

Article

Creating the Culture for Sustainable Innovation: A Gamified Approach

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Abstract: This research proposes a gamified approach to creating a culture for sustainable-oriented innovation. Specifically, we use action research to explore the mechanisms through which business decision-makers (such as entrepreneurs, executives and managers) reflect on their practices and obstacles to innovation, and then we use gamification to stimulate the involvement and creativity of managers. The main contribution of this paper is the design of a one-day gamified workshop in which participants collaborate first to identify common values and then to drive the co-creation of sustainable innovations. The workshop has been applied with managers of a real company to evaluate its playability and to validate its effectiveness in creating a culture for sustainable innovation.

Keywords: sustainable-oriented innovation; corporate values; gamification; action research

1. Introduction

Firms are increasingly required to adopt sustainable development goals (SDGs) [1] as a guide to their business strategies. However, only few have already transformed their culture to favour values-based sustainable-oriented innovation (SOI) [2,3]. Previous studies agree that most organizations have not yet understood the long-term implications of their businesses, so they have to make considerable efforts to reframe their priorities, to mediate among the conflicting objectives of their numerous stakeholders and change their innovation practices [4,5].

The debate on how cultural and values-driven transformations can facilitate SOI is not yet well developed [6], and there is little understanding on the normative approaches that can be consistently integrated throughout this process. The lack of consolidated knowledge as well as of practical experiences prevent the diffusion of good practices [7,8], so far that it is claimed that SOI still relies on trial-and-error attempts [9].

To fill this gap, this paper aims at developing a gamified approach to create a culture for sustainable innovation. The work is part of IMPACT, a research project funded by the European Commission within the Erasmus+ Knowledge Alliance Program. The overall purpose of this project is to translate SDGs into everyday business, developing new ways to put decision-makers' values into practice and illustrating how sustainability challenges can unlock innovation. It is in fact claimed that only few firms have already established practices that are grounded on their corporate culture and values to drive sustainability-oriented innovation [2]. Through a combination of action research (AR) and gamification, this paper presents a workshop to facilitate alignment of conflicting values among the company decision-makers to tackle the challenges of SOI. The rest of the paper is structured as follows: Section 2 presents a short background on both values-based SOI and gamification; Section 3 illustrates the research methodology; Section 4 presents the workshop structure while Section 5 discusses the results obtained from its application, according to the AR cycle. The last section draws some conclusions, limitations and research avenues.



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2. Background

2.1. Values-Based Sustainable-Oriented Innovation

SOI is purposed to develop innovations through a new philosophical and cultural approach that considers the three aspects of sustainability, namely economic, social and environmental [10]. It is about rethinking the company's purpose and culture to create shared value [11] through new, more sustainable products, processes and practices. This requires the adoption of more human-centred participatory methods such as design thinking and gamification [12]. In this case, the aim is to treat sustainability as a socio-technical challenge that requires mediation among complex and frequently divergent contextual factors, such as technologies, regulations, consumer behaviours and cultures [4]. It is said that firms need to embrace a broader perspective and adopt an ecosystem view that looks beyond their own boundaries [8,13]. Furthermore, firms should move from a stand-alone strategy, in which each business unit moves independently, to integrated strategies in which sustainability challenges are rooted in the corporate culture [14]. Finally, some studies show how achieving greater alignment of conflicting values can positively influence the process of SOI [2,15]. The mentioned literature defines values as a relatively stable and ordered system of priorities, which provides a decisive reference in people's social lives. In other words, values are beliefs that relate to desirable goals that: (a) go beyond certain situations or events, (b) serve as standards and criteria, and (c) are ordered according to their relative importance [16]. This relative importance determines people's behaviours and actions. It follows that values are persistent and should not be confused with interests. Interests in fact can be mediated in exchange for something, while values resist simple negotiation since they define 'who we are' [6].

