the organisational structure, prevalent management styles, knowledge management, and operational processes that guide the generation, development, and implementation of innovations. Notably, culture and strategy are two factors that the authors highlight as highly interdependent since the organisational strategy reflects the underlying culture but can also trigger and guide cultural change. This interdependence can be interpreted through the prism of the values-based innovation framework, which views strategic management as an intermediary management level where values on the normative level (espoused culture) are aligned with values on the operational level (enacted culture) and vice versa.

2.4 Gamification in the context of innovation management

Gamification, or “the use of game design elements in non-game contexts” (Deterding et al., 2011) is relevant to fostering the integration of values in managing innovation and building an innovation-supportive culture. Gamification taps into key motivational drivers of human behaviour through extrinsic (e.g., prizes, penalties, status) and/or intrinsic (e.g., fun, group membership, purpose) reinforcements. In this way, gamification assists in managing employee behaviours [Patrício et al., (2018), p.501] and attitudes (Procopie et al., 2015). Therefore, gamification addresses tacit, informal, emotional, and intangible factors that drive innovation cultures.

Studies indicate that elements inherent to gamification – such as formalised social interaction, non-monetary reward systems and storytelling – provide levers for building innovation-supportive cultures (Jassawalla and Sashittal, 2002; O’Reilly, 1989; Hogan and Coote, 2014). Moreover, when integrated in day-to-day business processes, gamification methods become part of the organisational culture and translate into cultural artefacts (like stories, physical arrangements and rituals). As instantiations of values, these artefacts include gamified approaches that facilitate the communication of values and cultural change by encouraging employees to adopt the organisation’s values through rituals, simulations, storytelling, etc.

Despite the opportunities presented by using gamification for innovation, the literature on potential applications is scarce. Gudiksen and Inlove (2018) review a number of gamified formats and games dealing with values and culture-related organisational challenges. They study their different applications to business challenges (such as breaking down silos, suspending power relations, and establishing trustworthy relations), or to challenges in the innovation process such as mitigating conflicts between competing objectives.

Other authors have focused on the role of gamification as a method to enhance creativity, engagement, and collaboration related to ideation challenges in the early stage of innovation (Patrício et al., 2018; Patrício, 2016; Schulz et al., 2015). Different approaches have been tested such as gamestorming (Gray et al., 2010) or gamified crowdsourcing (Roth et al., 2015; Kavaliova et al., 2016; Morschheuser et al., 2017a). However, there is sparse research on how gamification contributes to challenges in later stages of the innovation funnel, such as implementation or capture and evaluation (Shpakova et al., 2020).

In the context of cultural challenges to innovation, some authors have focused on how gamification generates social dynamics to overcome deficient interactions among interdisciplinary and cross-functional groups (Asmawi and Mohan, 2011; Tidd and Bessant, 2018; Dombrowski et al., 2007). In a broader context, Shi et al. (2017) discovered that the social, hedonic, and utilitarian mechanics of gamification provide effective means to address culture-related challenges faced by manufacturing firms in their transition to advanced service provision, such as barriers to interaction with customers and suppliers.

3 Research questions and design

Research on gamification approaches to dealing with cultural challenges and facilitating values-based innovation processes is still fragmented. Literature reviews are missing, and

most papers are not generalisable since they are limited to individual cases and a narrow scope with respect to innovation and gamification. As a consequence, practitioners, innovation managers, and designers who want to implement gamification to address cultural challenges and foster values-based innovation are missing reliable sources of knowledge on preconditions, requirements, and critical design elements and observations that can inform their efforts. Therefore, this study aims to answer the following research questions:

- 1 What are the core insights and research gaps in the academic literature on gamification dealing with cultural challenges to successfully implementing values-based innovation management?
- 2 How can gamification help to overcome cultural challenges to facilitating values-based innovation management? What actionable management guidelines are suitable for the design and implementation of gamified methods addressing cultural challenges and facilitating values-based innovation management?

Considering the fragmented research context and its early stage of development, we selected an exploratory research design to address the two research questions (Babbie, 2007). We synthesise insights from a literature analysis and expert interviews and draw from different company cases to aggregate the available management and design knowledge.

First, we conducted 26 exploratory expert interviews with innovation managers and experts from six European firms, each expert with a widely acknowledged track record in gamification for innovation: a science conglomerate, a telecommunications company, a metering company, an insurance company, an airline subsidiary for IT services, and a bank. We developed a semi-structured interview guide covering three areas of interest: major challenges to innovation, past experiences with gamified formats, and perceived future potential for using gamification. The interviews were conducted between June and October 2019 with companies located in Germany, Denmark, Spain, and the Netherlands. Respondents were selected based on two criteria:

- 1 having first-hand experience with gamification in an organisational context
- 2 being actively involved in their company's innovation processes.

The average interview duration was 45 minutes (see Table 1 for an overview of the study's sample and dataset).

To interpret the empirical data, we employed coding and aggregation procedures for expert interview analysis (Meuser and Nagel, 2009). We looked for response patterns and categories, how they help to inform the different management dimensions of normative, strategic, and operational management, and how they fit with overarching concepts such as preconditions and design challenges for gamification; aspects of innovation such as challenges, capabilities, process stages, and application domains; and aspects of organisational culture such as values, collaboration and cooperation, customer focus, time horizon (see Schein, 2010; Detert et al., 2000).

Our analysis of the literature followed Tranfield et al.'s (2003) systematic literature review methodology and consisted of two parts. First, an initial literature analysis elicited a total of 415 research papers sourced from SCI, SSCI, AHCI, and Web of Science databases between 1900 and 2021. The following keywords were used: (gamif* AND innovation) OR (gamif* AND creativity) OR (gamif* AND idea*) AND (culture OR

values). The word ‘game’ was excluded from the search string because it elicited a large number of additional articles (3,022), mostly unrelated to the topic of business innovation and our research questions and instead dealing with computer games and the video game industry.

Table 1 Overview of sample and dataset

<i>Companies and number of interviews</i>	<i>Positions of interviewed employees</i>
Science conglomerate (2)	Innovation manager, senior application support engineer
Telecommunications company (6)	Head of corporate gallery, senior expert at transformation office, senior expert for people transformation, design and customer experience lead, senior project manager of HR digitalisation and innovation
Metering company (2)	Senior UX designer, Head of data analytics and UX design
Insurance company (9)	Senior executive corporate strategy, chief executive HR transformation, head of management control department, smart insurance project lead, smart insurance for mobility product owner, senior consultant for organisation and processes, innovation manager, head of mobility product management department, senior executive of prevention programme
Airline subsidiary for IT services (4)	Executive for business development and innovation, CEO’s executive assistant, innovation manager, innovation manager
Bank (3)	Senior development manager, chief consultant business development, chief business analyst

Only JCR indexed papers were reviewed (no books and no conference proceedings). The 415 articles were narrowed down to 58 dealing with the topic of business, management, or economics. These were further narrowed down to 14 articles focusing on the concepts of values and culture in an innovation or entrepreneurship-related context.

In the second part of the literature analysis, we conflated industry and academic perspectives on the subject by reviewing International Society for Professional Innovation Management (ISPIM) conference, symposium, and innovation forum papers between 2009 and 2021. ISPIM is a community of researchers, practitioners, entrepreneurs, consultants, and public entities who share an interest in innovation management. One of their focus themes is gamification. We chose to review ISPIM publications due to the strong participation of innovation practitioners and consultants in its community and its comparatively stronger emphasis on practice-oriented themes in relation to the more theoretical focus of journal publications. We found 85 articles (<https://www.ispim-innovation.com>) that include the keywords ‘game’, ‘games’, or ‘gamification’ and extracted 37 that explored gamification methods for innovation, 11 of which we excluded from our analysis because only their abstracts had been published. We further narrowed down the list to 12 papers that included the keywords ‘culture’ OR ‘values’.

Thus, we selected and conducted an in-depth review of a total of 26 academic and practice-oriented papers discussing gamification approaches that address values-based innovation and cultural innovation challenges. We systematically described each article, summarising cultural challenges to innovation, research methods or approaches, games or

gamification format types, insights relevant to our research questions, and their suggestions for effective design or implementation.

4 Findings

In reviewing the selected literature, we related the cultural challenges with the normative, strategic, and operational management levels of the values-based innovation management framework (Breuer and Lüdeke-Freund, 2017). On the normative level of management, eight of the reviewed publications explored the potential of gamification to address challenges of alignment between stakeholder values and espoused organisational culture (see Table 2). On this level, cultural challenges consisted of the appropriate consideration of values specific to generations (Procopie et al., 2015), the different phases of group development (Jovanović et al., 2016), and the translation of values into daily practices (e.g., Gudiksen and Sørensen, 2017; Breuer et al., 2022b). Open innovation (Gimenez-Fernandez et al., 2021), brand perception (Eigenraam et al., 2021), and European policy (Perrotta et al., 2020) are discussed as challenging application contexts. Several gamification approaches support alignment of stakeholder values and espoused organisational culture, brand engagement initiatives, and attendance to key ethical issues of gamification design.

On the strategic management level, five of the reviewed studies present approaches for addressing challenges of business model innovation and strategic renewal (Table 3). Typical cultural challenges on this level are related to the leveraging of background knowledge, (contradictory) inter-organisational knowledge (Shi et al., 2017; Santonen et al., 2020), and manager skills and capacities conducive to (radical) business model innovations based on sustainability values (Lejeune, 2012; Wagner and Gałuszka, 2020). These challenges are addressed across the application contexts of stakeholder relationships (e.g., with clients or supply chain partners), workshop facilitation, and employee assessment and training. Different gamification approaches and game mechanics are discussed in relation to their effectiveness in enabling stakeholder dialogue and providing participants with a shared understanding of common values, normative directions, and strategic options [e.g., for availability-based vs. performance-based servitisation, see Shi et al. (2017) or for incremental technological developments vs. radical innovation, see Wagner and Gałuszka (2020)].

On the operational level, 16 of the reviewed studies concentrate on the more general social outcomes of gamification, that is, to improve engagement, communication, and collaboration among stakeholders across the innovation funnel of service, product and process innovations (Table 4). Here, the extant literature discusses cultural innovation challenges such as organisational inertia (Gimenez-Fernandez et al., 2021), values-based conflicts (Sick et al., 2018), and meagre intrinsic motivation (e.g., Lithoxidou et al., 2020; Morschheuser et al., 2017a), communication, collaboration, experimentation, or risk taking among stakeholders and within heterogeneous teams (e.g., Patricio et al., 2020; Parjanen and Hyypiä, 2019). Challenging application contexts include crowdsourcing (e.g., Morschheuser et al., 2017a), co-creation, and cross-functional collaboration (e.g., Bang, 2009; Parjanen and Hyypiä, 2019), ideation (e.g., Järvillehto et al., 2011), and open innovation (Bhimani et al., 2018; Gimenez-Fernandez et al., 2021). The effectiveness of different game mechanics and other design approaches

depends on the purpose and application context of the intervention, e.g., hedonic (motivation, engagement), social (team spirit, consensus building) and utilitarian [for creativity, productivity and cognitive outcomes, see Patrício et al. (2018)].

In addition, the literature suggests several types of games and gamified formats that are suitable to address specific cultural innovation challenges. First, dilemma games have been discussed for their potential to raise awareness and establish a shared understanding of organisational values (Breuer et al., 2022a; Gimenez-Fernandez et al., 2021) and to promote vertical as well as horizontal communication across boundaries (Gudiksen and Sørensen, 2017). Second, gamified workshop facilitation methods can guide participants through the collaboration process, support co-creation (Sick et al., 2018), and ensure that initial values-based framing informs subsequent decision-making (Breuer et al., 2022a; Ivanov and Breuer, 2021; Gimenez-Fernandez et al., 2021). Modelling materials can also be used as boundary objects to support workshop activities (Zenk et al., 2021). Third, several publications propose different ideation games as methods to promote collective creativity, collaboration, experimentation, and risk taking through the use of tangible symbols and actions (Patrício, 2016; Parjanen and Hyypiä, 2019; Gimenez-Fernandez et al., 2021). Fourth, another often discussed type of intervention is gamified crowdsourcing platforms, which enhance the engagement and motivation of employees and other stakeholders in contributing to the innovation process (Morschheuser et al., 2017a; Roth et al., 2015; Zimmerling et al., 2019; Gimenez-Fernandez et al., 2021). Fifth, the literature also presents various design games that facilitate dialogue between designers and other stakeholders, e.g., regarding values (Bang, 2009) or the implementation of alternative design strategies (Santonen et al., 2020). They can also be used to capture logic and emotions related to the design process and thus enable assessment of managerial capacities and skills (Lejeune, 2012). Sixth, less often discussed formats include traditional business simulations (see Dubina, 2015), which Bhimani et al. (2018) use to address social exclusion challenges in open innovation and approaches to gamifying social collaboration platforms and customer engagement initiatives (see Lithoxidou et al., 2020; Eigenraam et al., 2021). Seventh, agile management and retrospective games have potential to improve a shared understanding of values and project-related objectives in the early (forming and storming) phases of small group development (Jovanović et al., 2016; Gimenez-Fernandez et al., 2021).

From the interview transcripts, we also derived observations and lessons learned from the experts regarding the effective design and implementation of gamification to address innovation challenges. These were clustered into 11 emergent categories making up design and implementation guidelines associated with the different forms of values-based innovation: on the normative level, in interorganisational networks, or in organisational identity; on the strategic level, in business model innovation and strategic renewal; and, on the operational level, in service, product and process innovations (see Tables 5, 6 and 7). These findings were deepened with references to the scientific literature we analysed, which provided further support to the interviewees' observations and elicited further guidelines in the categories already identified.

Table 2 Gamification approaches (in normative management) to foster alignment of stakeholder values and espoused organisational culture

<i>Publication</i>	<i>Cultural challenge to innovation</i>	<i>Research method/approach</i>	<i>Game/gamification format type</i>	<i>Insights</i>
Procopie et al. (2015)	Companies need to adapt to Generation Y's values of independence, openness, idealism, and interactive work to adequately engage them in innovation processes.	Survey	-	Generation Y focuses on the potentials of gamification to aid product and service development, gain knowledge and skills, and create an interactive environment for innovation.
Jovanović et al. (2016)	Group development phases of forming, storming, norming, and performing in agile teams are facilitated through agile retrospective games. How can we select appropriate games for each phase?	Literature review	Agile retrospectives	The suitability of 85 retrospective games to support the four phases of group development is assessed and provides guidance for practitioners to select the appropriate ones.
Gudiksen and Sørensen (2017)	Official organisational values are frequently abstract and disconnected from daily practice, preventing their adoption in everyday work situations and customer interactions, as well as their potential to drive innovation.	Action research	Dilemma games	Dilemma games support the adoption of organisational values, sensitise employees to potentially conflicting or abstract values, and promote (values-based) communication across organisational boundaries.
Breuer et al. (2019)		Design patterns		
Ivanov and Breuer (2021)		Design patterns	Workshop facilitation	Gamified workshops can use a series of mini-games to raise awareness about corporate values, clarify ambiguous normative statements, and foster participants' adoption of values in daily work.
Gimenez-Fernandez et al. (2021)	Organisational inertia is a common cultural barrier to the successful transition towards open innovation. In the institutionalising stage of open innovation, it hinders cross-functional collaboration and the development of a shared, long-term vision that aligns employees.	Literature review	Agile workshop facilitation, dilemma games	Retrospective games, dilemma games, and gamified workshop formats facilitate the institutionalising stage of open innovation by increasing employees' intrinsic motivation, aligning their understanding of organisational values, introducing new forms of collaboration, or agreeing upon a new shared vision.
Perrotta et al. (2020)	Values of social responsibility and ethics are accepted guiding principles for market and innovation stimulation in European funding policies. Gamification has become a prominent policy priority, but ethically problematic aspects of gamification have remained neglected in European policy discourse.	Policy and discourse analyses	-	Recommendations are made for examining 'games as culture' and attending to key ethical issues of gamification (design), such as competition-collaboration dialectics, the role of uncertain rewards, the importance of social values, and the representation of stereotypical roles, narratives, gender, race and class.
Eigenraam et al. (2021)	The appropriate use of gamification approaches to engage customers in positive brand perception depends on the type of brand image the company has. How do brand values and heritage, in addition to warmth and competence, play a role in consumer responses to engagement initiation?	Survey	Customer engagement initiatives	Entertainment initiatives are not appropriate for warm brands, whereas informative engagement is appropriate for both warm and competent brands.

Table 3 Gamification approaches (in strategic management) for facilitating business model innovation and strategic renewal

Publication	Cultural challenge to innovation	Research method/approach	Game/gamification format type	Insights
Lejeune (2012)	The incorporation of 'strong sustainability' into business models necessitates the identification and evaluation of managers' skills and capacities to design business models based on sustainability values.	Single case study	(Business modelling) design games	A table game captures the logic and emotions related to the design of new sustainable business models and assessment of managers' capacities and skills.
Shi et al. (2017)	In transitioning towards advanced service provision, manufacturing companies must overcome cultural barriers, such as difficulties in sharing interorganisational knowledge or establishing interactive relationships with clients and supply chain partners.	Literature review	-	A theoretical model proposes two levels of gamification design: a viability-based and performance-based growth. Practitioners use gamification's emotional mechanics (hedonic, utilitarian and social) to overcome barriers to servitisation.
Breuer et al. (2019)	Workshops that address complex innovation management challenges require leveraging background knowledge, establishing common ground among participants, and facilitating creative collaboration.	Design patterns	(Business modelling) workshop facilitation	Gamified workshop facilitation methods provide participants with a shared understanding of common values, normative directions, and strategic options, and ensure that initial (values-based) framing informs subsequent decision-making.
Santonen et al. (2020)	Diversity of stakeholders with complementary or controversial skills and knowledge can pose a barrier to developing a shared strategic vision for circular economy business models.	Single case study	(Business modelling) design games	Qualitative and quantitative evaluation of a board game uses descriptions of circular economy strategies and blank cards to be filled. The game combines theory and business model design strategies to enable stakeholder dialogue and development of a shared vision.
Wagner and Gatuszka (2020)	Games promoting (sustainability-oriented) innovation should allow for creative acting and thinking. How can niches for innovation and radical change be incorporated in the imaginaries of games that reproduce outdated socio-technical regimes?	Discourse analysis	-	A critical analysis of social imaginaries in six digital serious games about the transition towards renewable energy advocates for less reductionist design to explain complex energy issues, by emphasising central priorities and a radical change of the social order.

Table 4 Gamification approaches (in operational management) addressing cultural innovation challenges

<i>Publication</i>	<i>Cultural challenge to innovation</i>	<i>Research method/approach</i>	<i>Game/gamification format type</i>	<i>Insights</i>
Bang (2009)	Users' emotional values and experiences about a product are difficult to verbalise, making communication and collaboration with designers difficult.	Single case study	Design games	A 'design game' engages users in a dialogue about soft and non-verbal issues like emotional values in textile design.
Morschheuser et al. (2017a)	Crowdsourcing campaigns bring in contributions from a wide range of stakeholders, promoting innovation-supportive cultures. However, as they provide little or no monetary incentives, their success is contingent on engaging 'the crowd' through intrinsic motivation.	Literature review	Crowd-sourcing platforms	A conceptual framework examines the attributes of gamified crowdsourcing systems, showing that gaming experiences elicit intrinsic motivation and increase crowdsource contributions.
Roth et al. (2015)		Literature review		Overview of a longitudinal study (Scheiner, 2015) indicates that basic game elements such as points, rating systems, badges, or levels positively impact the motivation to participate.
Zimmerling et al. (2019)		Field experiment		Game elements boosting crowdsourcing platform activity are ineffective at increasing the quantity and quality of ideas. Practitioners should treat game elements with caution to avoid undermining the utilitarian aspects of crowdsourcing.
Breuer et al. (2019)		Design patterns		Crowdsourcing formats foster engagement and collaboration through gamified ideation, resource allocation, crowdfunding and 'innovation markets'.
Parjanen and Hyypiä (2019)	Innovation-supportive cultures require collaboration among a wide range of stakeholders, but team heterogeneity and differences in working and communication styles can hinder collective creativity processes.	Single case study	Ideation games	The Innotin game supports innovation activities through cognitive (learning and understanding) and social (creative atmosphere, facilitated dialogue, networking and ideation) affordances.
Skaržauskienė and Kalinauskas (2014)		Literature review		Gamification fosters collective intelligence and creativity by incorporating game elements that promote competitiveness, collaboration, engagement/immersion and flow.
Zenk et al. (2021)		Comparative evaluation	Workshop facilitation	Moderation cards and LEGO bricks as boundary objects support workshop activities generating knowledge, negotiating, creating meaning, assuming alternative perspectives and exploring future potentials.