2.2. Gamification

The term gamification was coined in 2002 and gained widespread interest in the following years [17–19]. Today, it refers to the introduction of game elements in non-game situations to encourage people's motivation, enjoyment and engagement, particularly in work environments and situations of complex tasks and challenging objectives [20,21]. In fact, when faced with obstacles, people may feel depressed, overwhelmed, frustrated or cynical. These feelings are not present in a gaming environment, in which users are fully immersed in interesting tasks and fall often into a 'state of flow'. This can be defined as 'a feeling of happiness and inspiration associated with playing a game that prevents the user from getting bored' [22]. Therefore, gamification tries to create a fun atmosphere that stimulates people's openness, collaboration and cultural alignment [23]. In addition, it facilitates knowledge sharing, creative thinking, team spirit, consensus building and reduction of inhibition thresholds [24]. Gamification should neither be confused with reward systems nor with loyalty programs. These merely persuade people to perform actions in return for (a promise of) some earnings [25]. Conversely, gamification is much more than this, and the introduction of game elements, competition and rewards must be accurately conceived to comply case by case with what really motivates and keeps people. Gamification can be applied to any business domain [26,27]. However, it plays a key role in innovation tasks to promote creativity and out-of-the-box thinking [28]. Some studies also show how gamification can contribute to simplifying the complexity of decision-making since it favours a common understanding of the problem to be addressed [25]. Breuer and Ivanov [29] suggest that gamification can be proficiently used in SOI. These authors in particular claim that: (a) dilemma games can increase vertical and horizontal communication as well as awareness and understanding of a firm's values; (b) gamified workshops can enable the creation of values-oriented frameworks that thus guide collaboration and idea generation; and (c) gamification can also be used for open innovation to promote collaboration among different departments of the same firm or different firms of the same value chain.

In light of the above considerations, the research questions (RQs) that this study wants to address can be explicated as follows:

- RQ1: How can the culture for SOI be created and fostered?
- RQ2: How can gamification be used to develop SOI?

The following section describes the research methodology that addresses these RQs.

3. Research Methodology

This paper takes place within the context of the IMPACT research project, which unites innovation scholars and practitioners to improve the teaching and coaching of SOI. This project involves a number of different academic and industrial partners such as 3M (Madrid, Spain), Baker Hughes (Florence, Italy), TÜV Nord (Hannover, Germany), South Poland Cleantech Cluster (Crakow, Poland), University of Florence (Florence, Italy), School of Business of Leipzig (Leipzig, Germany), Universidad Complutense de Madrid (Madrid, Spain), Hochschule für Medien, Kommunikation und Wirtschaft of Berlin (Berlin, Germany) and Cracow University of Technology (Crakow, Poland). The methodology adopted by the IMPACT project is a mix of literature review, ethnography and action research (hereafter AR). In particular, this paper adopts AR as a participatory and democratic methodology that combines theory and practice and action and reflection to find practical solutions to important issues such as the prosperity of people and communities [30]. In AR, the intervention allows the insights coming from what the managers accomplish, instead of what they say they are accomplishing, as in case-based research [31]. With AR, researchers and system users collaborate to achieve some common goals. As such, they develop practical knowledge around a given phenomenon [32]. In this sense, AR requires deep explorations of situations and contexts, which is usually achieved by interviewing people. Furthermore, this methodology was integrated with an ethnographic approach, whereby we not only interviewed the managers but also observed their work context and daily practices in an ethnographic mode of inquiry [33]. Based on the interviews and our direct observations, we assigned the selected managers for the gamified workshop, as the role aligned consistently with their daily work activities. It is claimed that the AR method is excellent for introducing innovative practices into systems that tend to inhibit changes and innovations [34,35]. For this reason, we have combined AR and gamification to investigate how the barriers to SOI can be overcome. Basically, AR implies that researchers and practitioners are involved together in a cycle of activities that can also iterate in a continuous flow [31]. This process moves from diagnosis to intervention and reflective learning and constitutes the key element of this methodology [31]. More in detail, this cycle is composed of five phases (see Figure 1). In the first phase (DIAGNOSIS), the researchers analyse the situation to identify and define the problem setting. In the second phase (ACTION PLANNING), a detailed plan of action to deal with the problem is elaborated. The planned actions are then implemented in the third phase (ACTION TAKING), while in the fourth phase (EVALUATION), the researchers collect feedback and evaluate the outcomes from their implementations. Through critical reflection, the final phase (SPECIFYING LEARNING) is focused to elaborate and share the lessons learned inside and outside the problem context.

According to the mentioned cycle, Section 4 describes the findings of this work.

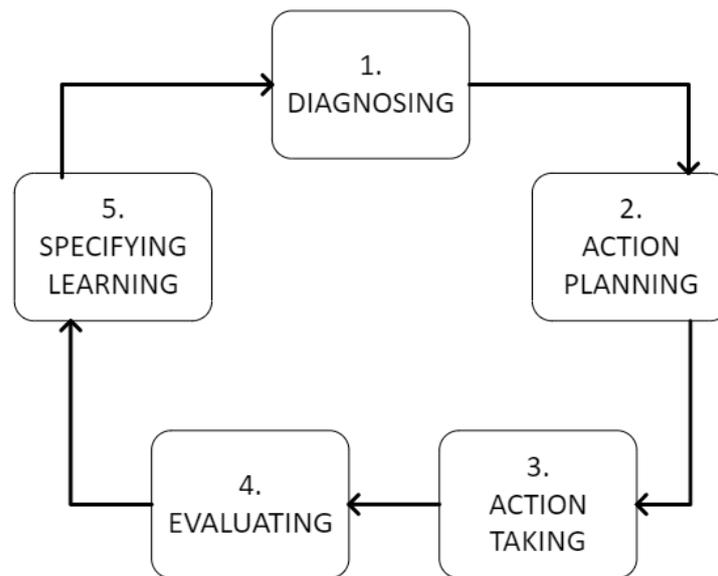


Figure 1. The phases of AR.

4. Findings from the Application of the AR Cycle

4.1. Diagnosing

Researchers interviewed eight managers of one large industrial firm that was partner of the research project, with the aim to understand the barriers to values-based SOI. One workshop was also conducted in which researchers and managers analysed data from these interviews, in order to agree on cultural issues of SOI. Combining these data with the literature on values-driven SOI [2], we found the following barriers:

- B1. Lack of a culture of sustainability and innovation. Specialization, silo-oriented mindset and functional culture represent a significant barrier to SOI; for example, the engineering mindset is relatively resistant to the integration of sustainability aspects in feasibility analysis; therefore, it hinders the necessary cross-functional collaboration.
- B2. Lack of communication regarding sustainability issues that involves all levels of the organization. Without communication, alignment between the values of the organization and those of employees is more difficult; misalignment requires greater efforts to engage all the stakeholders in the SOI processes.
- B3. Lack of a holistic approach. Organisations that want to develop SOI have to consider and embrace the broader system of which they are a part, rather than dealing with only those subsystems over which they have full control.
- B4. Resistance to change. SOI requires fundamental changes to business practices such as customers engagement and revenue generation mechanisms.
- B5. Lack of collaboration. There may be problems with different priorities, divergent interests and concerns of functional teams.

4.2. Action Planning

We elaborate a plan with clear objectives based on the identified barriers:

1. Identify the best practices and shared values to nurture SOI culture.
2. Design a gamified workshop to facilitate values-based SOI.

4.3. Action Taking and Evaluating

Following the action plan, we designed, implemented and evaluated a gamified workshop for SOI. The workshop is conceived to allow participants to first listen and understand each other, their values, practices and concerns related to sustainability. Then, there is room for sharing good practices, behaviours and initiatives. In the evaluation phase, people reflect on both their own values and those of their organization and identify what

values can facilitate SOI. Then, participants are required to generate ideas for improving the sustainability of products, services and processes. They also look for solutions to create shared value for the ecosystem in which the company operate. Last, they jointly evaluate the pros and cons of their proposals.

4.4. Action Taking and Evaluating

In this phase, the researchers analyse the results of previous activities, identify the lesson to be learned and share them with the academic and industrial communities. These lessons refer, on the one hand, to solutions and ideas for stimulating a broader culture of sustainability and, on the other, to the practices for facilitating values-driven SOI.