Table 4 Gamification approaches (in operational management) addressing cultural innovation challenges (continued)

<i>Publication</i>	<i>Cultural challenge to innovation</i>	<i>Research method/approach</i>	<i>Game/gamification format type</i>	<i>Insights</i>
Järvelä et al. (2011)	Conflicting organisational pressures, high complexity and uncertainty, and continuous exploration of customers' needs and values at the front end of innovation requires increased levels of engagement and collaboration among diverse stakeholders.	Multiple case study	Ideation games	InnoCoop enhances front-end innovation efforts through competition and a tournament format of serious games.
Patricio et al. (2018)		Literature review	-	Cross-comparison of 18 cases of gamification in the early stage of innovation identifies three positive gamification outcomes: hedonic (motivation, engagement), social (team spirit, consensus building), and utilitarian (cognitive).
Patricio (2016)	Innovation cultures support behaviours and capabilities such as collaboration, experimentation, and risk taking. How can such values be promoted through tangible symbols and actions?	Single case study	Ideation games	ideaChef helps teams to ideate solutions by using cooking metaphors, supporting innovation and co-creation in a more open environment, stimulating dialogue, team building and team spirit and shaping an innovation-supportive culture.
Patricio et al. (2020)		Multiple case study		
Bhimani et al. (2018)	Social exclusion experienced by individuals and groups threaten their sense of belonging and impede open innovation projects.	Single case study	Business simulation	An Open Innovation Game addresses social exclusion challenges by examining interactions and exchanges in open innovation processes.
Lithoxoidou et al. (2020)	Social collaboration platforms contribute to employee engagement and support knowledge exchange but motivating employees for long-term participation can be challenging.	Single case study	Social collaboration platforms	Positive qualitative and quantitative evaluation of an online social collaboration platform gamified through game mechanics that award participants for their active participation in exchanging knowledge and engaging in routine workplace activities with low interest.
Siek et al. (2018)	Wicked problems entail a wide range of stakeholders with opposing values, necessitating the integration of disparate viewpoints and collaboration among diverse actors.	Single case study	Workshop facilitation	The article proposes WickSprint as a holistic approach for multidisciplinary workshops using gamification elements (instead of crowdsourcing and innovation contests) to engage participants and foster collaboration.
Gimenez-Fernandez et al. (2021)	Organisational inertia is a common cultural barrier to open innovation, including the not-invented-here and not-sold-here syndromes, functional fixedness, knowledge inertia, and the lack of employee motivation and commitment.	Literature review	Crowd-sourcing platforms; ideation games	A systematic literature review proposes gamified crowdsourcing, future scenario techniques, and ideation games for facilitating the unfreezing and moving stages of open innovation. They overcome organisational inertia by boosting creativity and learning, introducing new communication flows, and engaging the crowd in the exploration of business opportunities.

In addition, the literature review indicated three further categories of guidelines for addressing cultural challenges on the operational management level:

- 1 using physical tools to promote communication and collaboration (Patrício et al., 2018; Parjanen and Hyypiä, 2019; Zenk et al., 2021)
- 2 using non-technical language to facilitate understanding (Procopie et al., 2015; Santonen et al., 2020; Zenk et al., 2021)
- 3 considering the pros and cons of using games or only game elements (i.e., gamification) depending on the application context (Skaržauskienė and Kalinauskas, 2014).

Table 5 Management guidelines to design and implement gamification addressing cultural innovation challenges of normative management

<i>Overarching design and implementation guidelines</i>	<i>Recommendations and exemplary quotes</i>
Providing clarity about the games' purpose and real-world impact	<p>Clarify the desired consequences of the activity to participants: "The game or the setting should impart to the people what kind of behaviour is expected from them" (Senior expert for people transformation at Telco).</p> <p>Clarify potentially negative consequences of the activity to participants: "What happens when you even don't play it, what happens when you win it, what happens when you lose it" (Design and customer experience lead at Telco).</p> <p>Rules that connect actions with rewards clarify the purpose of playing [Lithoxoidou et al., (2020), p.8].</p>
Ensuring fit to employee target groups and the organisational culture	<p>Ensure fit of gamification to employee target groups: "Not that it is one gamification for all. It [should be] goal oriented, knowing why I do what I do, and above all for whom ... and what (gamification) functions are relevant for them" (Innovation manager at airline subsidiary).</p> <p>Ensure fit of game rules to employee target groups: "How do we support a process to think that there are no strict rules ... rather to say that we have fundamental principles that are behind and for each target group, for each occasion we reconsider how is that game on that day" (Senior expert for people transformation at Telco).</p> <p>Among the great variety of approaches, identify those "that fit into the corporate culture, with the corporate purpose ... What is ... feasible? What can ... help us as a company and what can ... help the employees to successfully use gamification?" (Senior project manager of HR digitalisation and innovation at Telco).</p> <p>Consider Generation Y's attitudes and preferences (Procopie et al., 2015)</p> <p>Ensure fit to the current stage of a team's group development (Jovanović et al., 2016).</p> <p>Engage participants with diverse attitudes, but avoid confusion caused by unconventional rules or fuzzy guidelines [Breuer et al., (2019), p.17].</p> <p>Consider differences in the requirements and acceptance of games among educators and practitioners (Santonen et al., 2020).</p>

Table 5 Management guidelines to design and implement gamification addressing cultural innovation challenges of normative management (continued)

<i>Overarching design and implementation guidelines</i>	<i>Recommendations and exemplary quotes</i>
Considering the pros and cons of using games or only game elements	Avoid full-fledged games that constrain creativity by forcing players to comply with rules and use instead individual game design elements that do not involve the constraints found in the gaming world environment [Skaržauskienė and Kalinauskas, (2014), p.5].
Co-developing with employees to foster adoption and alignment with business objectives	Engage lead users from the workforce: “We have a strong gaming community ... with more than 9,000 subscribers ... You can ask these guys to perhaps also develop a game or think about what makes you play games” (Design and customer experience lead at Telco). Incorporate game tools to engage employees in the definition of corporate values. Foster self-efficacy and a sense of ownership by accompanying top-down definition and promotion of official values by contributions from individual members and newcomers to the organisation [Gudiksen and Sørensen, (2017), p.11]. Interview stakeholders to consider the special requirements of the industrial work environment (Lithoxoidou et al., 2020).

Table 6 Management guidelines to design and implement gamification addressing cultural innovation challenges of strategic management

<i>Overarching design and implementation guidelines</i>	<i>Recommendations and exemplary quotes</i>
Ensuring fit to the organisational strategy and/or pressing needs or challenges	Use gamified approaches for challenge-based ideation and idea management: “We [provide] every employee with 1000 euros a year to support and work on ideas in our crowdfunding system ... In this platform, one sees ... the challenges that have been defined. And we have different areas in which we look for ideas or where one can propose ideas besides these challenges which become visible to all employees in the company” (Innovation manager at airline subsidiary). Reflect on the effectiveness of gamification components to contribute to strategic objectives: “One should really look at what makes sense and why I use gamification functions or ... components and what I want to achieve with them ... and then ... self-reflect on if I really achieve that” (Innovation manager at airline subsidiary).
Considering time and resource expenditures as boundary conditions for implementation and dissemination	Ensure that games can be learned and played quickly: “Ideally, you have something that is easy to understand and easy to scale, because then you can spread it though the whole organization. And if I am talking about the main challenge, which is the cultural challenge, I think we need something that is easily scalable” (Head of corporate gallery at Telco). Involve influential stakeholders to support dissemination and scaling throughout the organisation: “Gamification is after all ... a new method ... It will be implemented successfully only when it has corresponding [top management] promoters [that motivate employees to try the new method]” (Smart insurance project lead at insurance company).

Table 7 Management guidelines to design and implement gamification addressing cultural innovation challenges of operational management

<i>Overarching design and implementation guidelines</i>	<i>Recommendations and exemplary quotes</i>
Ensuring sufficient support from middle and top management	<p>Indicate the importance of the activity: “to see that the key bosses are also participating in the game session” (Senior expert at transformation office at Telco).</p> <p>Help to foster engagement and ensure intrinsic motivation by having top managers participate on an equal footing with other employees [Procopie et al., (2015), p.1145f].</p>
Ensuring professional moderation	<p>Have facilitators clarify the purpose in advance: “[They] must ... talk about what is actually done ... Are [they] doing organizational development and trying to change people, to influence teamwork, to optimize processes? [They] should not be scared away if there is resistance” (Senior expert for people transformation at Telco)</p> <p>Have an experienced facilitator for commenting on the game process and purpose, ordering tasks, warming up, relaxing, and engaging the participants [Parjanen and Hyypiä, (2019), p.31].</p> <p>Ensure game success by engaging facilitators with prior experience playing the game before moderating it.</p> <p>Have experienced facilitators to guiding participants using boundary objects (LEGO bricks) in building models and formulating metaphors [Zenk et al., (2021), p.10].</p>
Avoiding misleading incentives	<p>Prevent disincentives, cheating to maximise game performance (posting many ideas with poor quality), or straying from the organisation’s objectives [Procopie et al., (2015), p.1146; Breuer et al., (2019), p.17].</p>
Adjusting balance between reward systems and intrinsic motivation	<p>Design games that are not based on monetary incentives: “[They] should be so well designed that people have fun playing it. And this is the core ... you want to release people from this profit orientation ... With a new game thinking about CO₂ reduction ... the winner [and] ... the telecom sponsors... [could invest in] sustainable projects ... [for] a societal benefit” (Design and customer experience lead at Telco).</p> <p>Emphasise intrinsic (values) rather than extrinsic (monetary incentives) motivations [Järvilehto et al., (2011), p.7].</p> <p>“When intrinsic motivation is supported by extrinsic stimuli, individuals may feel less motivated to work without a boost from the outside sources” [Skaržauskienė and Kalinauskas, (2014), p.5].</p> <p>Generation Y players are more likely to pursue intrinsic rather than extrinsic motivations, such as learning or feeling good about helping others [Procopie et al., (2015), p.1145].</p> <p>Avoid external incentives have little to no direct impact on the quality of proposed ideas, and provide instead intrinsic motivation such as real-time performance feedback and goal setting to have a positive impact on performance (Zimmerling et al., 2019).</p>

Table 7 Management guidelines to design and implement gamification addressing cultural innovation challenges of operational management (continued)

<i>Overarching design and implementation guidelines</i>	<i>Recommendations and exemplary quotes</i>
Adjusting task complexity and game characteristics	<p>Avoid strict rules that limit creativity even though playfulness can distract from main objectives: “Gamification should not mean that there will be a set of rules, imposed, forced that limit too much creativity and free space” (Senior expert for people transformation at Telco).</p> <p>Do not compromise the personal privacy of participants: “To organize myself through such a gamification approach that is very connected with my daily life and pushes a lot on my personal daily routine ... that doesn’t work when it becomes too personal ... [or] if one violates the rules or does not hold on to what he/she has set to achieve” (Senior expert for people transformation at Telco).</p> <p>Consider task characteristics and complexity when integrating game elements into crowdsourcing systems. Simple points and leaderboard-based designs are more appropriate for crowd rating and crowd processing, whereas crowdsolving and crowd creating can benefit from a variety of gamification designs that engage broad target groups in the short and/or long-term (Morschheuser et al., 2017a).</p> <p>Design tasks that are sufficiently challenging (confront business assumptions) to motivate participants [Patricio et al., (2018), p.506].</p> <p>Gamify desired behaviours by dividing them into small and easily fulfilled actions following the so-called tiny habit theory [Lithoxoidou et al., (2020), p.8; see Fogg, 2019].</p>
Balancing competitiveness which fosters motivation to play, but can also put pressure on participants	<p>Integrate community (team-based) aspects to improve motivation, internal communication, and collaboration: “Some sort of a community should emerge so that ... a sense of togetherness is discovered ... exactly like with that sport app... One can find people who walk the same routes ... and walk together” (Järvillehto et al., 2011).</p> <p>Design games based on cooperation, or a combination of cooperation and competition rather than competition alone in order to be more supportive in achieving a common output or goal.</p> <p>Encourage individual creativity in a competitive environment for ideation but be aware that the setting is less controllable than in a collectivistic setting and may provoke negative outcomes (Skaržauskienė and Kalinauskas, 2014).</p> <p>Motivate crowdsourcing participants more effectively using rankings or public visualisations of achievements as opposed to individual-level elements (Morschheuser et al., 2017a).</p> <p>Be aware that some gamification features that stimulate autonomy, competence, and social relatedness (such as design patterns for setting of shared goals or design principles for the design of motivational affordances) are more fit for developing cooperative formats than others (Morschheuser et al., 2017b).</p>

Table 7 Management guidelines to design and implement gamification addressing cultural innovation challenges of operational management (continued)

<i>Overarching design and implementation guidelines</i>	<i>Recommendations and exemplary quotes</i>
Balancing competitiveness which fosters motivation to play, but can also put pressure on participants	Ensure a networking environment to provide dialogue, information sharing, empathy, and transparency in gamification [Patricio et al., (2020), p.152].
Using non-technical language to facilitate understanding	Define game goals and objectives in a non-technical manner so that they are understandable for all participants [Procopie et al., (2015), p.1145]. Be aware that participants' task domain knowledge may heavily impact how useful they perceive a game (Santonen et al., 2020). Use a skill-building phase when introducing participants to new formats or mediums of play (LEGO bricks). Use a sense-making phase at the end of innovation workshops to retranslate insights generated from unconventional material to the existing organisational language [Zenk et al., (2021), p.10].
Using physical tools to promote communication and collaboration	Encourage interaction, consensus building, cognitive and creative thinking among participants by using physical tools such as cardboard, decks, art craft materials, or board games (Patricio et al., 2018). Use metaphoric boundary objects like notes, cards, and media as a coordinating mechanism to encourage knowledge sharing [Parjanen and Hyypiä, (2019), p.31]. Use LEGO bricks as they are more enjoyable and inspiring than moderation cards and are more suitable for aiding collaboration in the initial phases of the innovation process (ideation, conceptualisation). Use traditional moderation cards in the later stages of implementation, project specification, planning, budgeting, etc. [Zenk et al., (2021), p.12].

5 Discussion

Based on a literature review and 26 expert interviews, we identify several types of games and gamified formats that can be used to overcome cultural challenges and drive values-based innovation. Previous research on a limited variety of different games and gamified formats indicated a general (but not arbitrary) suitability of gamification to facilitate values-based innovation. In the literature, we found a strong focus on cultural challenges in the early stages of innovation; by contrast, our expert interviews indicated cultural challenges throughout all stages of the innovation process. This suggests a prevalent need for adopting measures and tools that enhance performance in the later and seemingly more problematic areas of innovation performance (i.e., implementation and the capture and evaluation of innovation results).

Concerning good practices in the implementation of gamification approaches to overcome cultural challenges, we find limited guidance on important matters such as type of participants, mechanisms and teams. This important aspect is often omitted because attitudes towards competitiveness (Skaržauskienė and Kalinauskas, 2014; Morschheuser

et al., 2017a), unconventional rules (Breuer et al., 2022a), physical boundary objects (Zenk et al., 2021), complexity of tasks (Patricio et al., 2018; Morschheuser et al., 2017a), or games in general (Skaržauskienė and Kalinauskas, 2014) vary depending on the participants and the context.

Furthermore, we found several gamification approaches – such as dilemma games and design games that enable facilitation of a bottom-up formulation of values involving individual employees in a ‘dynamic value definition’ of an organisation – that complement the conventional top-down approach of trying to align employees with the normative directives of the organisation (Breuer and Lüdeke-Freund, 2017; Gudiksen and Sørensen, 2017). Although organisational values defined at and descending from an authoritative upper management level play a key role in defining organisational cultures, these may remain disconnected from the values of operational employees or other important stakeholders. Thus, a top-down approach to communicating corporate values (see Jollands et al., 2015) may overlook employees’ individual priorities and undermine rather than support cultural integrity. When incompatibilities between official values and individual employee values remain unaddressed, they increase the organisation’s propensity for cultural (innovation) challenges, such as resistance to change and value-action gaps (Edwards and Cable, 2009; Sull et al., 2020).

Values and cultural issues are rarely self-evident, but instead are deeply woven in individual and organisational practices. Therefore, leveraging them to drive innovation requires more complex forms of gamification, likewise a richer set of mechanics than simple points, badges, and leaderboards are required to crowdsource diverse and creative contributions with gamification (see Morschheuser et al., 2017a). Moreover, the gamification of innovation activities that address social or environmental challenges needs to go beyond a reductionist design that underestimates the complexity of such wicked problems and the trade-offs between conflicting stakeholder values that they imply (Sick et al., 2018). To do so, designers should attend to the importance of ethical values that inform the design process and develop game imaginaries to support niches for radical (e.g., sustainability-oriented) innovation (Perrotta et al., 2020; Wagner and Gałuszka, 2020). This also aligns with Shahri et al.’s (2014) position advocating a value-sensitive design approach to ensure ethical use of gamification in enterprises.

6 Managerial guidelines for design and implementation

Based on the experiences and insights elicited from the expert interviews and literature analysis, we propose a set of management guidelines to design and implement gamification that addresses cultural challenges and facilitates different forms of innovation across the three dimensions of (values-based) innovation management (Figure 2).

On the normative level, gamification formats that aim at renewing corporate identity and initiating cultural change that lines up with stakeholder values should build on the existing culture and employee values. Players belong to different subcultures within an organisation and hold attitudes or preferences towards gamification that are specific to their demographic or functional backgrounds (Generation X vs. Y and Z; educators vs. practitioners) or level of experience (new vs. established teams; acquaintance with vs. scepticism about the advantages of gamification). These differences constrain the design

process and should be addressed in the development of game contents and mechanics as well as in how gamification formats are presented to their target groups. To accommodate the expectations of different subcultures, formats that facilitate innovation on the normative level benefit from co-development approaches that involve a wide range of employees as well as lead users from the workforce. Moreover, such co-development approaches can be combined with gamification formats that support bottom-up (re-)definitions of organisational values by collecting contributions from individual members and even newcomers to the organisation [e.g., for crowdsourcing of values as in the case of IBM's ValuesJam, see Breuer and Lüdeke-Freund (2017)].

Figure 2 Management guidelines for gamification to address cultural innovation challenges across three management dimensions of (values-based) innovation



On the strategic level, formats that facilitate business model innovation or strategic renewal should be aligned with the scope of the company's strategic agenda. Managers should weigh and continuously reflect on the effectiveness (the costs and benefits) of using alternative gamification approaches or components to support specific strategic objectives. For example, gamified workshop formats that bring together a narrow circle of strategists for the development of a new business model or a strategic framework will require an elaborate setup that structures collaboration, knowledge exchange, and decision-making among them. In other cases, however, the implications of an already defined strategic agenda need to be communicated and spread throughout the entire organisation. Fostering such large-scale dissemination will require much lighter formats that can be disseminated, learned and played quickly.

Finally, on the operational level, gamification formats focus on improving engagement, communication, and collaboration among stakeholders across the innovation funnel of service, product, and process innovations. Here, managers should pay special attention to how incentives, reward systems, and competitiveness support or diminish employee motivation. In line with previous publications, we recommend integrating explicit intrinsic (e.g., values-based) rather than extrinsic (e.g., monetary incentives) motivational stimuli to engage participants. Game elements such as epic meaning (Chou, 2019), storytelling (Toda et al., 2019), and humour (Dormann and Biddle, 2009) are some design approaches that facilitate such integration. Furthermore, we suggest developing game designs that combine cooperation with competition, so that the positive effects of the former mitigate the potential negative effects of the latter. Support from middle and top managers who participate on an equal footing with other employees, professional moderation, comprehensive tasks, and the use of non-technical language are further factors that positively influence the engagement of employees. Tangible tools such as cardboard, decks, craft materials, LEGO bricks, and board games are powerful means to support moderation, simplify task descriptions, and enhance creativity, communication, and collaboration.

7 Conclusions

This paper explores how gamification can be used to overcome the challenges organisational culture and values often pose to innovation. Through a review of literature and interviews with experts, we make sense of the main challenges experienced by companies, collect good practices from the literature, and propose concrete implementation guidelines for organisations to follow. We classified the challenges in ten categories and propose a course of action following good practices dealing with these challenges. However, the wide range of gamification approaches we investigated as well as the variety of research methods applied in the reviewed articles limited the possibility to formulate theoretical generalisations.

Furthermore, we summarised a set of management guidelines for gamification design and implementation in three domains: normative, strategic, and operational. In addition, we highlight some of the gaps in the literature on gamification in the context of cultural innovation challenges, such as the lack of existing formats and empirical insights on later innovation stages, methods for bottom-up elaboration, and working with employee and diverse stakeholder values.

We acknowledge that the nascent literature in this important topic is sparse, and we propose a research agenda that will help to advance theory and practice on gamification to address cultural challenges and facilitate values-based innovation.

First, additional systematisation and a focus on the interconnectedness of design elements (Shpakova et al., 2020) is needed. One promising approach would be to identify recurring innovation challenges and to analyse the interrelated gamification design patterns that address them.

Second, there is a need to further explore the role of the facilitator and how participant characteristics affect the design and implementation of a gamification intervention.

Third, further research into the ‘dark side’ of gamification for innovation is needed, for example, to explore how it can be misused to solely increase employee productivity.

Fourth, future research on collaborative, cross-hierarchical exploration and negotiation of values (e.g., through dilemma games, design games, or crowdsourcing) offers a promising area of investigation for methods to overcome cultural challenges such as value-action gaps and value incongruence as well as to facilitate values-based innovation on the normative management level.

Fifth, we found several recurring observations in the 26 expert interviews that point towards the future potential for using gamification in the context of innovation. These observations provide academics with implications for future research and practitioners with implications for the development of new gamified formats that address cultural innovation challenges and facilitate values-based innovation. We grouped the statements into five emerging categories: promoting experimentation in a safe environment, establishing a common ground of understanding, breaking down silos, facilitating cross-functional collaboration, and promoting personal relationships.

The findings of this study offer important theoretical and managerial contributions. First, a strong research agenda has been proposed to advance knowledge on how gamification can overcome cultural challenges for values-based innovation. Second, implications and guidelines for managers and practitioners are described. We provide a detailed list of good practices if gamification is to successfully deal with cultural challenges to innovation. Finally, developers and practitioners are provided with guidelines for design and implementation of gamified methods to support innovation.

In sum, the academic and field research undertaken in this study has allowed us to showcase the power of games and gamification to develop innovation-supportive cultures and values-based innovation. The diverse works reviewed in this study – often representing initial efforts in an emergent field – underline the need to develop novel organisation and situation-specific applications, to identify design patterns that address recurring innovation challenges, and to conduct further empirical research to better understand, design, and use more playful ways of managing what we care about.

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CULTURAL TENSIONS AND VALUES-ACTION GAPS IN SUSTAINABILITY-ORIENTED INNOVATION: AN ETHNOGRAPHIC INQUIRY

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European companies have widely adopted sustainability goals as part of their strategy and normative guidelines but struggle to facilitate organisation-wide cultural transformation towards more sustainable development. Despite the rapid development of theoretical concepts and methods for values-based and sustainability-oriented innovation (SOI), we still do not understand the discrepancies between sustainability-oriented values and strategies on the one hand and their insufficient translation into innovation-related practices on the other. In order to advance our understanding of the cultural tensions and values-action gaps that constrain SOI at the organisational level and to derive corresponding measures for building values-based innovation cultures, we conducted ethnographic research at a leading technical inspection company in Germany. The resulting insights reveal tensions and gaps between espoused values of corporate sustainability and everyday practices with regard to innovation culture, vertical and horizontal integration, external interfaces, practices and methods and personal alignment. Their discussion enriches our theoretical understanding of values-based and sustainable innovation practices and identifies areas and entry points for managerial intervention to promote a sustainable innovation culture.

Keywords: Sustainability-oriented innovation; organisational culture; innovation practices; tensions; values-action gaps; rapid ethnography.

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Cultural Tensions and Values-action Gaps in Sustainability-oriented Innovation

Sustainable development as the integrated pursuit of economic, social and environmental goals and values has become a global strategic imperative widely recognised by both political and business actors. There is also an emerging consensus that there is an urgent need to move from superficial activities to enhance corporate communication with “green” credentials to rigorous compliance and anticipation of increasingly stringent regulation. For example, in business strategies, operations, products and stakeholder relationships to achieve a net zero carbon economy by 2050. At the same time, companies are prioritising economic, social and environmental goals not just because of external regulations or incentives, but as drivers rather than constraints of their innovation efforts. Many companies have explicitly aligned their strategies with stakeholder and corporate sustainability values (Breuer *et al.*, 2022a). However, few have established an organisational culture with inherent practices to manage innovation accordingly (Bocken and Geradts, 2020; Goldmann and Huulgaard, 2020). Despite increased attention to values, their potential to generate innovation management challenges and translate into effective practices is not yet well understood (Breuer *et al.*, 2022a).

Sustainability-oriented innovation (SOI) involves “making intentional changes to an organisation’s philosophy and values, as well as to its products, processes or practices to serve the specific purpose of creating and realising social and environmental value in addition to economic returns” (Adams *et al.*, 2016, p. 180).

Although companies are defining sustainability-oriented corporate vision, mission and purpose statements and integrating stakeholder values into their SOI strategies, recognising the importance of values for managing innovation is very different from effectively managing values for innovation on a day-to-day basis (Breuer *et al.*, 2022a). The challenge is not only to set ambitious goals and formulate sophisticated purpose, mission and vision statements, but also to put them into practice and create a values-based innovation (VBI) culture. Given the significant impact of values on innovation processes and outcomes, the relationship between values and SOI practice remains a surprisingly underdeveloped area of research (Breuer *et al.*, 2022a). This places the exploration of VBI cultures as antecedents of SOI and mediators of SOI-related tensions at the top of the sustainability transition research agenda (Wannags and Gold, 2020).

In this paper, we explore how to create VBI cultures that reliably create a positive environmental, social and economic business impact. To understand the discrepancies between sustainability-oriented strategies and everyday practices, we explore the following question: How do cultural tensions and values-action gaps impede the translation of SOI strategies into everyday practice?

We conducted ethnographic research in a large inspection company that has always operated according to its values of protecting human life and has recently articulated a strong commitment to SOI. However, the company was struggling to harness its potential to innovate and respond to the greatest values-based challenge of our time: the sustainability challenge. Despite its best intentions, clear strategy, exemplary track record and committed employees, it was still struggling to become a fully sustainable organisation. Our empirical insights reveal gaps between the espoused values of corporate sustainability and everyday practice in terms of innovation culture, vertical and horizontal integration, external interfaces, practices and methods and personal alignment. These insights are relevant both to the many other technology companies in their ongoing transition to sustainability and indeed to any attempt to establish a new set of core values for an organisational culture. Their discussion contributes to research on VBI and sustainability-oriented cultures, improves our understanding of values-based and SOI practices and advances the VBI management framework. It also contributes to the discourse on tensions constraining the sustainability transition by differentiating emerging categories of tensions and values-action gaps within the management of values for SOI. In addition to these theoretical implications, the case offers practitioner implications by highlighting six essential task areas and illustrating entry points for managerial intervention within them and societal implications by supporting organisations in their cultural transformation towards sustainability.

Theoretical Background

In this section, we review theoretical frameworks and empirical studies that show how the systematic management of values can contribute to cultural development and SOI, or how the disregard of stakeholder values can create tensions and values-action gaps that compromise SOI. Practices and values are seen as two fundamental components of organisational cultures (Bourdieu, 1977; Schein, 2010). The different types of cultures they generate can act as antecedents of sustainable transformation (Quinn and Dalton, 2009; Linnenluecke and Griffiths, 2010) and SOI performance (Globocnik *et al.*, 2020; Islam *et al.*, 2019). Effective implementation of SOI strategies requires organisations to develop an enabling VBI culture (e.g., Breuer and Lüdeke-Freund, 2017a) that prioritises sustainability values and effectively translates them into organisational practice. Although it is readily appreciated that an enabling culture is an antecedent of SOI, it is difficult to assess and promote the development of values-based cultures due to the lack of knowledge about the components that make up these cultures. Improving this understanding through empirically based theoretical insights will further the development and validation of frameworks and methods to promote SOI.

Values and practices as constituents of organisational cultures

Human values are defined in social psychology as notions of what is desirable and “ordered systems of priorities” (Schwartz, 2006). They are understood as fundamental components and reliable representations of organisational culture. According to Schein (2010), all organisational cultures share a certain set of values that are always present either implicitly as basic assumptions or explicitly as espoused statements or as enacted artefacts, behaviours, processes, structures and other tangible cultural elements. Schein’s model suggests that misalignments between the three levels at which values are manifested will impede organisational performance and change processes. It also suggests that leaders have a critical role to play in managing values in a way that mitigates misalignments. As Schein (2015, p. 9) puts it, “defining values and norms, turning these into shared rules for behaviour, is *de facto* creating and managing culture”.

Alongside values, practices are often seen as another fundamental component of organisational culture. While values reflect the priorities of an organisation and its members, practices reflect how these priorities are operationalised as behaviours and processes, implying a distinction between espoused and enacted cultural dimensions. Bourdieu’s (1977) theory of practice analyses practices as resulting from the interaction of different forms of available capital (economic, social, cultural, symbolic), habitus (a collective system of dispositions such as conventions, rules and values held at individual, collective and social levels) and field (a structured social space in which people enact their dispositions). The adoption of practices must therefore be understood in the context of both the changing field in which they are enacted and the changing habitus that engages with that field at both micro (individual) and macro (social) levels (Bourdieu, 1977). According to this perspective, values not only influence the adoption of practices, but are also influenced by practices and can be reinterpreted or even redefined in relation to them. Depending on their mutual alignment or lack thereof, values and practices drive virtuous or vicious cycles that influence cultural development accordingly.

Values-based innovation management

A values-based view on innovation management focusses on the role of human values in driving innovation in processes, products and services or business models. A VBI framework (Breuer and Lüdeke-Freund, 2017a) distinguishes between three major functions through which values facilitate innovation management. First, organisational values form ordered systems of priorities, wherein they fulfil an integrative function to align diverse stakeholders around shared or overarching values and facilitate their translation into consistent strategies and practices. Second, the generative function of values refers to practices of translating stakeholder values into

heuristics for ideation, specification of new business opportunities, anticipation of threats, and adjustment of innovation efforts. As such, values help to anticipate innovation opportunities and impact that would be left unnoticed if innovation projects merely responded to external trends and short-lived stakeholder interests. Third, values serve as directives and orientations towards “desirable end-states” (Rokeach, 1979, p. 49), thus alleviating uncertainty and facilitating collaboration.

The explanatory power of the framework can be seen in case studies, but further empirical evidence is needed for a detailed account on the functions of values, their translation into practices and related tensions (for an overview of research, see Breuer *et al.*, 2022a; and for the application of frameworks, see Partelow, 2023). Likewise, evidence is missing with respect to the framework’s contributions to related challenges in responsible and SOI such as managing conflicting stakeholder conflicting values (e.g., Lubberink *et al.*, 2017; Stilgoe *et al.*, 2013).

Cultural tensions in sustainability-oriented innovation

Instead of assuming fundamental alignment between business and sustainability goals, recent management literature focuses on tensions that must be dealt with when seeking to attain a more sustainable business development. These tensions are defined as the presence of “two phenomena in a dynamic relationship that involve both competition and complementarity” (Epstein *et al.*, 2014, p. 3). Whereas tensions that are based on relationships of competition provoke trade-offs, tensions based on relationships of complementarity encourage synergies. Essentially, the dichotomies between trade-offs characterised by a “win-lose” outcome and synergies representing a “win-win” outcome originate from the same underlying tensions (Haffar and Searcy, 2017). In this light, previous studies have emphasised that the understanding and leveraging of tensions can help organisations to rise above trade-offs involving their priorities for corporate sustainability or identify synergies that develop SOIs (van Bommel, 2018; Wannags and Gold, 2020). In this study, we define cultural tensions as dynamic relationships that involve competition and complementarity between different values within an organisation. For example, sustainability tensions are often related to differences between private and shared values, that is, “between acting in the interest of shareholders only at the organisational level, and in the interests of society and the planet as a whole at the systemic level” (Wannags and Gold, 2020, p. 4).

Values-action gaps in sustainability-oriented innovation

Besides cultural tensions that occur between values within an organisation, values-action gaps represent another cultural impediment to the implementation of SOI

strategies. Values-action gaps are discrepancies between the employees' organisational or individual values and their actual behaviours or practices. They prevent the translation of values as criteria for what is desirable and important into a corresponding interpretation and adoption of practices by organisational members. Several company cases suggest that closing the values-action gap is essential for succeeding in SOI (Sull *et al.*, 2020). The Volkswagen diesel emissions scandal (Aurang *et al.*, 2018) and the Apple "Batterygate" scandal (Rodriguez Vidal, 2019) illustrate the detrimental consequences that may result when officially proclaimed values are not lived by organisational members. Both companies incurred significant financial and reputation losses through product development practices that contradicted sustainability regulations as well as their own organisational values.

Although research on the barriers to pro-environmental consumer behaviour has often addressed the importance of values-action gaps, sometimes using alternative terms such as values-behaviour gaps (Kennedy *et al.*, 2009) or "green gaps" (ElHaffar *et al.*, 2020), the concept remains largely overlooked in the management literature. Some studies show a positive relationship between organisational values and improved innovation performance along economic, social and environmental parameters (Globocnik *et al.*, 2020; Manohar and Pandit, 2014; Pedersen *et al.*, 2018). It seems self-evident that we will try to bring about the things we want to achieve. However, the literature does not provide evidence on how values-action gaps hinder SOI. A deeper contextual understanding of values-action gaps and cultural tensions is needed to understand how innovation managers and entrepreneurs can adopt SOI practices more effectively.

Methodology

Methodological background

Innovation management research has produced different conceptualisations of values to account for the role of values, tensions and values-action gaps in managing SOI. First, a substantive approach (e.g., Von Schomberg, 2011) takes predefined European values such as sustainability, security or privacy as criteria to ensure responsible innovation. Second, Stilgoe *et al.* (2013) propose a procedural approach to actively engage stakeholders in value deliberation and reflection — without prescribing how to do so or elaborate their implications. "Both approaches invite a conceptualisation of values as ready-made entities, at once knowable and available for deliberation. Whether they can be found in political documents or by interrogating stakeholders. . . the moral hermeneutics of identifying values is ignored" (Boenink and Kudina, 2020, p. 454f.). Boenink and Kudina (2020)

therefore propose a complementary, practice-based approach that recognises that values are realised in specific practices, are interactive with material, social and cultural environments, and are dynamic and changing. In addition to reviewing policy agreements and eliciting values through stakeholder surveys, they call for the study of “valuation in action” (Boenink and Kudina, 2020, p. 461) through interpretive methods such as case studies and focus groups.

Another prominent interpretive method is ethnography, which is an approach that has proven its worth in exploring stakeholder values and values-based practices in organisations (Andersen, 2017; Breuer and Lüdeke-Freund, 2017; Langendahl *et al.*, 2016) and in paving the way for meaningful change in corporate strategy and innovation (Madsbjerg and Rasmussen, 2014). Ethnographic research allows the exploration of symbolic forms, experiences, values and layers of cultural meaning that are often not obvious to the participants. It can thus provide insights into otherwise implicit values or contradictory behaviours, such as organisational tensions and values-action gaps. However, only a few studies have used ethnographic methods to empirically explore the influence of values on SOIs (e.g., Andersen, 2017; Halme *et al.*, 2016; Langendahl *et al.*, 2016).

Although ethnographic approaches are valued as the most appropriate approaches for exploring organisational culture, values and conflicts or tensions, they require considerable time, skill and effort and have therefore not been widely adopted (Cooper and Edgett, 2008). Essential key features of the ethnographic approach include holism, the field as the unit of study, multi-method material collection and interpretative analysis requiring reflexivity on the part of the researchers (Bloomberg *et al.*, 1993). In keeping with these principles, we streamlined the material collection in this study through methods for rapid inquiry of stakeholder values based on field interview techniques that engage participants in interactive exercises and staged activities rather than participatory observation of natural work-related practices. We also ensured compliance with quality criteria of qualitative research (Steinke, 2004, p. 186ff.): Comprehensibility including documentation of the process, attention to process cues and limitations, empirical grounding and reflected subjectivity (e.g., by making initial assumptions explicit). Triangulation of material sources between different investigators, different perspectives on the same material and methodological triangulation (combining interviews and observations) was applied (Patton, 2002; Yin, 2017).

Methods and sampling

We designed an interview guide for 2–4-h field interview sessions with 18 mandatory top-level questions and optional sub-questions covering the following five main topics: personal background and history in the company, interpretation and

prioritisation of corporate values, experience of innovation projects, relationship between sustainability values and innovation management and future outlook. The interview sessions included interactive exercises such as depicting a mood curve (to identify emotional highs and lows and critical turning points at the job), card sorting (to prioritise organisational values), a core-values assessment exercise (following the competing values framework; Santoriello, 2015) and a heaven-and-hell imagination exercise (using exaggerated scenarios to elicit deep concerns, fears and far-reaching hopes). Participants were also asked grand-tour questions (Spradley, 2003) to guide the interviewers through their own workspace, the company offices, meeting and collaboration spaces, and inspection facilities. An observation guide followed the interview structure and focused on illustrations, visualisations, artefacts (such as templates and presentations) and site-specific installations to expand on verbal information and elicit implicit aspects and values through interpretation.

The current case study is part of a larger multi-case investigation of the SOI cultures of 11 companies in four countries (Germany, Italy, Poland and Spain). In this study, we focus on the insights from a leading German technical inspection company (TIC) founded more than 100 years ago to ensure the operational safety of industrial equipment. It was chosen as a case (Yin, 2017) because it had characteristics that are also relevant for other technology companies introducing sustainability as a new core value equal in importance to the fundamental value of safety. It is also a revelatory case (Yin, 2017), as company representatives invited researchers for an in-depth and open exploration of rarely accessible, even conflicted information and internal tensions related to its ongoing cultural transformation. Over the years, TIC has remained committed to its traditional values of safety, neutrality and trust as an independent third party between technology users and providers. These values have underpinned its expansion into other areas of inspection and certification, such as mobility, training, IT, engineering, mining and aerospace, among others. Since 2018, sustainability has been one of the company's core values, and is becoming increasingly important to its culture and a key component of its official strategic goals. TIC thus provides a unique case of how an organisational culture traditionally focused on the values of safety and neutrality has integrated sustainability values as a new top priority, integral to its culture, innovation strategy and operations.

In order to gain a broad understanding of the company's SOI practices, we selected participants who deal with innovation and sustainability as part of their job profile, but who came from different hierarchical levels, business units, innovation-related functions and locations, and who had been with the company for different lengths of time. Our primary contacts were the head of innovation management and a head of digitalisation in the largest business unit.

They introduced us to participants at different hierarchical levels who could provide information on sustainability and innovation issues. The participants were sent a standardised information sheet and consent form prior to the interview, and they suggested who else we should talk to. In this way, snowball sampling (Parker *et al.*, 2019) complemented the initial top-down approach to participant selection and recruitment.

Material collection

Between November 2021 and April 2022, three researchers conducted nine interviews with individual participants (Table 1). Five interviews were conducted in German and four in English. Each interview lasted between 2 h and 4 h and was recorded with audio, video and field notes. These recordings were used to produce detailed 10-page profiles for each interview. Due to the Corona pandemic, three of the interviews were conducted online and the participants were asked to show objects and spaces using portable devices and to complete the practical exercises using an online collaboration platform (Mural) and pre-set templates. Each profile was sent back to the participant for communicative validation, which resulted in minor changes to one of the profiles due to misleadingly translated quotes.

Pattern recognition and insight synthesis

Based on the profiles, three researchers analysed the material in a two-day collaborative workshop (see Table 1 for an overview of the interpretive approach). (1) We transformed the material gathered in the field into profile templates. In a storytelling session, we presented the profiles of our participants, describing observed actions, initiatives, methods, values and stories. (2) Based on these profiles and stories, we noted relevant findings and coded them into thematic categories. (3) We identified recurring patterns or clusters of related themes (e.g., drivers, value alignment, practices, tensions, value-action gaps, persistent challenges, etc.) across the coded categories. We carried out this pattern recognition through a process of “formal indication”, which identifies recurring patterns and higher order themes that connect the material through creative and analytical conversations (Madsbjerg and Rasmussen, 2014, p. 115). (4) We explored the resulting patterns in terms of interrelated desires, values and tensions or conflicts experienced by the participants. This approach helped streamline the ethnographic interpretation towards the identification of “seeds of insight”. We identified a total of 18 insight seeds. (5) In a final step these were aggregated into six overarching insights and associated subordinate aspects. Each insight seed and overarching insight describes fundamental characteristics of the participants’ emotions and activities

Table 1. Overview of the respondents with their pseudonyms, reference numbers, background and age group and the steps of the interpretative approach with examples from the material.

Research activities	Output	Exemplary results
(1) Create participant profiles from field material	Field material and participant profiles	Nine participant profiles: (1) <i>Theo</i> , head of group management; (2) <i>Ronald</i> , head of digitalisation; (3) <i>Christos</i> , operational management lead; (4) <i>Mark</i> , corporate venturing; (5) <i>Martha</i> , strategic management; (6) <i>Stefan</i> , product management; (7) <i>Alex</i> , service station management; (8) <i>Ulrich</i> , CR management; (9) <i>Holger</i> , head of auditing
(2) Collect findings and code them in thematic categories	Clustered findings from interviews and observation	<p><i>Developing a constructive attitude towards mistakes: Teams avoid failure at early-stage development:</i></p> <p>“Things simply go wrong, and we should develop a constructive attitude to it and always strive to draw something positive from these mistakes.” (Theo)</p> <p><i>Problems as sources of learning:</i> “You want big enough problems so that failing gives you either a big gain or a big learning experience.” (Ronald)</p> <p><i>Resistance to change:</i> Observation of a participant response to a poster in the meeting room calling for experimentation that there is still cultural resistance to experimental approaches. (Mark)</p> <p><i>Leadership struggles to accept learning from failure:</i></p> <p>“When I explained this learning from failure concept to my boss... he struggled ... He said: We must then also make learning from success.” (Theo)</p> <p><i>Failure results in blaming:</i> Observation of a participant commenting on failure and blaming by demonstrating that finger-pointing involves three fingers pointing back to the person doing the blaming. (Theo)</p>

Table 1. (Continued)

Research activities	Output	Exemplary results
(3) Identify recurring patterns	Patterns	Recognizing the need for experimentation and failure tolerance
(4) Identify and describe “seeds for insights” with illustrative formulations	Seeds for insights formulated with a desire, values, and conflict	“We want to experiment and learn from failure so that we can rapidly advance towards our ambitions for sustainability-oriented innovation, but we also fear failure and finger-pointing and identify with the risk aversity that characterises the traditional inspection business.”
(5) Aggregate seeds for insight and describe overarching insights	Overarching insights	Insight 1: “We want to establish a sustainability-oriented innovation culture so that we can comply with and act on our values like sustainability, safety and trust, but in some cases, our history and engineering mindset prevent us from fully embracing a failure-tolerant, stakeholder-inclusive and sustainability-oriented innovation culture.”
(6) Ethnographic writing	Ethnographic descriptions	Insight 1 “Sustainable innovation culture” presented with one-sentence summary, illustrative statement, short description, empirical evidence supporting the insight and its aspects (Innovation mindset and Sustainability literacy), lessons learned from the insight and discussion of its theoretical implications

from their point of view, provides explanations for why they act as they do and articulates tensions between desires and values on the one hand and opportunities for fulfilment on the other.