The framework in Figure 2, which is the first contribution of this research, summarises the contents of the AR cycle, connects the barriers to the objectives of the action plan and ultimately justifies the choice of AR to foster SOI through a gamified workshop.

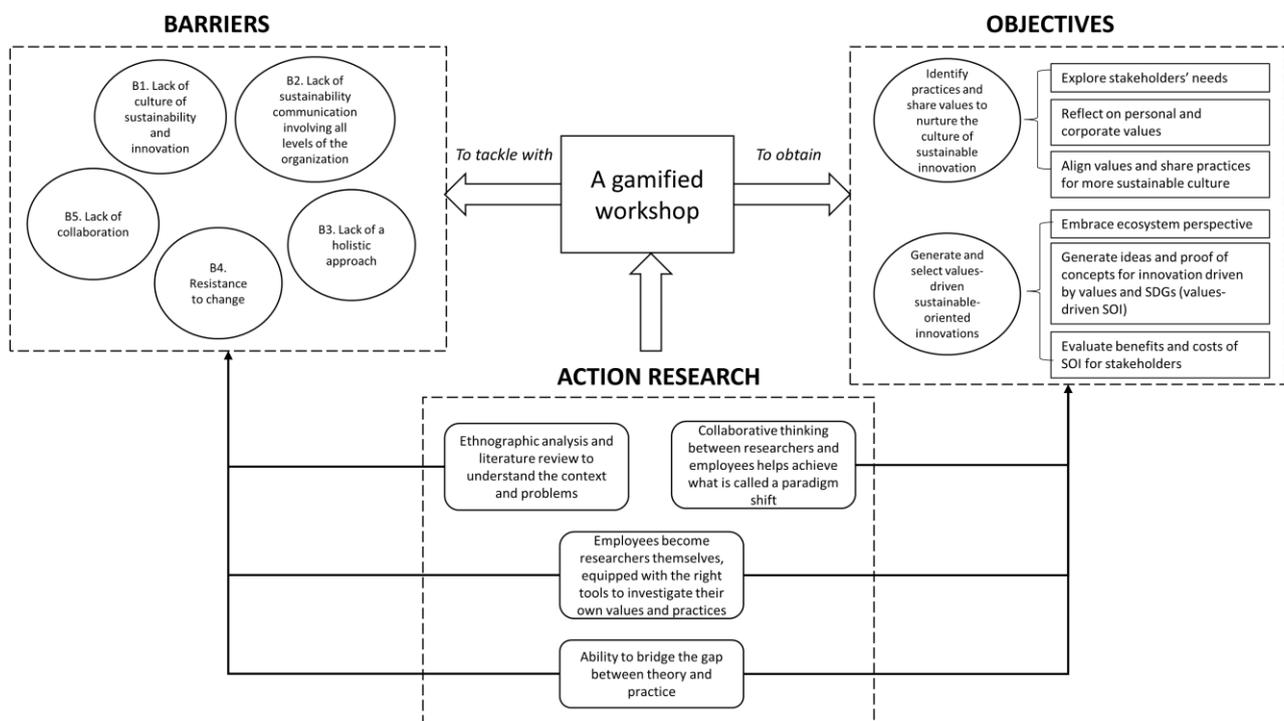


Figure 2. AR framework for SOI.

5. Designing a Gamified Workshop for Values-Driven SOI

We decided to design an in-presence workshop. In-presence has been preferred, on the one hand, to obtain detoxification from the abundance of virtual meetings and, on the other, to favour socialisation and encourage physical interaction of participants. Conducting the workshops in person was considered also beneficial for facilitators, so they can read non-verbal communication, feel emotions, grasp what is working and not working and act accordingly [36]. In designing the workshop, the authors worked on two mutually complementing tracks: choosing which gamification techniques could help more in tackling the SOI barriers [12] and including mechanisms for motivating and engaging participants. Since game elements per se do not automatically create better engagement, we used the Octalysis framework [37], which is acknowledged as the most comprehensive method to introduce gamification in work contexts [38]. Here, the assumption is that people are not motivated, and consequently they do not change their behaviours in the absence of some key drivers (cores) [39]. In the following sections, we explain these choices in more detail.