Ethnographic writing

Ethnography has been defined as “a written account of the cultural life of a social group, organisation or community, which may focus on a particular aspect of life in that setting” (Watson, 2008, p. 100). Ethnographic writing is therefore an essential aspect of the interpretation of material collected in the field, which should ultimately result in “thick descriptions” (Geertz, 1973, p. 6) of the phenomena observed. Thick descriptions are detailed accounts of fieldwork in which the researcher makes explicit contextualised patterns of cultural and social relations (Holloway, 1997).

In order to provide thick descriptions for each insight, we used the following structure. First, we described each insight, summarising it with a title and a short statement, and illustrated it with a statement the participants could have used to get to the point of the insight, using the structure of desire (we want), values (so that) and conflict (but) for each phrase (Table 2). Second, we described the insight and provided empirical evidence supporting the insight and its aspects. Third, we summarised the lessons learned from the insight and the underlying empirical findings, reasoning why the evidence supports the insight. Finally, in the discussion section, we explain how our insights contribute to open questions in the VBI and SOI literature. Throughout the text, we refer to the pseudonyms or reference numbers (in parentheses) of the participants who provided the evidence.

Insights

Overview

We provide an overview of the six insights, each with a summarising sentence and an illustrative statement (Table 2). In the remainder of this section, we provide a detailed account of the empirically identified tensions and values-action gaps across the six insights. Each insight is presented here with a title, a brief description, one or two key aspects, and lessons learned with reasons how the evidence supports the insight.

Insight 1: Sustainable innovation culture

Description: TIC’s history of prioritising values of safety and trust over short-term benefits makes it well placed to lead the transition to sustainability. However, it is still struggling to move beyond a traditional engineering mindset and practices

Table 2. Overview of the six insights with illustrative participant statements.

Insights	Summary	Illustrative participant statement
(1) Sustainable Innovation Culture	Sustainability literacy is unevenly distributed across actors, and SOI competencies are grown more from individual initiative rather than a pervasive strategy and VBI culture.	“We want to establish a SOI culture so that we can comply with and act on our values like sustainability, safety, and trust but in some cases, our history and engineering mindset prevent us from fully embracing a failure-tolerant, stakeholder-inclusive, and SOI culture.”
(2) Vertical Integration	Misalignments between executive and operational managers’ understanding and implementation of the core values desynchronise mutual efforts to advance SOI.	“We want to collaborate across hierarchical levels based on shared values so that we can achieve a higher impact of our joint efforts, but our strategy and values are not consistently adopted and backed up with supporting measures.”
(3) Horizontal Collaboration	Divergent interests and interpretations of values hamper multilateral collaboration and knowledge exchange to address sustainability challenges.	“We need to collaborate across divisions so that we can learn from one another and leverage distributed knowledge for sustainable value creation but the division of efforts and returns often remains uncertain and breeds conflicts.”
(4) External Interfaces	Sharing and absorbing sustainability-related expertise require great efforts to maintain ambidexterity and gain reputation as an outstanding sustainability enabler.	“We want to be open to external trends and stakeholders and seek exchange with partners from universities, legislation, and civil society so that we can exchange perspectives and capture opportunities that can ensure positive impact but absorbing and exerting external influences while developing our established business is challenging.”

Table 2. (Continued)

Insights	Summary	Illustrative participant statement
(5) Practices and Methods	Normative and theoretical frameworks can increase the scope and maturity of SOI but require consistent adoption and continuous development of supportive practices and methods.	“We have successfully experimented with new practices and methods so that we can establish a SOI culture but some of them face resistance while others are not yet adequately managed due to increased complexity and perceived distance from the accustomed corporate values and way of work.”
(6) Personal Alignment	Engaging the workforce in the process of cultural transformation requires leveraging their individual values and informal interactions.	“All employees expect to align their personal (idealistic) values with TIC’s organisational values so that they can fully engage and make the world a better place but many struggle to keep up the spirit alive as the company culture changes.”

focused on safety values to promote new sustainability values along with an innovation mindset. An uneven distribution of sustainability literacy and a historically developed risk-averse mindset hamper its forward-looking development.

Innovation mindset (aspect 1): TIC has evolved as an engineering-driven company creating value through expert knowledge to ensure technical safety and regulatory compliance. However, SOI is not easily implemented through operational rules, and the transition to an SOI culture requires this engineering mindset to be complemented with sensitivity in dealing with diverse stakeholders. A transformation from a male-dominated, engineering-driven, solution-focused way of working to a problem-focused approach is needed to identify the customer problems and develop SOIs to address them (2, 3, 4, 5). Some participants (1, 3, 6) highlight the potential of TIC's internal academy as a facilitator to extend their engineering background with soft skills and to practice novel approaches, such as deepening the understanding of a problem space before developing solutions and exploring synergies between technical competencies and values. However, other participants (1, 2, 9) emphasise that the deeply ingrained engineering mindset leads to resistance to change, fear of failure, (1, 2, 4, 9) and limited awareness of innovation potential.

Sustainability literacy (aspect 2): A second key aspect of this finding is the uneven distribution of sustainability literacy. Participants noted a fragmented approach to sustainability, reducing it to ecology (3, 6, 7) or sidelining it as part of the core value of integrity (8) or as a natural consequence of other values (4). Holger (9), head of auditing, criticises that a comprehensive understanding of sustainability (in its environmental, social and economic aspects) is still lacking. For example, he mentions a reporting verification project in which the social dimension was not taken into account. Holger (9) believes that only an integrated approach would allow "people to work on this one topic from different perspectives". Corporate responsibility manager Ulrich (8) warns that even a triple bottom-line approach to sustainability tends to neglect one of the three dimensions. Instead, he advocates a system-value approach (i.e., not balancing three domains, but assuming that business is at the centre of concentric circles that address societal needs). However, a common, actionable understanding of sustainability as a core value in innovation is still lacking.

Lessons learned and underlying empirical findings: A general takeaway is that consistent communication about and a common understanding of the implications of core values and concepts such as sustainability are essential to establishing SOI cultures. Since sustainability depends on and evolves in relation to existing values such as safety, trust and integrity (1,2,4), we need to attend to the priority systems that these values represent, without reducing the new values to a mere extension of those already established. Even eliciting an appropriate understanding of these

values, and then establishing and mainstreaming a shared notion of sustainability, is challenging.

Strategic and senior managers are aware that SOI requires a different mindset and practices. They emphasise the importance of a more failure-tolerant and stakeholder-inclusive culture and drive this change, but they are rarely involved in the details of implementation. Moreover, ingrained mindsets such as risk aversion cannot be overcome by top-down directives, even if they are perceived as a barrier to SOI (1, 2, 4, 9), limiting experimentation and ambidexterity. Staff at more operational levels rely primarily on their professional expertise to manage day-to-day tasks and on their “own moral compass” (9) to prioritise and interpret official values. In several cases, they were unaware of the links between their local initiatives (e.g., to power offices with solar panels, 7) and the overarching strategy and values.

Insight 2: Vertical integration

Description: TIC’s strategic managers are trying to embed the new sustainability values throughout the organisation (1, 2, 5, 8, 9). However, these efforts often don’t reach the operational managers and employees, who instead act on their own instructions. Some operational managers work with little or no regard to official values, while others, although highly engaged with issues related to these values, interpret them autonomously with respect to their local context. In addition, their independent initiatives to improve sustainability from the bottom up, although encouraged by the official values and statements from senior management, do not always receive appropriate recognition and feedback.

Top-down integration (aspect 1): Some operational managers prioritise employee or customer concerns as key reference points for managing SOI, while remaining detached from core values (3, 7). Other managers who are less involved in the hierarchical structure, such as Mark (4) from Corporate Venturing, even replace the official innovation strategy with self-defined criteria to drive SOI. Mark (4) believes that innovation managed through a standardised process can only be incremental. Since his focus is on generating radical, disruptive innovation, he prefers to replace the official strategy with approaches to stakeholder analysis and small-scale experimentation to develop proofs of concept. In addition, an inconsistent (different values mentioned on different company websites, 8) and incomplete (5) set of core values creates further confusion and hinders the scaling of SOI efforts across all levels of hierarchy.

Bottom-up integration (aspect 2): Although TIC employees are given opportunities to work independently (4, 6, 9), their personal initiatives to improve sustainability are not systematically managed and seem to exceed the organisation’s capacity to absorb

them (1, 4, 7). For example, Alex (7), a service station manager, is convinced that sustainability improvements depend on his own initiatives. However, his ideas often receive no feedback or are not acted upon. He struggled with the lack of a clearly defined process, resources and management support to implement his ideas, such as offering a solar charging station for customers. He also wanted to introduce networked printing at his station to improve operational efficiency, but his idea was criticised because of data privacy concerns. When Alex (7) found a reliable workaround, he still had to install the printer himself. Other employees are also given autonomy to initiate their own SOI projects, but little interaction with senior management (9) and uncertainty about how project outcomes will be managed and benefits shared (4) limit the bottom-up absorption of their ideas.

Lessons learned and underlying empirical findings: Participants pointed to several factors as contributing to the gap between how the core values are understood by senior and operational managers and how they share their strategic and operational expertise to drive SOI. Holger (9) attributes these discrepancies to an unsystematic management of values, which rarely goes beyond their definition at the senior management level. The lack of two-way communication about values forces employees to develop and rely on their “own moral compass” (9) and situated interpretations of official values. As a result, Holger (9) would like to see more “cool workshops” (9) and regular follow-up with supporting materials that communicate the values and encourage compliance.

In addition, participants cited overly consensual negotiations between the group’s subsidiaries, dispersion across multiple headquarters (1, 2), and a lack of courage to impose strict governance and take difficult decisions (1, 2, 6) as reasons for slow inter-hierarchical exchanges that take “TIC seconds” (i.e., excessive amounts of time; 2, 7). The heterogeneity of different headquarters and subsidiaries addressing different markets requires a clear top-down structure and centralised process, a consistent set of values, clearly defined leadership processes, and rules applicable across all organisational units.

Insight 3: Horizontal collaboration

Description: Digitalisation trends towards networked systems are disrupting the inspection industry and require the involvement of expertise from several fields beyond conventional (e.g., automotive) engineering (1, 2, 3, 4, 5, 6). TIC’s subsidiaries operate in heterogeneous industries such as mining, aerospace and IT, revealing opportunities for interdisciplinary collaboration to respond to these trends. However, subsidiaries are compared to federal states, in that they are “as influential as the board of directors” (8) and unwilling to sacrifice effort and returns for collaboration. In addition, the group’s senior managers are scattered across

several isolated locations (1, 2, 8). Vehicle inspection is offered in 14 regions, each with different processes and management practices (6). While TIC's heterogeneous structure offers potential, it also reveals challenges in managing collaboration for an effective transition to SOI.

Balancing interests for collaboration: Balancing the interests of the TIC subsidiaries is crucial for interdisciplinary cooperation. Theo (1) notes that due to digitalisation, inspection services are increasingly dealing with "networked intelligent systems" (1). He therefore set up an innovation advisory to coordinate the innovation efforts of the subsidiaries and to use their diverse expertise in joint projects. However, the subsidiaries lack the motivation to sacrifice resources and control for the sake of long-term common goals and joint projects, as they are measured by their performance annually. Because of their divergent interests, they engage in constant negotiation rather than collaborative SOI efforts (1, 8).

For example, Theo (1) proposed an innovation portfolio to evaluate all the group's projects. He wanted to use a Fibonacci sequence to weight factors in the portfolio and give higher priority to key indicators such as sustainability. However, the subsidiaries struggled to agree on how to prioritise the indicators and were opposed to extending the Fibonacci sequence beyond 8 (to 13 or 21), which would widen the gaps between them and make them look bad.

Lessons learned and underlying empirical findings: According to Theo (1), TIC's decentralised structure is rooted in its subsidiaries' history of misaligned interests. Their historical background makes it difficult to initiate and coordinate effective, group-wide SOI projects. Overcoming this historical burden requires efforts from both subsidiaries and central management. On the one hand, subsidiaries need to improve their mutual respect for each other's values, interests and functional agendas. On the other hand, group leaders need to develop a clear top-down structure that can implement decisions on the distribution of effort and returns in SOI projects. In addition, the newer values of TIC, such as sustainability, should be established as points of reference for initiating joint SOI projects that incorporate but also go beyond the historically ingrained risk aversion that Theo (1) links to short-termism and strategies oriented towards survival rather than growth.

Ulrich (8) suggests that such horizontal implementation of sustainability values can be achieved by engaging subsidiaries in peer-to-peer evaluation of each other's innovation projects based on sustainability criteria — and has obtained promising results from experimental peer review sessions. He expects this will also reduce workload, break down silos and stimulate knowledge transfer between subsidiaries. Another suggestion — supported by Ulrich (8), Mark (4) and Martha (5) — is to justify all SOI projects with a clear, long-term purpose, thus protecting them from short-term interests or values in internal negotiations. Finally, Ulrich (8)

emphasises the need to hire dedicated staff and organise regular steering committee meetings to manage the negotiation and exchange regarding SOI across subsidiaries.

Insight 4: External interfaces

Description: TIC seeks to complement the development of its historically established inspection business with an innovation mindset to identify new trends and market opportunities. Participants stressed the importance of balancing these two perspectives (ambidexterity of exploitation and exploration), rather than downplaying one or the other (1, 2, 5). In this context, they emphasise different channels for absorbing external knowledge and identifying outside-in business opportunities. In addition, TIC's experience as an inspection provider and its values of trust and neutrality are seen as advantages for developing SOI inside-out. By leveraging these strategic and normative assets, TIC can enable sustainability in other companies and institutions, e.g., by providing specialised services, inspiring business partners or advising policy makers and regulators. However, TIC's potential in this regard depends on its legitimacy and recognition as a sustainable firm.

Ambidextrous management of external interfaces: TIC uses several channels to absorb external knowledge and identify new opportunities for SOI. For example, exchanges with academia provide perspectives on best practices (3) and lead to joint spin-off ventures (2). Partnerships with NGOs are maintained, despite being unprofitable, because they allow exchange of perspectives, potential future strategic benefits and benchmarking of SOI practices with actors from more advanced industries (9). Furthermore, stakeholder engagement with legislators is critical in innovation projects that respond to anticipated regulation (5). Customer engagement and understanding of customer needs are also seen as a crucial but under-utilised lever for successful SOI (2, 3, 4, 5). Even competitors are involved, as when Ulrich (8) surveyed over 600 stakeholders to formulate TIC's sustainability strategy.

TIC also enables sustainability for other actors inside-out, for example by participating in regulatory committees (5, 6) and providing audit and inspection services that enable other firms to design and verify their impact (8, 9). However, digital trends are challenging some of TIC's services with the largest market share (e.g., automated self-inspection in future car models, 4, 5, 6), while creating demand for third-party inspection in other areas (e.g., regulation of online advertising or distributed ledger systems, 4). TIC's transition to SOI can benefit from capturing these emerging opportunities as well as maintaining competitiveness in traditionally served markets, such as vehicle and industrial inspection, where demand for sustainable value propositions is growing. However, to become an

effective enabler of sustainability, TIC needs to gain legitimacy as a sustainable company (8). Some levers that have helped strengthen TIC's legitimacy include gaining recognition from credible third-party institutions (e.g., gold medals from an international provider of sustainability ratings, 8), selecting B2B customers that define their strategy based on sustainability values rather than simply complying with regulations (9), and engaging third-party stakeholders to determine whether an innovation proposal is legitimate (i.e., whether it meets TIC's own sustainability standards and those of its stakeholders) (5). However, these initiatives have not yet been translated into dedicated strategic programmes and operational practices to position the company as a leading provider of sustainability-oriented inspection services.

Lessons learned and underlying empirical findings: As a service provider, TIC's impact is characterised by innovations that enable sustainable development for other actors in its ecosystem. However, to become an established enabler of sustainability, TIC needs to gain and maintain legitimacy, high reputation and topic-leadership in sustainable business conduct. More systematic stakeholder engagement, communication of achievements, and screening of appropriate certification initiatives and partnerships in which to engage can help TIC gain widespread recognition of its expertise, legitimacy and reputation and establish itself at the centre of an emerging sustainable ecosystem.

Insight 5: Practices and methods

Description: TIC's transition towards SOI is supported by the adoption of normative or theoretical frameworks, such as the SDGs, system-value creation and disruptive innovation. These, in turn, are implemented through methods and practices, which some employees are hesitant to adopt while others take the initiative to experiment with them, even before being instructed by an official directive. For example, impact assessment is a key method for implementing TIC's SOI strategy and informing gate decisions. However, even after receiving training and support from the CR department many managers resisted its adoption. In contrast, other employees readily experimented with informal practices that are tailored to their day-to-day work and from their perspective effectively contribute to SOI.

Framing of practices and methods (aspect 1): TIC adopts normative and theoretical frameworks as proven reference points for the adoption and implementation of SOI methods. For example, Ulrich (8) advocates moving from a triple bottom-line approach to evaluating innovation projects to system-value creation, that is, from "juggling the three balls" of people, planet and profit "while some units have only one hand" (e.g., finance, works council) to integrating priorities in concentric circles based on the SDGs. Although senior managers such as Ulrich (8) and Theo (1) see the need for the adoption and methodological

operationalisation of such frameworks, they also identify challenges. For example, the introduction of project impact assessments based on the SDGs is resisted by some managers, who emphasise increased complexity and workload rather than the strategic advantages it brings (1, 8).

Formal and informal practices (aspect 2): Formal initiatives such as training of innovation experts (3, 6), events on topics such as learning from failure (1) or envisioning TIC's inspection station of the future (5, 6, 7) successfully support the transition of TIC towards sustainability. Informal practices based on individual experience provide additional levers that could be shared and adopted more widely. For example, to promote the system-value approach, Ulrich (8) speaks of it as if it were already established rather than a newly introduced priority. He also presents it as his virtual background during online meetings. Other employees experiment with practices tailored to their specific expertise, such as Mark (4), who uses probability theory and grouping principles to estimate the sustainability impact of his projects.

Lessons learned and underlying empirical findings: Employee initiatives to adopt informal practices that support cultural transformation are important levers that can be scaled more deliberately. Even more important seems to be the appropriate communication of underlying frameworks that are crucial to embedding SOI methods into the organisational culture. Although such frameworks provide a sound basis for the introduction and widespread adoption of SOI practices and methods, such as TIC's impact assessment, there is some difficulty in convincing managers of their strategic importance. This requires ongoing efforts to communicate and establish the theoretical and normative foundations of SOI methods and practices in order to successfully mainstream them at the operational level.

Insight 6: Personal alignment

Description: Most participants joined TIC because they saw it as a company where they could do meaningful work in line with their individual values — they saw the unique opportunity to “be part of the solution rather than the problem” (1, 2, 4, 8, 9). Their careers at TIC are an extension of their personal development and social activism. While all employees identify with the values TIC established throughout its history, such as safety and neutrality, some resist change to include values based on the more recently adopted SOI culture. Official directives are not enough to bring about cultural transformation, which is instead facilitated by a gradual process of mutual persuasion through informal interactions.

Hidden treasure (aspect 1): TIC is seen as a values-based employer. Participants' positive associations can be seen in their pride in the company, expressed in statements such as “we are the good ones” (1, 2, 8). Some employees joined because of the company's values (1, 2, 3, 4, 6, 8, 9) and the opportunity to do

meaningful work that “makes the world a better place” (9). In some cases, TIC allowed employees to integrate their expertise as technical specialists and their commitment to social activism (6, 8). For example, in the 1990s, Ulrich (8) held a senior management position in an SME and was also an “ethical hacker”. He used his expertise in management and cyber security when he joined TIC’s IT subsidiary, where he introduced a “security for safety” strategy, based on the concept that TIC’s core value of safety could not be maintained without taking responsibility for data security. He became so passionate about corporate responsibility that he resigned from his IT management position to approach TIC’s board of directors with a proposal for a new sustainability strategy, and successfully applied for a newly created position.

Informal interactions (aspect 2): Official directives may not be conducive to increasing employee identification with sustainability values, as they tend to provoke resistance when introduced (8). On the other hand, communication through informal interpersonal interactions, e.g., conversations in the canteen (8), during workshops (1), or requests for help (9) facilitate or block away a gradual cultural change. Ulrich (8) recalls how, months after the introduction of TIC’s new sustainability strategy, a manager he met in the canteen said to him, “I was always sceptical, but if it wasn’t for you, I don’t know how we could be thinking about our future at this point.” Ulrich (8) was surprised because the same person had voiced a different opinion in a meeting where his line manager opposed the sustainability strategy that Ulrich (8) was proposing.

Lessons learned and underlying empirical findings: Participants emphasise that congruence between personal and organisational (sustainability) values is key to harnessing capabilities and business potential for SOI (2, 4, 5, 9). TIC’s employees are generally aligned with the company’s established core values and commitment to sustainability, which is a key organisational asset. However, for some members of the organisation sustainability is not a key priority in their personal system of values. Again, their resistance can be attributed to the fact that sustainability is not communicated clearly enough as an extension and specification, rather than a replacement, of TIC’s established core values, such as safety (i.e., “protection of human life” 1). In addition, informal interactions between employees seem to reveal both diverging and shared values and to further the process of cultural change.

Discussion

Each insight reveals cultural tension and points to values-action gaps that constrain the adoption of newly adopted sustainability values and corresponding SOI strategies into everyday practice.

First, an innovation mindset and a broad distribution of sustainability literacy are key components of SOI cultures. Like other similar cases (e.g., technology companies with a traditional focus on safety), TIC's case shows that cultures characterised by risk aversion can lead to blaming individuals for failure (1, 4) and by ingrained habits that disparage the value of learning from failure. A cultural tension is expressed in the fixation on safety, which limits the willingness to experiment and hinders the adoption of unconventional approaches to innovation challenges. This supports previous findings that personal and organisational values act as key enablers of or constraints on business experimentation (Lee *et al.*, 2004) and experimentation for sustainability (Weissbrod and Bocken, 2017). Future research can look for further evidence on how the development of an innovation mindset acts as an antecedent and constitutive component of SOI cultures.

This also points to a challenging values-action gap in the sustainability transition: New sustainability values will require new competencies not required by the pre-existing set of values (e.g., to integrate diverse stakeholders or to manage complex trade-offs). A basic prerequisite is to create a shared understanding of the new sustainability values and related concepts, for example, which concept of sustainability applies to the organisation.

Second, there is a cultural tension between the priorities of systematically integrating a shared understanding of sustainability values across all hierarchical levels, on the one hand, and absorbing local initiatives from operational employees who may still have a poor understanding of these values, on the other. By encouraging and absorbing local initiatives, strong SOI cultures enable employee-led innovation that responds to perceived customer preferences and values, as well as to business opportunities and challenges encountered in day-to-day operations. A multitude of bottom-up initiatives addressing the multi-stakeholder and multi-dimensional aspects of sustainability challenges need to be empowered by top-down direction, inspiration and support through the provision of resources and recognition. Although senior management recognises these needs of the operational workforce and addresses them with official statements and management systems, more is needed to engage all employees in a collective effort towards sustainable transformation. Immersed in their everyday tasks and situated interpretations of official values, operational managers need more practical and interactive ways of experiencing and learning about the practical relevance of abstract values statements and how they provide a basis for SOI.

Third, alignment of interests is a key prerequisite for sustainability-oriented collaboration across subsidiaries and for reducing values-action gaps in SOI. Multi-industry, multi-regional and multi-market conglomerates can enable different organisational units to synergise their competencies to more comprehensively identify and address sustainability challenges. However, managing collaboration

across a multitude of organisational boundaries becomes challenging when stakeholders lack a shared understanding of the group's overarching values and goals and instead foreground their short-term interests. VBI management (Breuer and Lüdeke-Freund, 2019) and stakeholder theories (Freeman and Auster, 2015) emphasise that while interests are often used as a means of political negotiation, values largely define the identities of the actors involved and therefore resist simple negotiation tactics. Therefore, establishing a common ground based on shared sustainability values can help stakeholders to identify points of conversion of their situated interests in order to engage in effective collaboration for SOI. The TIC case illustrates these theoretical assumptions and provides examples of initiatives to put them into practice (e.g., building informal SOI communities with employees who share a strong commitment to sustainability, 6; hiring dedicated employees to manage negotiations, 8; and facilitating horizontal implementation of sustainability values based on peer reviews of innovation projects, 8).

Fourth, the TIC case illustrates the cultural tension between prioritising different approaches to open innovation in SOI management, which is defined as innovation processes based on interactions with other actors that lead to inside-out knowledge exploration or outside-in knowledge exploitation (Chakrabarti *et al.*, 2020). On the one hand, TIC facilitates SOI through outside-in open innovation by identifying, assimilating and applying external knowledge from partners, competitors, academia and others. On the other hand, it also applies inside-out open innovation practices that focus on transforming internal knowledge and resources into external business opportunities through, for example, licensing, spin-offs, joint ventures, technical consulting, etc. TIC employees highlight the importance of integrating these two approaches, a process defined as coupled open innovation, where complementary partners continuously connect “internal and external knowledge through collaborative innovation work” (Remneland Wikhamn and Styhre, 2019, p. 450). The case shows that to drive this integrated approach, companies need to leverage their sustainability competencies to gain legitimacy, that is, to demonstrate the appropriateness of their actions within a set of specific rules, norms, values and beliefs established by multiple stakeholders (Suchman, 1995). It suggests that practices of external communication and participation in industry benchmarks can be helpful, but remain insufficient to enhance legitimacy if not backed by a dedicated strategy.

Fifth, the case shows how discrepancies in employees' understanding of official values or other normative frameworks can lead to low willingness to adopt SOI practices and methods. This values-action gap is illustrated by TIC's challenges in transitioning from conventional approaches to SOI impact assessment derived from the triple bottom-line framework (Elkington, 2013) to methods based on system-value creation (Baue, 2021). While the triple bottom-line approach focuses

on balancing the social, financial and environmental priorities of organisational performance, system-value approaches anticipate potential rebound effects by recognising issues of carrying capacity and thresholds at which systems begin to collapse. Although the system-value framework appears to be more in line with the company's sustainability values and strategy, some managers are reluctant to operationalise it for reasons of impact assessment. This confirms the need for a value-based perspective on innovation management, as it suggests that values and related normative frameworks influence the adoption of innovation practices because they can influence how employees interpret organisational practices.

Sixth, while most employees are motivated to join and stay with TIC because of the alignment between their individual values and TIC's corporate values, some struggle to identify with and embrace the newly introduced sustainability values. An emerging cultural tension between the established and newly introduced values calls for promoting the synergies between them rather than focusing on the contradictions. This can be done by framing sustainability values as extensions and specifications of, rather than replacements for, established values. The TIC case shows that such communication of new sustainability values requires leveraging both formal and informal channels, as inconsistencies between them increase employee resistance, while synergies reduce it.

Conclusions

Insights derived from case studies can be generalised to other concrete situations and contribute to theoretical developments by advancing existing concepts or raising new ones (see Yin, 2017, p. 41). Following Wannags and Gold (2020), we identify new categories of cultural tensions that constrain the transition to sustainability and SOI and require ambidextrous management, such as between safety and experimentation, top-down and bottom-up integration of values and employee-led SOI initiatives, local interests and overarching values in internal negotiations, inside-out and outside-in approaches to open innovation, and formal and informal channels for communicating and establishing sustainability values. We also identify values-action gaps in the implementation of SOI practices and methods, caused by divergent interests of organisational subsidiaries and an uneven distribution of sustainability literacy and understanding of the concept of sustainability and related frameworks across hierarchical and cultural levels (i.e., assumptions, values and artefacts; Schein, 2010). In doing so, we substantiate the VBI management framework, specify the integrative, generative and directive functions of values in innovation management and highlight the tensions involved. First, the case provides evidence of how the integration of values across hierarchical

levels, organisational divisions and strategic partnerships, as well as between employees' individual values and the organisation's official values, plays a crucial role in promoting or hindering the implementation of SOI practices. Second, it shows the role that the generative function of values plays in translating normative frameworks, such as the UN SDGs, into methods for evaluating and screening SOI projects. This translation depends on creating common ground and aligning new sustainability values and frameworks with established organisational narratives. Third, the case shows that the directive function of values can facilitate not only a strategic but also a cultural transition to SOI by determining desirable end-states and future scenarios, as in the case of envisioning the future inspection station of TIC.

Our results have implications for practitioners. First, in order to promote a cultural transition towards SOI and evenly distributed sustainability literacy, managers need to communicate sustainability and related concepts in a way that reflects existing organisational values and priorities (see Bertels *et al.*, 2010). Sustainability values and strategies should be underpinned by theoretical and normative frameworks, such as system value and the UN SDGs and aligned with established cultural assumptions, values and artefacts in order for them to be successfully adopted as guidelines and consistent vocabularies for implementing SOI practices and methods. Second, to effectively engage operational employees in supporting SOI strategies, the relevance and meaning of these strategies and their underlying values need to be communicated through more hands-on and interactive methods. Gamified workshops are an effective way to support the top-down integration of values by immersing employees in organisational narratives and instantiations of values-based decision making (Breuer *et al.*, 2022b). In addition to top-down integration, bottom-up integration from the operational level can be leveraged by improving feedback channels and initiating new activities such as a ValuesJam to co-define values with employees (see Yaun, 2006) or interactive workshops to redefine normative statements (Seiler *et al.*, 2022). The TIC case suggests such values-based management initiatives can be crucial for promoting SOI and calls for further research to validate their potential. Third, the TIC case provides examples of initiatives that can help establish a common ground based on shared sustainability values among organisational units and support their horizontal collaboration for SOI, for example, building informal SOI communities, hiring dedicated staff to manage negotiations, or enabling peer reviews of innovation projects. Fourth, our results suggest that ambidextrous management of inside-out and outside-in approaches to SOI requires strategic communication to gain and maintain corporate legitimacy regarding sustainability values. Fifth, we suggest that the alignment of employee and organisational values can be systematically harnessed to drive cultural transformation towards SOI, for example through leadership based on organisational values and expressed in corresponding

attitudes, behaviours and evaluations, or through HR management practices such as selective recruitment, training and team building (Das and Singh, 2016; Rani and Mishra, 2014). In this context, the values of sustainability and corporate responsibility can be used to attract young talent in particular, who are increasingly interested in such values when choosing an employer (Bustamante *et al.*, 2021).


Ethnographic research provides an in-depth understanding of corporate culture and its challenges through a research strategy and a set of methods that allow it to uncover values and the tensions and conflicts associated with them. Our methodological approach includes a prioritisation of the insights (as one of the participating senior managers enthusiastically noted), which makes them actionable for practitioners in the case company and in other companies, especially in technology, which are undergoing a similar transition from a safety-oriented to a sustainability-oriented culture. However, as the results depend on the selection of participants and their access to key information, it is up to managers in the case company and other companies to devise follow-up activities and to decide which insights and actions to prioritise.

In principle, each of the six cultural tensions should also be considered as potentially critical areas for other companies seeking to establish a sustainable innovation culture, especially for technology companies such as TIC with an established safety culture. Although this study meets the quality criteria for qualitative research (Steinke, 2004) and uses communicative validation and triangulation to validate results, there are several methodological limitations. First, the study focuses on a single company in the technical inspection industry. While this provides in-depth insights into a specific context, it limits the analytical generalisability of theoretical insights (Yin, 2017), which cannot necessarily be applied to other industries or organisational settings. Second, this study applies rapid ethnography techniques in order to streamline the material collection and manage resources effectively. This streamlined approach may miss nuances that could be captured using more traditional ethnographic methods, which require days or months in the field rather than hours. Finally, despite triangulation (the use of different methods, material sources and researcher perspectives), the study's reliance on self-reports may be subject to biases such as recall bias or social desirability bias, where participants may provide answers that they perceive as favourable rather than reflecting their true attitudes or behaviours.

Overall, this study improves our understanding of the business practices, challenges and tensions that need to be addressed in the transition to a sustainable economy. Corporate sustainability, even for a focal company, is not just a matter of isolated activities or major campaigns. It is not enough to introduce new processes, products or services, or to create new sustainable business models or strategies, or to add sustainability to a list of core values. It requires significant

cultural change, involving deeply held beliefs and values, practices and methods, activities and artefacts. Attempting to establish sustainability as a core value of an organisation is fraught with potential challenges (conflicts, tensions and values-action gaps), six of which we have identified in the insights of this study. Addressing these challenges is critical if we are to move beyond good intentions, elaborated strategies and verbal commitments to making sustainability and related values an everyday practice. Rapid, high-impact interventions to support and accelerate ongoing cultural transformation must follow rapid research such as that undertaken in this study to mitigate the global polycrisis in the time we have left to avoid the worst consequences.

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Values-Based Barriers and Good Practices in Sustainability-Oriented Innovation Management

Despite growing awareness of and interest in the role values play in innovation, a systematic overview and classification of recurrent barriers to the integration of stakeholder values in innovation activities are still lacking. A comprehensive overview of good practices to facilitate the management of values for sustainability-oriented innovation (SOI) is also missing. Due to conceptual confusion, different value frameworks, and unsystematic evidence about effective practices, it is still difficult to manage values for SOI. The present study aims to bridge these gaps by gathering evidence from a comprehensive literature review and from expert interviews with 17 innovation specialists. It identifies 21 barriers and 28 good practices and classifies them according to the integrative, generative, and directive functions of values. A conceptual model is proposed to explain how managing stakeholder values across the different dimensions of responsible innovation practice can facilitate SOI.

Keywords: sustainability, values, barriers, practices, responsible innovation, values-based innovation

1. Introduction

As a driver of socio-economic transformation throughout history, innovation is also recognised as a key driver of sustainable development. Innovation enables the creation of new technologies, processes, products, and business models, and thus plays a crucial role in addressing today's grand challenges. In this context, sustainability-oriented innovation (SOI) is defined as 'making intentional changes to an organization's philosophy and values, as well as to its products, processes or practices to serve the specific purpose of creating and realizing social and environmental value in addition to economic returns' (Adams et al., 2016, p. 180). This definition implies that effective SOI management depends on the consideration of values and interests of multiple

stakeholders and not just the organisation's shareholders and their economic priorities (Hörisch et al., 2014).

Management of stakeholder values is a driver of SOI and a condition for achieving sustainable business impact (Rauter et al., 2017; Hörisch et al., 2014). By understanding stakeholder values companies can uncover new potentials to address emerging customer needs, market potentials and sustainability challenges through dedicated innovation efforts. Moreover, since values are deeply embedded in the identities of companies and their stakeholders, they hold greater potential to leverage stakeholder relationships than the negotiation of short-term interests or mutual benefits (Breuer & Lüdeke-Freund, 2019). Values that align diverse stakeholders in the pursuit of overarching goals and normative imperatives such as sustainability can motivate inter-organisational collaboration and intra-organisational cultural development to address SOI challenges more effectively. Therefore, this paper proposes values-based stakeholder management, characterised by the 'clarification of shared or divergent values, creative collaboration and conversation', as a new approach to drive SOI (Breuer & Lüdeke-Freund, 2019, p. 13).

Despite the growing interest in the topic of values in the context of innovation, several authors point out high barriers to translating values and SOI strategies into practice (Bocken & Geradts, 2020; Guldmann & Huulgaard, 2020; Lubberink et al., 2017a). By analysing such barriers to SOI, researchers and practitioners are able to identify their root causes and develop targeted strategies to address them effectively. However, if values-based barriers to SOI remain unattended or misunderstood, they can lead to cumulative negative consequences, such as the misallocation of resources towards ineffective sustainability initiatives, loss of reputation, and missed innovation

opportunities. A profusion of studies provide an overview of recurrent barriers to SOI (e.g. Auer & Jarmai, 2017; Bocken & Geradts, 2020; Guldmann & Huulgaard, 2020; Laukkanen & Patala, 2014; Preuss & Walker, 2011). However, a systematic overview and classification of barriers to the management of stakeholder values for SOI is still lacking.

Other studies provide extensive reviews of organisational practices that help to overcome barriers to SOI and foster the development of SOI cultures (e.g. Adams et al., 2016; Lubberink et al., 2017a). Some studies specifically address the potential of managing values to support SOI practices (Breuer et al., 2022). However, a comprehensive overview of how the management of values can support the implementation of SOI practices has not been provided yet. Moreover, since values permeate organisations on different levels – such as personal, institutional, or societal – and can be both explicitly defined or only implicitly effective, there is significant conceptual confusion about how values impact the implementation of SOI practices. There are different theoretical frameworks that encompass stakeholder values and their impact on SOI (Breuer and Lüdeke-Freund, 2017a; Stilgoe et al., 2013; Cameron & Quinn, 2011). However, comparative investigation of these frameworks is scant, and a systematic understanding of their implications is lacking. An integration of these isolated theoretical perspectives can contribute to a robust theory that offers practical implications to manage SOI processes, cultures, and partnerships more effectively.

This study draws evidence from a systematic literature review and expert interviews with 17 innovation specialists to bridge the above-mentioned literature gaps through three research questions:

1. What recurrent barriers impede the management of stakeholder values for sustainability-oriented innovation?
2. How can the management of values support the implementation of organisational practices for sustainability-oriented innovation?
3. What are the conceptual foundations for understanding the role of values in implementing good practices for and mitigating barriers to sustainability-oriented innovation?

***Theoretical background**

2.1 Individual and organisational values

Individual values are extensively studied in psychology and sociology, where they are defined as ‘beliefs that are linked inextricably to affect’ and ‘desirable goals that motivate action’ (Schwartz, 2006, p. 143). According to Schwartz (2006), values form hierarchical structures, or ordered systems of priorities, in which trade-offs are made among competing values, which then stimulate related attitudes and behaviours.

Similarly, Feather (1996) views values in associative networks, where each value relates to a set of attitudes, beliefs, knowledge structures, and other values and networks.

Values are both terminal, in that they consist of beliefs about desirable end-states (e.g. carbon neutrality) and instrumental, in that they are shaped by beliefs about modes of conduct that would contribute to reaching those end-states (e.g. honesty; Rokeach, 1979). Values thus provide a future orientation and heuristics that facilitate decision-making under uncertainty or that encourage scrutiny of conflicting options (Breuer & Lüdeke-Freund, 2017a; Rindova & Martins, 2018).

In organisations, leaders’ individual values predefine organisational culture and are translated into shared rules for behaviour (Schein, 2010). Founders’ values are

initially replicated by their organisations, but as companies mature, other stakeholder values gain relevance and become integrated into the cultural strata. Thus although values are often presumed to function as control systems defined by top management and cascading throughout the organisation (Jollands et al., 2015), they may also conflict with the values of other stakeholders. For instance, extensive research highlights that value incongruence (i.e. the dissonance between an organisation's explicit values and its employees' individual values) leads to lower productivity, resistance to change and value-action gaps, among other consequences (Edwards & Cable, 2009; Sull et al., 2020). Moreover, organisational values detached from employee values can act as vague statements that cannot translate into a framework for action (Lemon & Sahota, 2004). Thus if employee values are implicitly effective within an organisation's culture, they can hinder the implementation of sustainability-oriented practices. To manage values effectively, companies need to systematically examine employee values and formalise them in official normative statements.

2.2 Values-based SOI barriers

Innovation barriers are 'constraints or factors that inhibit innovation' (Hjalmarsson et al., 2014, 2). A related notion is 'success factors for innovation', which can be interpreted as barriers when organisations fall short of attaining them. Typically, scholars distinguish between external and internal innovation barriers. Laukkanen and Patala (2014) propose a different categorisation, differentiating between structural (i.e. practices, processes, organisational forms, and structures) and cultural (i.e. norms, values, behaviours, and attitudes) barriers to sustainable business model innovation. According to this distinction, structural barriers to SOI are regulatory constraints or market and financial issues, while cultural barriers represent behavioural and social

impediments within stakeholder relationships. Thus barriers to the integration of stakeholder values can be classified as cultural SOI barriers. However, the literature has not yet offered a classification of recurrent barriers that impede the integration of stakeholder values in SOI management.

2.3 Values-based innovation management

To delineate the central role of values for innovation management, Breuer and Lüdeke-Freund (2017a) propose a values-based innovation (VBI) management framework. The authors distinguish three management levels across which values support innovation activities: normative, strategic, and operational. The normative level defines a company's identity and core objectives beyond a simple focus on achieving competitive advantage. It often translates implicit stakeholder values into explicit normative orientations or statements. The strategic level then translates these normative orientations into strategic programmes that guide value creation and capture to achieve competitive advantage. The operational level, in turn, translates the normative orientations and strategic programmes into standard processes and practices. For example, a company can emphasise its commitment to sustainability and ethical business practices through a purpose statement, core values and a code of conduct defined on the normative level. On the strategic level, the company can set clear goals and devise plans to pursue innovation projects that align with its core values. And on the operational level, it can adopt specific practices that ensure SOI, such as assessing the potential environmental impact of all innovation projects.

Breuer and Lüdeke-Freund observe that stakeholder values do not just feed into official normative statements but also fulfil integrative, generative, and directive functions. The integrative function is rooted in the conceptualisation of values as

priority systems in which subordinate values are integrated into overarching ones.

Based on shared overarching values, stakeholders are able to establish relationships and resolve conflicts. The integrative function can be initiated by external pressures, or by top-down or bottom-up internal pressures. External pressures induce alignment with values emerging from new legislations, public expectations, or cultural trends. In top-down integration, values defined by senior executives are mandated in the organisation, while bottom-up integration refers to reformulations of corporate values initiated by operational staff. The generative function uses stakeholder values as heuristics for recognising latent opportunities and threats and directing innovation efforts accordingly. Lastly, the directive function provides an orientation toward desirable futures for the organisation and its stakeholders. In the VBI management framework, these functions facilitate process, product, and service innovations on the operational level, business model innovations on the strategic level, and a renewal of corporate identities and (shared) aspirations on the normative level (figure 1).

2.4 Value integration and SOI practices

The responsible innovation (RI) framework has a significant conceptual overlap with the notion of SOI and thus enables a deeper understanding of SOI practice (Lubberink et al., 2017b). RI classifies four dimensions of practices: inclusive deliberation (engaging diverse stakeholders in deliberation on ‘visions, purposes, questions, and dilemmas’), reflexiveness (‘reflecting on underlying purposes, motivations, and potential impacts’), responsiveness (adjusting the direction, trajectory, and pace of innovations through adaptive learning), and anticipation (describing and analysing intended and unintended impacts on sustainability) (Owen et al., 2013, p. 38). Several authors stress that values should inform RI practices in all dimensions and throughout

the innovation process (Boenink & Kudina, 2020; Lubberink et al., 2017a). This section examines more closely the role of values in each of the four dimensions of RI practice.

2.4.1 Values-based inclusive deliberation

According to institutional theory, organisations pursue sustainability to gain legitimacy, that is, to be perceived as desirable, proper, or appropriate within a set of rules, norms, values, and beliefs established by multiple stakeholders (Hu et al., 2020). Stakeholder theory also stresses the importance of stakeholder values for managing corporate sustainability. In this connection, Edward Freeman (2018; Freeman et al., 2000) proposes ‘values-based capitalism’, where capitalism is seen ‘as a system of cooperation among stakeholders around important values’ (Freeman et al., 2000, p. 32). Freeman’s emphasis on values-based cooperation as an antecedent of sustainable development finds support in previous research stressing that sustainability transformation can only be achieved if diverse actors engage in deliberate interaction, knowledge exchange, networking, and co-innovation (Roome, 2012).

Based on the implications of institutional and stakeholder theories, I interpret the advantages of stakeholder values integration within SOI from two distinct angles. On one side, values allow firms to capture stakeholder requirements better and address them with appropriate solutions. On the other, they provide a basis for and reveal opportunities for stakeholder collaboration. RI’s inclusive deliberation dimension (Stilgoe et al., 2013; Owen et al., 2013) outlines the practices that can harness these two advantages of stakeholder values integration.

2.4.2 Values-based reflexivity

Reflexivity practices include ‘critically thinking about one’s own actions and responsibilities (1), values and motivations (2), knowledge and perceived realities (3),

and how each of these have an effect on the management of the innovation process' (Lubberink et al., 2017a, p. 12). Reflexivity considers not only what is already known, for example, from sustainability-oriented regulations and frameworks, but also what is unknown, in terms of 'associated uncertainties, risks, areas of ignorance, assumptions, questions, and dilemmas' (Owen et al., 2013, p. 38). This happens when innovation researchers and practitioners account for the 'value-ladenness' of the technological solutions that they develop (Strand, 2019, p. 58), for example by considering the alignment problem in new AI applications (Christian, 2021). The literature proposes various perspectives on how to prompt reflexivity on values, ranging from reliance on third-party experts to upstream engagement and deliberation with all stakeholders, from formal evaluations to informal (self-) assessments, and from 'knowledge-concept-process' mechanisms to leading an empowered and open communication (Strand, 2019; Lubberink et al., 2017a; Burget et al., 2017).

2.4.3 Values-based responsiveness

Subsequent to practices of inclusive deliberation and reflexivity, the next logical step is to respond to the feedback acquired from the external environment or through introspection by adapting innovation efforts accordingly. This 'capacity to change shape or direction in response to stakeholder and public values and changing circumstances' corresponds with RI's responsiveness dimension (Stilgoe et al., 2013, p. 1572).

Responsiveness requires an institutionalised response to changing stakeholder values, unforeseen developments concerning grand challenges, or after implementing innovations. Consideration of values is essential for engaging in responsiveness practices, arguably because of the potential of values to reveal unconventional

perspectives for market assessments and corresponding opportunities for responsive action (Rindova & Martins, 2018).

2.4.4 Values-based anticipation

Anticipatory practices analyse both intended desirable and unintended negative impacts on sustainability. They apply methods like technology assessments, value mapping, target setting, crowdsourcing, and scenario management (Burget et al., 2017; Lubberink et al., 2017a). In both the VBI and RI frameworks, normative scenario management can use the directive function of values to formulate radical, long-term visions and derive implementation strategies for SOI (Breuer & Lüdeke-Freund, 2017a; Lubberink et al., 2017a).

Besides articulating ‘promissory narratives of expectation’, anticipatory practices also explore potential unintended impacts, side effects, and risks by asking ‘What if...’ questions (Owen et al., 2013, p. 38). To anticipate the long-term implications of innovations, companies need a deep understanding of the dynamics of market, environmental, and social processes. This necessitates the early-on and wide-range inclusion of stakeholders in systematic assessments of potential problems and available alternatives (Wickson & Carew, 2014).

The above discussion of the four dimensions of RI practices shows that RI not only provides an empirically endorsed framework for managing SOI practice but also highlights the importance of the integration of stakeholder values for its success. However, there are no systematic attempts to leverage the RI framework to better understand values-based practices and barriers in SOI management. Thus, a comprehensive conceptual model that explains the impact of values on adopting practices for and mitigating barriers to SOI is still missing.

3. Method

Previous research has investigated the impact of values on SOI barriers and practices from a wide range of perspectives. A literature review is a suitable approach to systemise the fragmented extant knowledge. This study triangulates different literature analysis methods to generate a holistic understanding of the academic discourse (see figure 2). First, it builds on a systematic literature analysis (Tranfield et al., 2003)

conducted as part of an EU-funded Erasmus+ project (**anonymised**). The systematic review was conducted in collaboration with six independent researchers and identified 317 relevant papers from the Web of Science published between 1987 and December 2023. The Web of Science platform provides comprehensive coverage of publications on innovation management and is commonly used as a primary bibliographic source for literature reviews in the research field (e.g. Adams, 2016; Lubberink et al., 2017a). It provides access to multiple databases for different academic disciplines. This study sourced published monographs, journal and conference articles from the SCIE, SSCI, AHCI, ESCI, and CPCI databases. The search string was optimised in several iterations to refine the keyword selection to capture the most relevant literature. The articles were selected based on three keyword categories: 1) values AND 2) (sustainable innovation OR sustainability-oriented innovation) AND 3) seventeen additional terms (e.g. barriers OR practices; see figure 2). The selection of additional terms was guided by considerations of limiting the number of studies to a manageable amount while addressing a broad range of theories and concepts relevant to SOI management.

The researchers screened the titles and abstracts of the initial subset of 317 articles and selected 67 for in-depth analysis based on inclusion criteria such as business context applicability, relevance to SOI management, and relevance to individual and

organisational values (as opposed to e.g. only economic value or statistical values). A number of research themes identified as prominent in the systematic review (e.g. VBI, RI, competing values framework, innovation networks) allowed the researchers to draw from their experiences and include eleven more papers discussing values-based SOI barriers and practices for integrative analysis (Souza et al., 2010). Furthermore, to extract as much information as possible from the reviewed papers, a backward snowballing approach (Wohlin, 2014) was used to include eleven further articles for in-depth analysis (table 1). The aggregated data from 89 papers were clustered into evidence tables that allowed the extraction of barriers and practices related to values-based and SOI.

Besides the review of extant literature, this study draws on 17 expert interviews with innovation specialists from five leading European firms in diverse industries (energy, technical inspection, science conglomerate, a cleantech cluster, and a start-up accelerator). Expert interviews are a well-known method for exploring expert knowledge and reconstructing social situations and processes (Gläser & Laudel, 2009). They allowed the findings from the literature to be supplemented with examples of first-hand experiences of experts with values-based practices and barriers across different industrial contexts of SOI. Of the 17 respondents, three were engineers, six managers, one project coordinator, two departmental heads, one vice president, two directors, and two CEOs, all of whom were closely involved in innovation management. All interviews were conducted within a one-hour timeframe and followed a semi-structured guide that focused on respondent experiences with organisational values, barriers, and practices. Coding and aggregation procedures for expert interview analysis (Meuser & Nagel, 2009) were employed to identify response patterns and categories, indicating

values-based barriers (table 2) and practices (table 3) and how they fit into the overarching frameworks of RI and VBI management. To ensure quality, the data analysis complied with core criteria for conducting qualitative research defined by Steinke (2004).

The analysis of data was conducted in five steps (table 4). First, relevant barriers and practices were extracted from articles from the systematic literature review. Second, associated barriers and practices were extracted through backward snowballing and integrative analysis of relevant papers. Third, relevant findings were extracted from the interview transcripts. Fourth, associated barriers and practices were clustered and coded under overarching categories. Fourth, by applying the theoretical lenses of VBI and RI, the practices were associated with the integrative, generative, and directive functions of values and the four RI dimensions.

4. Results: Classification of values-based SOI barriers and practices

The interview data and publications analysis identified 21 barriers (table 5) and 28 good practices (table 6). These were classified in line with the VBI and RI theoretical frameworks to define five categories of values-based SOI barriers and nine categories of values-based SOI practices. These findings confirm the relevance of the three functions of values for implementing RI practices in SOI management. Furthermore, they consider extending RI's inclusive deliberation dimension to include value congruence as a critical factor that can facilitate or impede SOI. This section provides detailed descriptions for each of the nine categories of values-based SOI practices. Each subsection follows a consistent structure, starting with a summary of the literature review findings, then findings from the expert interviews, and finally presenting one case

example for each of the nine values-based SOI practice categories.

4.1.1 Managing compatibility with stakeholder values

The literature reviewed describes a number of inclusive deliberation practices that use the integrative function of values to manage the company's alignment with its stakeholder values. Reficco and colleagues (2018) and Todeschini and colleagues (2020) propose using shared values as cornerstones for building a macroculture upon a normative foundation for sustainability-oriented collaboration. Watson and colleagues (2018, p. 263) stress that alignment between stakeholder values, missions, and strategies facilitates environmental co-innovation, as partners 'tend to allocate more resources and have fewer incompatibilities'.

When partner relationships are extended into interorganisational networks, the integrative function of values serves to integrate a wide range of autonomous stakeholders who pursue both individual and common goals. Lubberink and colleagues (2017a) observe that innovation network participants are more likely to achieve their goals if they share values related to their common goals or if they associate in positive ethical network (Dossa & Kaeufer, 2014). Similar to positive ethical networks, values-based networks (Breuer & Lüdeke-Freund, 2017b) link business actors and other stakeholders in partnerships based on shared values. Other related concepts are collaborative ecosystems (Gutiérrez & Macken-Walsh, 2022) and mission-oriented innovation ecosystems that assemble diverse actors to tackle grand challenges (Jütting, 2020).

Whereas shared values act as antecedents for SOI partnerships, divergent values among business actors act as a common barrier (Lubberink et al., 2017a). Alinaghian and colleagues (2020) find that when supply network partners lack shared values, they

are less likely to undertake radical changes to adopt sustainability initiatives. Moreover, SOI barriers stemming from divergent values tend to become more severe as companies mature and face intensive competitive dynamics (Reficco et al., 2018). In such cases, divergent values catalyse trade-offs between the requirements of different stakeholders such as customers, investors, and the environment. Dealing with these trade-offs requires normative competency, that is, the ‘ability to reflect, to negotiate and to apply sustainability values, grounded on deeper concepts of justice, equity and ethics’ (Biberhofer et al., 2019, p. 27). Divergent values can also catalyse other trade-offs concerning SOI, such as between profit and technological breakthroughs as strategic goals, tight and loose coupling of customer orientation, or discipline and passion as personal drivers (Zeng et al, 2017). To manage these trade-offs effectively, ecosystem participants need to engage in exchanges that facilitate the co-creation and sharing of overarching values (Zeng et al, 2017; Barile et al., 2020).

Even if companies do not initially share values, they can still involve actors with divergent values in their innovation processes (Lubberink et al., 2017a). To do so, they can adopt strategies for reconciling opposing values based on negotiation or compromise (Le Ber & Branzei, 2010). However, organisational values that are at the core of a company’s identity are typically not subject to negotiation in response to external pressures. In cases where there are no shared sustainability-related values, Reficco and colleagues (2018) conclude that partners should be excluded as this enables companies to reduce coordination costs, increase the frequency of their interactions with other partners, secure agreements, and consolidate a shared macroculture.

Interviewed experts from the science conglomerate and technical inspection companies also highlighted the practice of defining a set of non-negotiable values. Their

companies do not make compromises with values, which are central to their services and processes, such as integrity and neutrality. Commenting on what are the reasons for incompatible values and difficult relations with partners, a respondent from the start-up accelerator company highlighted national cultural differences.

An illustrative case from the literature is of Wok, a restaurant chain, which actively works to develop a set of sustainability values that can associate all stakeholders related to its business model (Reficco et al., 2018).

4.1.2 Assessing stakeholder values through interpretive methods

To manage the compatibility and integration of their own and their stakeholders' values, companies need to assess which values make up their stakeholders' priority systems.

However, even when shared values are identified, different actors can attribute different meanings to the same values and fail to establish a common understanding of these supposedly shared values or they can even derive divergent implications for action from them. To mitigate such risks and facilitate common understanding, several authors recommend the use of interpretive methods for assessing values. For example, Boenink and Kudina (2020) argue that RI management should analyse values as 'evolving results of valuing processes' rather than as 'stable entities'. They highlight the effectiveness of interpretive methods, such as case studies, focus groups, and interpretative phenomenological analysis, rather than methods relying on self-reports of stakeholder values and their impact. Barile and colleagues (2020) discuss sense-making events as another interpretive method to engage stakeholders in deliberation on shared values and other ideas for achieving SOI. Similarly, Gutiérrez & Macken-Walsh (2022) apply participatory focus groups and storyboarding exercises to elicit shared as well as conflicting stakeholder values in collaborative ecosystems. Watson and colleagues

(2018) discuss ‘empathising’ as yet another interpretive method for better understanding stakeholder values and subsequently co-creating SOI. Empathising engages various stakeholders in deliberation on the differences between their values. Instead of seeing these differences as sources of conflict that require a middle-ground compromise, the goal is to harness the potential of divergent values to approach problem-solving from a more holistic and nuanced perspective. Holmes and Smart (2009) present illustrative cases of empathising between corporate and nonprofit organizations in the UK and how they resulted in SOI outcomes.

4.1.3 Promoting intra-organisational value congruence

A critical factor that influences the implementation of SOI strategies is the alignment between an organisation’s espoused values and its employees’ individual values. Misalignment between organisational and individual values requires greater efforts to engage all internal stakeholders in SOI processes (Bellosi et al., 2023). Conversely, greater congruence between an organisation’s and its members’ purposes (Geradts & Bocken, 2019) and values (Zhao et al., 2021) foster SOI. Moreover, individual sustainability values predispose corporate responsibility and competency development for sustainability-driven entrepreneurship (Preuss & Walker; 2011; Bansal & Roth, 2000; Biberhofer et al., 2019).

To reduce the possibility of value incongruencies acting as SOI barriers,

Giacomarra (2019) and Zeng and colleagues (2017) argue that employees and other stakeholders need to identify overarching values and use them to co-create SOI. Their research exemplifies initiatives that support bottom-up integration of values as antecedents of SOI. Other studies emphasise top-down integration as key for leveraging value congruence in the context of SOI. According to Arnold (2010) and Sarkis (2010),

the individual values and visions of managers translate into explicit normative orientations that act as cultural preconditions for developing SOI strategies. Similarly, Biberhofer and colleagues (2019) identify a number of types of individual values and worldviews related to sustainability that predispose the development of entrepreneurial competencies for SOI. In addition to the impact of leaders' values-based orientations on sustainability, the literature reports that commitment, communication, and behaviour by leaders in accordance with ethical values also predispose SOI initiatives (Klewitz & Hansen, 2014; Preuss and Walker, 2011; Reficco et al., 2018).

Although leaders' values play a significant role in guiding sustainability transformation, these values should not be conveyed as abstract or generic slogans. The communication of abstract value statements needs to demonstrate their practical implications for dealing with recognisable, everyday decisions and activities (Geradts & Bocken, 2019). In this connection, Bertels and colleagues (2010) recommend introducing sustainability priorities by framing them in a language that aligns with established organisational or departmental values. Two respondents from the oil and gas company provided an example for such an initiative, a cultural dictionary featuring interviews, where employees from different hierarchical and functional backgrounds share how they understand and apply newly introduced sustainability values.

4.2.1 Continuous reconciliation of conflicting values

A key aspect of values-based reflexivity throughout all stages of a SOI process is the analysis of potential conflicts between values and how to address them. Organisations need to uncover and address any potential divergency in how values are defined or interpreted to avoid further escalation of a conflict. In this connection, Taebi and colleagues (2013, p. 122) note that 'value conflicts in technological innovations often

need to be made more explicit. Discussing potential trade-offs publicly with broad participation could inspire and facilitate technological and institutional (re)design to accommodate a variety of values.’ Similarly, Ratner (2004, p. 64) describes sustainability as a ‘dialogue of values’ and advocates power sharing practices such as participatory decision-making, alternative forms of governance, or reduction of power inequalities to support the reconciliation of conflicting values. However, the present literature review identifies practices that reach beyond the goal of conflict resolution and harness the integrative function of values to establish common ground between conflicting parties and co-create SOI based on overarching shared values. For instance, hybridising (i.e. ‘acknowledging organisational tensions and co-creating appropriate solutions’; Watson et al., 2018, p. 268), prioritising (Lubberink et al., 2017a; see Bocken et al., 2013 on a ‘value mapping tool’), or forming positive ethical networks (Dossa & Kaeufer, 2014). Dossa & Kaeufer (2014) exemplify the latter practice with the case of Triodos Bank, which on multiple occasions extended its partnerships to actors with diverging values to increase the impact of its green funds.

4.2.2 Reflecting on the effect of values on innovation governance and outcomes

Generally, RI discourses associate reflexivity with individual self-scrutiny of one’s own decisions and practices (Stilgoe et al., 2013). However, Lubberink and colleagues (2017a) and Gonzales-Gemio and colleagues (2020) associate reflexivity specifically with practices that enable reflection on the effect of one’s values on innovation governance and outcomes. They highlight that since organisational leaders use values as decision-making heuristics when initiating and managing innovation projects (i.e. using their generative function), they need to be conscious of which values form the basis of their decisions. If leaders lack personal ethics or base their decisions on values of short-

term gain rather than long-term impact and stakeholder integration, this will have a negative effect on SOI. Reflexivity practices can help to prevent future threats to sustainability performance by raising leaders' awareness of how values shape their decisions. An illustrative case is the Caja Navarra bank (Ayuso et al., 2006), which engaged all employees in projects at the corporate customer service branches. The initiative aimed to help employees gain direct experience of the dynamics of customer relations and reflect on how to improve them.

4.2.3 Supporting stakeholder engagement through external focus of organisational values

Previous studies applying the competing values framework (CVF) perspective discuss the preconditions that induce tensions between economic, social, and ecological values. CVF (Cameron & Quinn, 2011) differentiates different types of cultures based on their dominant values, ranging between internal and external focus and control and flexibility. In line with the assumption that a company's approach to sustainable management depends on the dominant characteristics of its culture, researchers have hypothesised that the four types of culture defined by CVF – hierarchical, clan, market, and adhocracy – are associated with a particular dimension of corporate sustainability, economic, social, ecological, or a balance of the three, respectively (Globocnik et al., 2020). However, empirical findings show that not only adhocracies, but also hierarchical and market cultures generate positive impacts on all sustainability dimensions (Globocnik et al., 2020; Reyes-Santiago et al., 2017). To explain the inconsistencies between their hypotheses and findings, authors have highlighted the role of an external focus of values in facilitating SOI. For example, high SOI performance in hierarchical cultures is attributed to top-down decision structures, which enable a rapid

and firm response to anticipated external regulations (Globocnik et al., 2020).

Furthermore, while values of short-termism in market cultures correspond negatively with SOI performance, Globocnik and colleagues (2020) argue that a market culture's focus on external stakeholders fosters incremental SOI.

These results can be explained through the lens of the VBI management framework, which associates sensitivity towards the priorities of external stakeholders with the generative function values, that is, using values as heuristics to recognise emerging opportunities and threats. An illustrative case of how the external focus of organisational values can support SOI is described by Andersen and colleagues (2018).

They analyse a Swedish real estate company, which despite of its hierarchical- and clan-oriented culture puts strong emphasis on stakeholder integration. By considering the opinions of external stakeholders, it avoids impulsive decisions and unnecessary investments that the market does not demand.

4.3.1 Prioritising sustainability values as heuristics for ideation, evaluation, and corporate policy making

The advantages of emphasising socio-ecological values at least as strongly as economic values when managing SOI finds support from a number of reviewed publications. For example, when economic values, and related management theories and practices, take precedence over socio-ecological values, they hamper SOI (Dyck & Silvestre, 2018). Bocken and Geradts (2020) also find that institutionalised rules, norms, and beliefs that focus on shareholder value, uncertainty avoidance, and short-termism rather than a balanced integration of stakeholder values lead to a number of SOI barriers (2020). Another study on SOI barriers in business models by Guldmann and Huulgaard (2020) finds further evidence for the impeding role of organisational values that focus

on economic advantage. A longitudinal study by Hansen and colleagues (2022) coins the term ‘separation drift’ to describe the change of organisational value hierarchies from an emphasis on universal values (prioritising social and environmental concerns) toward security values (prioritising financial returns), which over time reduces the company’s ambidexterity capabilities in pursuing SOI.

To address instances of the deprioritisation of sustainability values, organisations use the generative function of values to implement various practices. For example, Chen and colleagues (2023) demonstrate that the use of a directed search patterns based on sustainability values increases managerial attention towards sustainability values when selecting ideas from internal crowdsourcing campaigns. Furthermore, Stock and colleagues (2017) indicate that a balanced use of values as heuristics related to all three dimensions of sustainability supports opportunity identification and idea generation at the fuzzy front end of SOI. Official environmental values also act as heuristics that reinforce environmental championing activities among individual employees (Eikelboom et al., 2018; Preuss & Walker; 2011). The subsequent prototyping of innovation ideas can be supported by value-sensitive design (Friedman & Hendry, 2019), which implements predefined values-based heuristics in SOI projects (Stilgoe et al., 2013). In addition to the development of new products and services, business modelling workshops can use values-based heuristics to identify potential for strategic renewal towards sustainable value creation, delivery, and capture (Breuer & Lüdeke-Freund, 2017b). Lastly, on the normative level of management, sustainability values provide heuristics for defining corporate policies that support SOI strategies and processes (Bertels et al., 2010; Rauter et al., 2023) and foster collaboration mechanisms for SOI (Reficco et al., 2018).

Three of the expert interviewees also pointed out the ubiquity of conflicts between economic and sustainability-related values. Two of them mentioned that while economic sustainability is prioritised as a driver of radical innovation and a balanced focus on sustainability, it is also juxtaposed with and often subordinated to other organisational priorities, which can have greater socio-ecological impact and, thereby, longer-term financial advantages. To overcome such barriers to SOI, respondents from the science conglomerate and technical inspection companies emphasised the practice of defining a set of non-negotiable socio-ecological values and translating them into criteria to screen out projects that do not contribute to sustainability or have a one-dimensional focus on sustainability. Respondents mentioned also other practices, such as values-based ideation and the utilisation of scorecards and impact assessments to evaluate innovation projects based on corporate values or normative directives like the SDGs.

4.3.2 Renewal of corporate values in response to external and bottom-up tensions The literature shows that values-based responsiveness practices require continuously reviewing and, if necessary, revising statements defined on the normative level of management, such as values, missions, and visions in response to changing market and societal contexts or stakeholder needs, expectations, and materiality (Román et al., 2022; Visser, 2018). Practices of deliberative governance (Visser, 2018), meta-governance (Stilgoe et al., 2013), and proactive monitoring of stakeholder behaviour (Barile et al., 2020) can enable the integration of stakeholder values for corporate renewal on the normative level of management. For example, the Italian woodworking company, Palm (Barile et al., 2020), uses simulation software to monitor the evolution of user opinions, engagement, and behaviour.

4.4.1 Formalising stakeholder and sustainability-oriented values with future-oriented statements

By articulating comprehensive statements of organisational purpose and coherent sets of sustainability-oriented values, organisations can establish behavioural and decision-making guidelines that drive SOI (Geradts & Bocken, 2019). However, misalignment between organisational values and policies impedes the development of collaboration competences for SOI (Yen & Yen, 2012; Todeschini et al., 2020). These findings indicate another recurrent barrier to SOI: the poor formalisation of sustainability-oriented and stakeholder values within corporate statements and policies.

The literature indicates a number of good practices for fostering the formalisation of sustainability-oriented and stakeholder values on the normative level of management. These practices use the directive function of values to envision desirable long-term developments based on sustainability-oriented and stakeholder values. For example, organisations codify their sustainability-oriented values or other normative statements – such as purposes, visions, and missions – in corporate policies, thereby more readily implementing them as part of SOI strategies, processes, and partnerships (Bertels et al., 2010; Reficco et al., 2018; Rauter et al., 2023). Furthermore, by reflecting on their target groups' needs and values, companies can anticipate not only the positive outcomes of innovation but also potential negative consequences (Auer & Jarmai, 2017; Van Hees et al., 2023). A respondent from the start-up accelerator company also emphasized the potential of values as criteria for identifying critical areas for future SOI developments.

5. Discussion: Managing stakeholder values in SOI practice

Based on a classification of values-based barriers and practices, I propose a conceptual

model that describes which value functions can be used to support the implementation of SOI practices differentiated in the RI framework (figure 3). I identify nine categories of values-based SOI practices and link them with their primary value functions and illustrative cases found in the data. Drawing on the reviewed literature, I will now discuss theoretical and practical implications from the nine categories based on the identified relationships between value functions and RI dimensions.

When applying inclusive deliberation practices, companies can use the integrative function of values to identify and align with the values of potential partners and other stakeholders. Companies with clearly articulated values can derive criteria for selecting appropriate and avoiding inappropriate partner relations (Ivanov, 2022; Wang & Zhang, 2017). Wang and Zhang (2017) outline a number of advantages associated with value compatibility among networked actors, distinguishing them from advantages generated from the compatibility of strategic interests alone. Several types of interorganisational networks – such as positive ethical networks (Dossa & Kaeufer, 2014), values-based networks (Breuer & Lüdeke-Freund, 2017b), mission-oriented innovation ecosystems (Jütting, 2020), and collaborative ecosystems (Gutiérrez & Macken-Walsh, 2022) – are proposed as SOI antecedents. When companies work together in networks based on shared values, rather than strategic interests, they integrate their individual corporate identities into a common identity on the normative level of management (Breuer & Lüdeke-Freund, 2017a). The common identity among innovation network partners improves knowledge exchange, thereby fostering SOI (Oskam et al., 2021).

To assess the values of their stakeholders in inclusive deliberation practices, companies need to gain a deeper contextual understanding of those values that goes

beyond the analysis of public statements. Values can remain implicit for those who hold them, can be variously interrelated within complex priority systems, and can be interpreted differently by different actors and in different contexts (Rindova & Martins, 2018). As such, it is difficult to identify values using common techniques for stakeholder analysis. To achieve a more contextual assessment of stakeholder values, studies recommend interpretive methods such as case studies, focus groups, interpretative phenomenological analysis, sense-making, and empathising. Ethnography is another interpretive method suited to assessing stakeholder values in SOI research and consulting (Breuer et al., 2022).

A number of studies highlight a positive relationship between organisational value congruence and SOI and indicate that value incongruences impede the cultural transition towards SOI. These findings can be attributed to the potential of congruent values to facilitate knowledge management, a key prerequisite for RI and SOI (Lubberink et al. 2017a). Shared values help employees to establish a common reference frame for interpreting events, thus promoting knowledge exchange and alleviating misunderstandings (Meglino et al., 1992). However, integrating individual employee values with organisational values requires consistent deliberation on the meaning of values. The more values are expressed in a generic form, the more susceptible they become to varying interpretations that negatively influence value congruence and the top-down ingratiation processes concerning values within a company (Rindova & Martins, 2018). Therefore, leaders should apply inclusive deliberation practices that engage employees in discussions on how organisational values can lead to SOI, rather than leaving them with only an abstract understanding.

Values-based reflexivity practices consider conflicts between organisational and

stakeholder values as well as within an organisation's priority system. Such conflicts are typical sources of trade-offs and ethical dilemmas, forcing business actors to choose from multiple lines of action that each seem right (Ivanov, 2022). Although sustainability-related dilemmas can be highly complex and difficult to address, when they are systematically scrutinised they can trigger organisational change towards a more mature SOI culture (Siebenhüner & Arnold, 2007). Moreover, conflicting values and trade-offs related to sustainability can reveal opportunities for new forms of value creation when these tensions are reframed to accommodate the concerns of all of the relevant stakeholders (Hörisch et al., 2014). Practices such as forming positive ethical networks (Dossa & Kaeufer, 2014), hybridising (Watson et al., 2018), and prioritising (Lubberink et al., 2017a) show how the integrative function of values can be harnessed to establish common ground between conflicting stakeholder values and co-create SOI based on overarching shared values.

Furthermore, regarding reflexivity practices, the literature shows that when leaders avoid reflection on which values fulfil generative functions in shaping their decisions, they fail to comprehensively analyse the trade-offs and dilemmas they face and become prone to making unfavourable choices that prioritise short-term gains or unethical behaviours (see Urbany et al., 2008). Cases such as the Volkswagen dieselgate and the Apple batterygate scandals have demonstrated the detrimental consequences of leaders not living their organisations' official values. Both companies incurred significant financial and reputational losses because their employees applied product development practices that contradicted sustainability regulations and their own organisational values. However, leaders and other employees are not solely responsible for reflecting on the impact of values on their decisions. Their capacity for critical self-

reflection also depends on the extent to which their organisation's culture and governance structures allow established values and norms to be questioned.

Organisational members should not be seen as solely carriers or receivers of meanings and practices but as 'active interpreters' who negotiate meaning and can challenge and shift existing norms and practices (Kemper et al., 2019, p. 9). Applying this cybernetic perspective through accommodating structures and systems can help organisations to perpetuate a virtuous cycle, wherein 'values, structures and systems give continuous feedback to each other and their coherent interplay contributes to the firms' evolving capacity for sustainable innovation' (Ayuso et al., 2006, p. 486).

Another way in which reflexivity practices can use the generative function of values is through the application of external stakeholder values as heuristics for identifying emerging opportunities for and threats to innovation. Regardless of their type of organisational culture as classified by the CVF, companies use the standpoint of their stakeholder values to reflect on the potential positive and negative outcomes of innovation. This can enable them to balance the economic, social, and environmental components of their SOI efforts without sacrificing other key priorities, such as internal process efficiency in hierarchical cultures, human relations in clan cultures, or competitiveness in market cultures. This is consistent with theoretical claims that value rationality should not exclude economic instrumental rationality but that the two should be synergised for greater strategic effectiveness (Rindova & Martins, 2018). In addition, it aligns with evidence on the positive impact of buyer-driven knowledge activities on SOI performance (Awan et al., 2021a; Awan et al., 2021b).

RI practices require the identification and incorporation of public values (i.e. intersubjectively and consensually defined sets of stakeholder values) in innovation

processes (Taebi et al., 2014). Similarly, a values-based approach uses the generative function of values to turn stakeholder values into explicit or even mandatory criteria for innovation management. It thus supports a number of responsiveness practices for SOI that prioritise stakeholder and sustainability values as heuristics for ideation, evaluation, and corporate policy making. These include defining a set of non-negotiable values (Avery & Bergsteiner; 2010) using values as ideation heuristics (Eikelboom et al., 2018; Preuss & Walker; 2011; Stock et al., 2017), value-sensitive design (Stilgoe et al., 2013), values-based project evaluation, business modelling (Breuer & Lüdeke-Freund, 2017b), and codifying values in corporate policies (Bertels et al., 2010).

Values-based responsiveness practices involve adjusting statements formulated on the normative level of management in response to external and bottom-up tensions stemming from incompatible stakeholder values. If normative statements are based on management's a priori assumptions, they create fertile ground for dogmatism, resistance to change, cognitive rigidity, and short-termism (Rindova & Martins, 2018). However, simply changing normative statements in response to stakeholder requirements does not guarantee cultural change. Moreover, if newly introduced normative statements do not translate into values-based practices, they appear as greenwashing. This raises the question of how leaders can be responsive to external pressures and incorporate the right changes into the organisational values set while retaining the values that define corporate identity and aspirations (Rindova & Martins, 2018). Case studies offer a solution to this challenge by demonstrating how initiatives for the bottom-up integration of values have led to improved innovation performance. Such a bottom-up integration of employee values can also foster the integration of customer values and other external stakeholders with whom the operational employees closely interact and whose priorities

they are highly sensitive to. For example, Breuer and Lüdeke-Freund (2017a) discuss the case of IBM's 'ValuesJam', which invited employees to discuss the organisation's values on its intranet. Contributions from 50,000 employees were considered when revising the values set, which identified gaps between current practices and the new values, and introduced values-based initiatives that boosted IBM's innovation performance in the following years. Seiler and colleagues (2022) describe another initiative for bottom-up integration that improved ideation and innovation performance through guiding questions and workshops that engaged employees in (re)defining organisational visions, purposes, and values. Siebenhüner and Arnold (2007) describe cases of three large technologically focused companies that incorporated values from the subcultures of engineers, product developers, and service personnel to translate environmental concerns into more accustomed technological challenges. Finally, Jones (2000) concludes that neither unitarist (top-down) nor pluralist (bottom-up) approaches to managing values for sustainability can be fully effective. Instead, a combination of both should be cultivated in a hybrid culture that responds to tensions in both directions.

When applying anticipatory practices to envision the future impact of their SOIs, companies can use the directive function of values to align their future orientation with sustainability-oriented and stakeholder values. When values are seen as 'beliefs about desirable end-states' (Rokeach, 1979, p. 49), they enable actors to reflect on which possible futures are considered valuable and why. Organisations can select relevant stakeholder and sustainability-oriented values and reflect on how they point towards convergent, desirable futures. The explicit consideration of desirable futures enables the company to formulate a compelling vision and formalise its implementation through corresponding corporate policies.

6. Conclusion and future research implications

This study provides a classification of 21 values-based barriers and 28 values-based practices in the context of SOI. Based on this classification it proposes a conceptual model, describing which value functions can be used to support the implementation of SOI practices as differentiated in the RI framework. From a theoretical perspective, the relationships between value functions and RI dimensions reveal a strong alignment between VBI and RI approaches to driving SOI. However, despite their overlap, the two frameworks possess inherent differences. For example, whereas the VBI framework aids understanding of how the functions of values can be proactively harnessed to manage SOI, RI focuses on a practice-oriented approach to adjust innovations ('responsible', implying a post factum response or compliance with a particular set of values). Breuer and Lüdeke-Freund (2017a) acknowledge that values-based innovation can take the form of responsible innovation and sustainability-oriented innovation but emphasise that it is non-prescriptive with regard to sustainability values as it can be used to explore and elaborate the functions of all kinds of values. Future research should further examine whether the VBI and RI frameworks are complementary or whether they provide dichotomous conceptual lenses on the impact of values on SOI. For examples, studies can empirically validate the potential of the herein proposed conceptual model to explain how values support or impede SOI.

From a practitioner perspective, the proposed relations between value functions and practices yield implications on how to facilitate the efficient implementation of SOI practices. By using the integrative function of values, practitioners can identify compatible stakeholder values as a normative foundation for collaboration, use interpretive methods to mitigate risks of divergent interpretations of values, align

employee and organisational values in SOI projects, reconcile conflicting stakeholder and organisational values, and continuously review and revise organisational values in response to changing stakeholder needs to maintain the relevance of SOI strategies. The generative function can support practitioner reflexivity on the potential negative impact of their decisions regarding innovation as well as sensitivity towards the priorities of external stakeholders and the consideration of sustainability values in ideation, evaluation, and policy making. Finally, the directive function supports the codification of future-oriented value statements into corporate policies that provide guidelines for behaviour and decision-making to drive SOI.

To enhance relevance, the proposed conceptual model and its nine categories of values-based SOI practices can be repurposed as comprehensive guidelines or a checklist for practitioners, indicating which practices to facilitate or attend to, and which specific approaches can be utilised for intervention. As such the model provides a structured approach to implement and refine SOI practices, e.g. by creating mechanisms for continuous feedback and adaptation, implementing change initiatives and interventions to address inherent barriers, or using existing or developing new methods to operationalise SOI practice.

Implications for future research can be grouped according to the four dimensions of RI practice. First, future studies can analyse and further validate the advantages of interpretative methods for assessing stakeholder values in inclusive deliberation practices. Regarding reflexivity, the discussed discrepancies between employee behaviour and organisational values have similarities with the value-action gap concept, which has been extensively studied as an impediment to pro-environmental consumer behaviour (Achchuthan et al., 2017) but remains overlooked in the innovation literature.

Future studies can further explore the relationship between value incongruencies and value-action gaps and new methods for values-based decision-making through self-reflection on trade-offs and dilemmas. An interesting research area in the responsiveness dimension is the exploration of initiatives for bottom-up integration of values and their impact on SOI performance as well as new (e.g. gamified) methods for their facilitation. Finally, longitudinal studies can explore how anticipatory practices of defining normative scenarios and visions for sustainable futures can impact SOI performance.

Although this study complies with quality criteria for qualitative research (Steinke, 2004) and literature reviews (Tranfield et al., 2003), several limitations must be acknowledged. The systematic literature review was limited to the Web of Science database, potentially excluding relevant studies from other sources. The expert interviews, conducted with 17 specialists from five European firms, may not fully represent the diversity of industries or geographical regions, affecting the generalizability of the findings. The classification of values-based barriers and practices is based on the researcher's subjective interpretations and is by no means exhaustive. Future studies are likely to identify other categories of practices and interactions between values functions and SOI practices.

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7. Figures and tables

Integrative analysis of 11 Papers discussing values-based barriers and practices in SOI	Backward snowballing of 11 Papers from the 78 selected articles (67 sourced from a systematic literature review + 11 from an integrative literature review)
Alinaghian & Qiu, 2020	Arnold, 2010
Anderson et al., 2018	Auer & Jarmaj, 2017
Bertels et al., 2010	Ayuso et al., 2006
Breuer & Lüdeke-Freund, 2017b	Bansal & Roth, 2000
Boenink & Kudina, 2020	Dossa & Kaeufer, 2014
Globocnik et al., 2020	Holmes & Smart, 2009
Gonzales-Gemio et al., 2020	Le Ber & Branzei, 2010
Klewitz & Hansen, 2014	Preuss & Walker, 2011
Lupova-Henry & Dotti, 2019	Reyes-Santiago et al., 2017
Stilgoe et al., 2013	Yen & Yen, 2012

Table 1. Papers selected through integrative review and backward snowballing.

Barrier	Quote
Hampered collaboration due to divergence in national cultures and associated values	<i>'(Trust) is very important (organizational) value... (but) not a very common value represented in Poland, because of the communistic past... We have a lot of problems connected to this trust in Central and Eastern European countries. It's the opposite situation in Scandinavian countries... (In Poland) ...usually you need a lawyer and this agreement has maybe 100 pages... You don't need documents like that when you trust people... another value would be cooperation...'</i> (CEO of cleantech cluster company).
Conflicts between economic sustainability and other sustainability-related values	<i>'Sometimes there are contradictive values in some industries. For them, it's really hard to be sustainable. Let say the industrial, energy sectors, oil and gas industry and so on. They want to be more environmentally friendly, but sometimes it's hard to the profits and their goals'</i> (Innovation Manager at start-up accelerator company). <i>'We can't do anything sustainable with which we don't make money. And that's why we still have for the financial values slightly higher valuation factor... If we don't earn any money with it, then I also, personally as a manager in the end do not get anything'</i> (Director of Innovation and Digitalization at technical inspection company). <i>'An independent start-up could very easily pivot towards an attractive business model, just focusing on money. But we're really thinking very hard into what governing structures, what legal contractual things do we need so that... so that we can probably even leverage our values into other industries...'</i> (Head of IT and Digitalization at technical inspection company).

Table 2. Interview quotes indicating VBI barriers.

Practice	Quote
Providing active guidance for the implementation of normative statements that define SOI goals	<i>'As soon as you open our SharePoint portal... There are interviews... You can understand how people globally are using these values... There are manuals and explanations. For instance, at the beginning I did not understand 'care'... because when we talk about 'care' this is always related with the customer... now it's more clear... (It was) less evident because the customer is a little bit far away, because we are doing components in my production site.'</i> (Continuous Improvement Manager at oil and gas industrial service company)
Using non-negotiable values as criteria for screening incompatible innovation projects	<i>'It's something that is very strongly and very repeated by the top management of the company and is going down.... there are several - I was going to say a lot - several red lines that nobody can cross... you can always refer to that.'</i> (Application Engineer at science conglomerate) <i>'We have to stay neutral otherwise we lose our business. ... very strong and clear set of values that are far beyond making money and only making money, but really looking into how can we maintain this neutral stance this neutral standpoint in everything we do and I think there's a huge room for innovating towards these values.'</i> (Head of IT and Digitalization at technical inspection company)
Using corporate values as criteria for evaluation of ongoing innovation projects	<i>'This is one of the areas that we are evaluating alignment with our values. It's a guidance for decision making about how we promote (projects) internally.'</i> (CEO of a start-up accelerator company) <i>'We have built Maslow's pyramid of needs with regard to our services. What good are they doing compared to the SDGs? ... (and also) we calculate the so-called sustainability index, which consists of an evaluation of a project with regard to the SDGs.'</i> (Director of Innovation and Digitalization at technical inspection company) <i>'We orientated ourselves to the SDGs... And that's what we first subjected all innovation projects to... it made a lot of sense because going through this catalog of criteria was also done with the project managers and the other colleagues involved on these topics...'</i> (Strategic Manager at technical inspection company)
Leadership review of values, vision, and mission to align the innovation strategy to the market and societal contexts	<i>'Our core business is safety, how do I evaluate the safety of a networked, intelligent system? There are no really satisfactory answers to this yet. And since our brand stands for trust, trust in the usability of technology, in the safe use of technology, we have to find an answer to this, otherwise we will eventually be superfluous.'</i> (Director of Innovation and Digitalization at technical inspection company)
Using corporate values as criteria for identifying new opportunities	<i>'We have run for the last three years the internal program 99%. It is the idea of step by step improving our company... looking at certain opportunities or challenges and addressing that... For example, this year we have teams working on customer excellence, conscious branding and Extreme Ownership... Discovering certain opportunities, this is something that is very connected to our values...'</i> (CEO of start-up accelerator company).

Table 3. Interview quotes indicating VBI practices.

Intermediary steps of the data analysis	Barriers	Practices
1. Extraction of relevant findings through systematic literature review	Emphasis on shareholder value, uncertainty avoidance, and short-termism as opposed to a balanced integration of stakeholder values (Bocken and Geradts, 2020)	Integration of sustainability values throughout idea generation (Stock et al., 2017); Codifying sustainability values into corporate policies (Rauter et al., 2023; Reficco et al., 2018)
2. Extraction of relevant findings through backward snowballing and integrative analysis	Values of efficiency, incrementalism and short-termism inhibit SOI performance (Globocnik et al., 2020; Reyes-Santiago et al., 2017)	Value-sensitive design (Stilgoe et al., 2013) and Values-based business modelling (Breuer & Lüdeke-Freund, 2017b); Codifying sustainability values into corporate policies (Bertels et al., 2010)
3. Extraction of relevant findings from the interview transcripts	Conflicts between economic sustainability and other sustainability-related values (Start-up accelerator company, Technical inspection company)	Using non-negotiable values in innovation projects screening (Science conglomerate, Technical inspection company); Using corporate values as evaluation criteria for innovation projects (Start-up accelerator company, Technical inspection company)
4. Coding and categorisation	De-prioritization of sustainability values as heuristics for ideation, evaluation, and defining of the innovation strategy	Prioritizing sustainability values as heuristics for ideation, evaluation, and corporate policy making
5. Theoretical generalisation linking categories with values' functions and RI dimensions	De-prioritization of sustainability values as heuristics underutilises the generative function of values and hampers the responsiveness dimension of RI	The generative function of values supports responsiveness for RI by integrating sustainability values in ideation and evaluation and corporate policy making practices

Table 4. Exemplary walkthrough of the intermediary steps of the analytical approach.

Functions of Values	Dimensions of Responsible Innovation Practices	Classification of Values-based SOI Barriers	Examples of Analysed Papers and Expert Interviews Where Values-based SOI Barriers or Success Factors are Described
Integrative	Inclusive Deliberation	Incompatible stakeholder values	Tensions provoked by divergent stakeholder values (Reficco et al., 2018, p. 1182; Biberhofer et al., 2019, p. 32; Zeng et al, 2017)
			Conflicting stakeholder values hampering reflection and deliberation (Lubberink et al., 2017a)
			Hampered collaboration due to divergence in national cultures and associated values (Cleantech cluster company)
			Building shared macroculture provides normative foundation for sustainability collaboration (Reficco et al., 2018)
			Compatible stakeholder values increase the likelihood of collaborative SOIs in the value chain (Todeschini et al., 2020)
		Absence of shared values among supply network partners hampers sustainability initiatives (Alinaghian & Qiu, 2020).	
		Value incongruence within the organization	Personal sustainability values predispose sustainability-driven entrepreneurship (Preuss & Walker; 2011; Bansal & Roth, 2000; Biberhofer et al., 2019, p. 30f)
			Alignment between individual and corporate purposes predisposes SOI (Geradts & Bocken, 2019, p. 3)
			Person-organization value fit mediates organizational commitment as predictor of SOI capability (Zhao et al., 2021)
			Value incongruence requires greater efforts to engage all internal stakeholders in SOI processes (Bellosi et al., 2023)
Leaders' lack of commitment to ethical values hampers sustainability procurement initiatives (Preuss & Walker; 2011, p. 497)			
Management's values, vision and norms act as cultural preconditions for SOI strategies (Arnold, 2010; Sarkis, 2010)			
Generative	Reflexivity	Organizational values related to strong internal orientation	Values related to strong internal orientation inhibit sustainability ideas from being translated into innovation (Globocnik et al., 2020) and reduce perceptions of SOI success (Rubio-Andrés & Abril, 2022)
			External orientation toward stakeholders (open system/adhocracy values) relates positively with sustainability-related innovation performance (Globocnik et al., 2020; Rubio-Andrés & Abril, 2022)
	Responsiveness	De-prioritization of sustainability values as heuristics for ideation, evaluation, and defining of the innovation strategy	Values of efficiency, incrementalism and short-termism inhibit SOI performance (Reyes-Santiago et al., 2017; Globocnik et al., 2020)
			Fixed pie fallacy excludes SOI ideas in internal crowdsourcing (Chen et al., 2023)
			Changing org. value hierarchy from universalism values to security values diminishes ambidexterity capabilities for SOI (Hansen et al., 2022)
			Conflicts between economic sustainability and other sustainability-related values (Start-up accelerator company, Technical inspection company)
			Explicit environmental values predispose environmental championing (Eikelboom et al., 2018; Preuss & Walker; 2011)
			Theories and practices that deprioritise socio-ecological well-being are susceptible to overlooking socio-ecological innovations (Dyck & Silvestre, 2018)
			Emphasis on shareholder value, uncertainty avoidance, and short-termism as opposed to a balanced integration of stakeholder values (Bocken and Geradts, 2020)
			Org. values and business model structures emphasizing shareholder value and short-termism impede circular business model innovations (Guldmann & Huulgaard, 2020)
Directive	Anticipation	Poor formalization of stakeholder values/long-term orientation within org. statements/policies	Clearly articulated purpose and sustainability values predispose SOI (Geradts & Bocken, 2019, p. 4)
			Misalignment between org. values and policies hamper collaboration competences for value chain SOIs (Yen & Yen, 2012; Todeschini et al., 2020, p. 4)
			The positive impact of sustainability innovation goals on SOI performance is mediated by corresponding values, visions, and norms (Rauter et al., 2023)

Table 5. Classification of values-based SOI barriers associated with value functions and RI dimensions.

Functions of Values	Dimensions of Responsible Innovation Practices	Categories of Values-based Practices for SOI	Examples of Analysed Papers and Expert Interviews Where Values-based SOI Practices Are Indicated
Integrative	Inclusive Deliberation	Managing compatibility with stakeholder values	Restricting partner relations with stakeholders who do not share the same values (Reficco et al., 2018)
			Ensuring alignment between partners' values, missions, and strategies (Watson et al., 2018)
			Working with actors sharing the same values (Lubberink et al., 2017a; Lupova-Henry & Dotti, 2019), e.g. by forming positive ethical networks (Dossa & Kaeufer, 2014), values-based networks (Breuer & Lüdeke-Freund, 2017b), mission-oriented innovation ecosystems (Jütting, 2020), or collaborative ecosystems (Gutiérrez & Macken-Walsh, 2022)
		Assessing stakeholder values through interpretive methods	Working with actors with different or opposing values (e.g. by negotiating new responses, new values, and new logics; Le Ber & Branzei, 2010; Lubberink et al., 2017a)
			Aligning organizational and ecosystem actor's values (Barile et al., 2020)
			Empathizing: Reflecting on differences in values for co-creating SOI with external stakeholders (Watson et al., 2018; Holmes & Smart, 2009)
	Promoting value congruence within the organization	Sense-making events to strengthen shared values and co-create value propositions (Barile et al., 2020)	
		Hermeneutic methods for understanding stakeholder values and their impact on RI practices (Boenink & Kudina, 2020)	
		Participatory focus groups and storyboarding exercises to elicit shared and conflicting values (Gutiérrez & Macken-Walsh, 2022)	
		Co-creation models to strengthen shared values and initiate SOI (Giacomarra, 2019)	
		Co-creation and sharing of innovation values across organizational boundaries (Zeng et al., 2017)	
		Communication of (sustainability) values and visions emerging from the personal values and ethical leadership of founders (Reficco et al., 2018, 1179; Klewitz & Hansen, 2014, p. 10)	
Reflexivity	Continuously reconciling conflicting values	Leaders' communication of core ethical values (Adams et al., 2016, p. 191; Preuss & Walker, 2011, p. 497)	
		Framing sustainability in line with the organizational values and priorities (Bertels et al., 2010)	
		Providing active guidance for putting into practice normative statements that define SOI goals (Geradts & Bocken, 2019, p. 5; Oil and gas industrial service company)	
Generative	Responsiveness	Dealing with incompatible values (e.g. by forming positive ethical networks; Dossa & Kaeufer, 2014 or by 'hybridizing'; Watson et al., 2018)	
		Prioritizing conflicting values (Lubberink et al., 2017a; Bocken et al., 2013; Harrison et al., 2012; Technical inspection company)	
		Reflecting upon target groups' needs and values (Auer & Jarmai, 2017)	
	Reflecting on the effect of one's values on innovation governance and outcomes (Lubberink et al., 2017a; Gonzales-Gemio et al., 2020)		
	Supporting stakeholder engagement through external focus of organizational values (Globocnik et al., 2020; Anderson et al., 2018)		
	Prioritizing sustainability values as heuristics for ideation, evaluation, and corporate policy making		
Integrative	Renewal of corporate values in response to external and bottom-up tensions	Using non-negotiable values in innovation projects screening (Science conglomerate, Technical inspection company)	
		Directed search patterns based on sustainability values increase managerial attention towards sustainability (Chen et al., 2023)	
		Integration of sustainability values throughout idea generation (Stock et al., 2017)	
Directive	Anticipation	Value-sensitive design (Stilgoe et al., 2013)	
		Using corporate values as evaluation criteria for innovation projects (Start-up accelerator company, Technical inspection company)	
		Values-based business modelling (Breuer & Lüdeke-Freund, 2017b)	
Integrative	Renewal of corporate values in response to external and bottom-up tensions	Codifying sustainability values into corporate policies (Bertels et al., 2010; Rauter et al., 2023; Reficco et al., 2018)	
		Meta governance (Stilgoe et al., 2013)	
		Proactive monitoring of stakeholders' behaviour to support renewal of corporate values (Barile et al., 2020)	
Directive	Anticipation	External stakeholder values and market factors contribute to redefining the organizational values and SOI efforts (Román et al., 2022)	
		Leadership review of values, vision, and mission to align the innovation strategy to the market stakeholder needs (Visser, 2018; Technical inspection company)	
		Using corporate values as criteria for identifying new opportunities (Start-up accelerator company)	
Directive	Anticipation	Codifying sustainability values into corporate policies (Bertels et al., 2010; Rauter et al., 2023; Reficco et al., 2018)	
		Reflecting upon target groups' needs and values to anticipate potential negative consequences of innovation (Auer & Jarmai, 2017; Hees et al., 2021)	
		Formalizing stakeholder and sustainability-oriented values with future-oriented statements	

Table 6. Classification of practices that support stakeholder value management for SOI associated with value functions and RI dimensions.

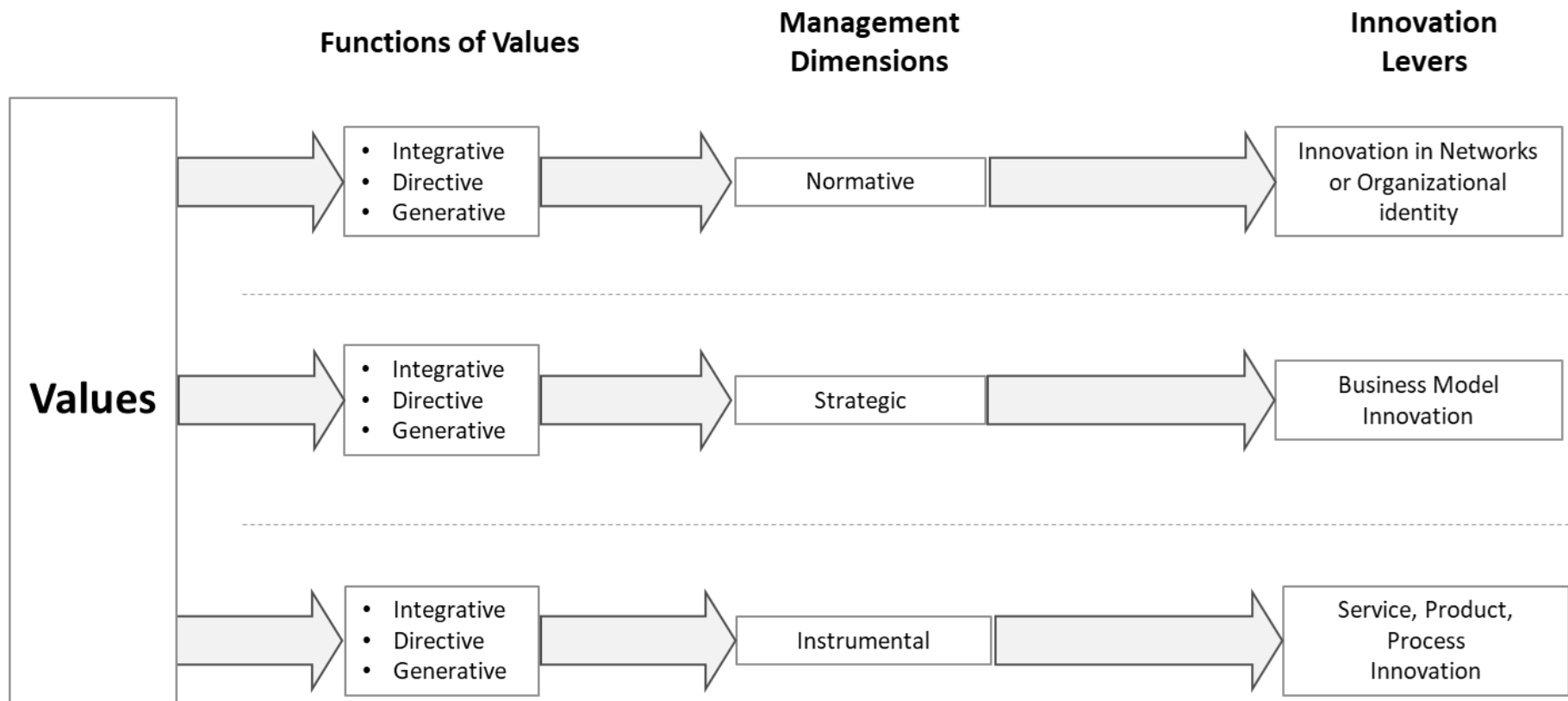


Figure 1. The three functions values fulfil across three management dimensions and how they contribute to innovation management via corresponding levers. Adapted from Breuer and Lüdeke-Freund (2017a, p. 64).

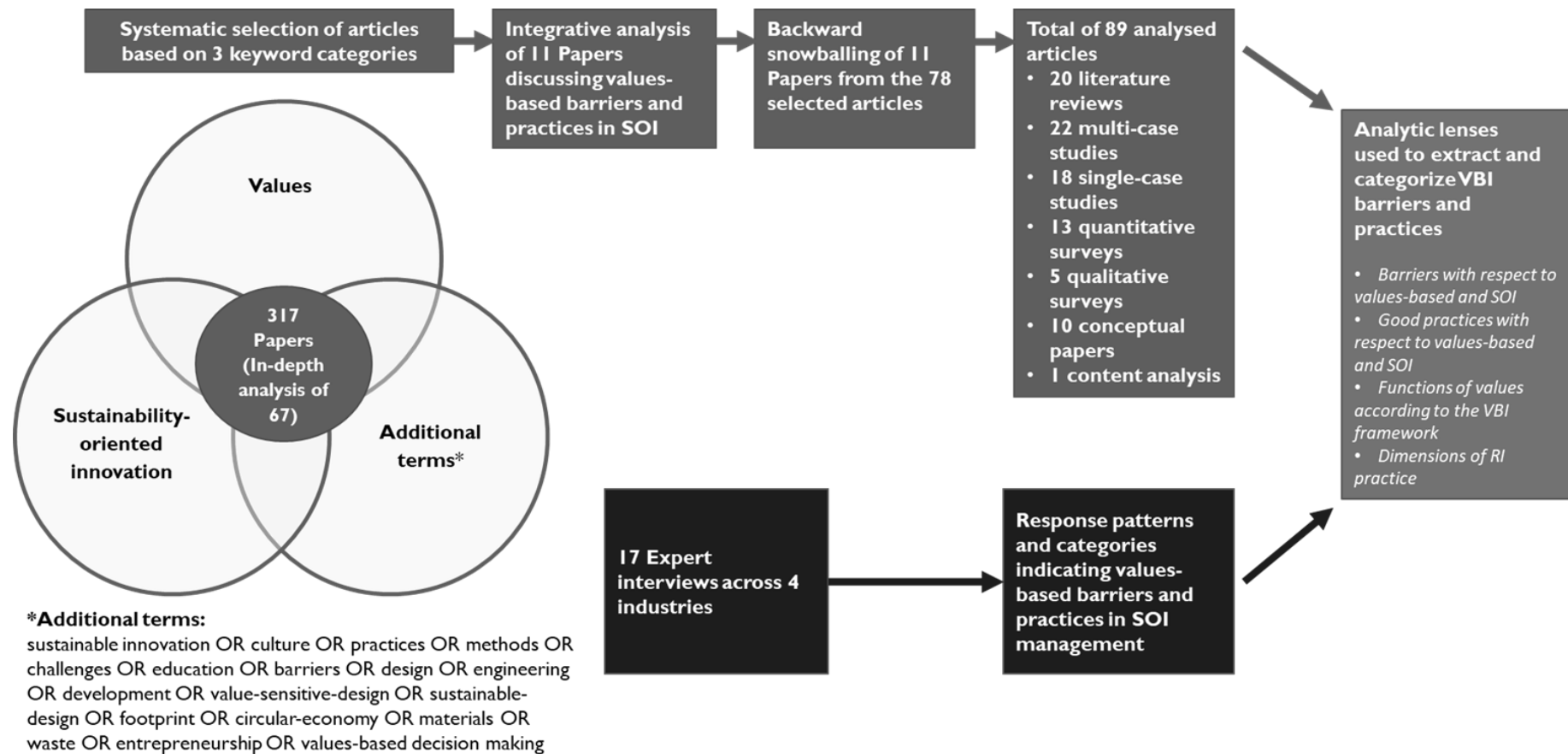


Figure 2. Overview of methodological approach.

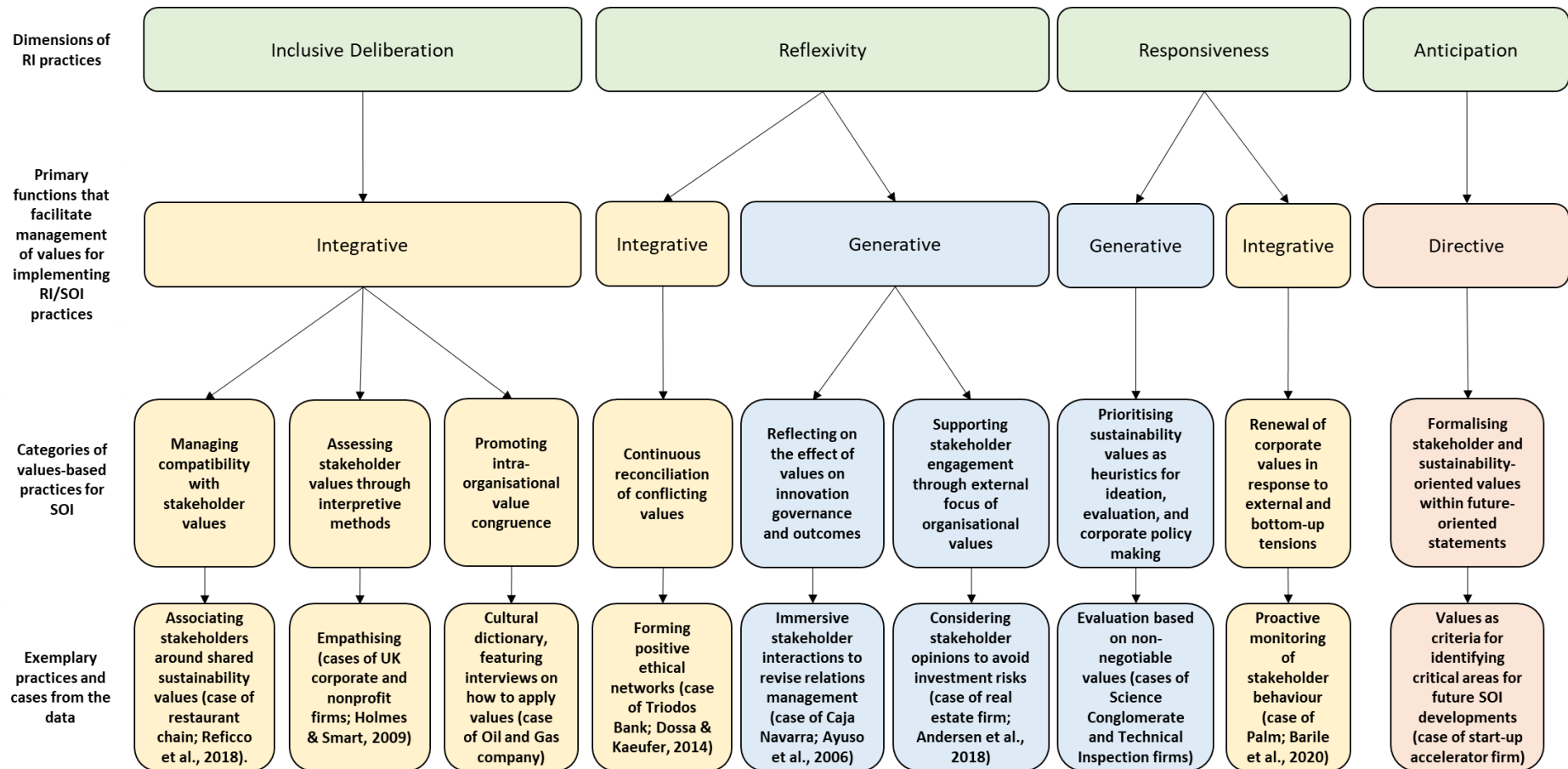


Figure 3. Conceptual model explaining how integrative, generative, and directive functions of values facilitate stakeholder values management across the dimensions of RI and the implementation of distinct categories and exemplary cases of SOI practices.