5.1. Games Selection and Application of the Octalysis Framework

As said, we intersected the literature on gamification [40] and sustainable innovation [41] to evaluate which games could facilitate tackling SOI barriers. We also modified the original version of the selected games to fit with the specific purpose and contextual constraints. Table 1 shows the selected games and connects them to the SOI barriers illustrated in Section 4.1. Then, Table 2 describes the application of the Octalysis framework and explains which cores have been applied to the workshop and why they are relevant.

Table 1. Linkages between games and barriers.

Game	Description	Barriers
Fishbowl	This game helps decision-makers to listen to and understand each other's values. It represents the first step in integrating decision-makers into the innovation process. In our revisited version, the focus is on values, practices and sustainability.	B1 B2
Show me your values	This is a game in which participants reflect on their corporate and individual values. The focus on sustainability is given by seeking cultural alignment for SOI.	B1 B2 B5
Value mapping	This is purposed to assess the positive and negative outcomes of a value proposition in a broader stakeholders ecosystem. The revisited version focuses on creating value that is more sustainable	B3 B4 B5
Force field analysis	This game evaluates the extent of changes and innovation. Forces for and against the changes are compared and discussed among participants	B3 B4

Table 2. The Octalysis framework adapted from [37].

Cores	Description	Application to the Workshop
Epic Meaning and Calling	This core motivates people because they believe they are engaged in something bigger than themselves. It is activated when the game inspires people and makes them enthusiastic to act for an important purpose. When this core is present, participants choose to be part of the game and take action not because they necessarily benefit directly from it, but because it turns them into the heroes of the story.	The goal of the workshop is to help the community in adopting more sustainable innovation. Before the workshop begins, the facilitator must make participants emotionally involved, making them enthusiastic about taking action and making them feel the magnitude of the purpose.
Development and Accomplishment	This core motivates people to grow, to move forward, to achieve. It generates a sense of continuous improvement through the use of stimulating activities and the use of classic game elements such as leaderboards, badges and points that allow results to be tracked and satisfies the human desire to grow and see numbers increase.	In the workshop, there are many challenges that participants must face together in order to pass the levels and measure their progress. To further increase the perception of this series of individual challenges, there is also a score that ranks those who excel in the various activities. At each level, some points are earned to elaborate a workshop leaderboard. At the end, there is a prize for those who had excelled in the different tasks.

Table 2. Cont.

Cores	Description	Application to the Workshop
Empowerment of Creativity and Feedback	This core empowers people to be creative and allows them to unleash their imagination to overcome the problems that the challenge poses. People need not only express their creativity but they also see the results and receive feedback.	In the second part of the workshop there was a brainstorming session to stimulate people's creativity and come up with sustainable innovations. To reinforce an open and confrontational approach in the last phase, there will be a space for discussion and exchange of feedback between participants.
Social Influence and Relatedness	This core is generated by what others think and say and how they act. It originates from the human desire to socially compare and connect with others. Examples are mentoring, competition and teamwork.	This core emerges within the collaboration that is established between teammates to overcome each challenge and reach the next level. However, we can also find it in the individual competition handled with the leaderboard, as well as in the group competition, which is fuelled by the "thinking hats" method.
Unpredictability and Curiosity	Due to the human brain's tendency to become infatuated with unpredictability and novelty, it is possible to keep people active and engaged if one provides new and unexpected information. Added to this is natural human curiosity, which looks into the unknown with a desire to discover.	During the second level of the workshop, there is a curiosity-stimulating game in which participants have to find out what values each group identifies for the stakeholder they represent.

5.2. The Workshop Structure

The main contribution of this paper is the design of a workshop that facilitates values-based SOI. Participants can be managers of different departments of the same firm, as well as from different firms of the same value chain. The overall objective of the workshop is to create a gamified environment to stimulate collaboration, co-creation and idea generation for values-driven SOI. In this regard, participants are asked to read some documents (things to know) that illustrate the basic concepts of SOI. Knowledge about the firm's values can also be subject to evaluation prior to attending the workshop, and eventual gaps should be filled through information and preliminary discussion. The workshop is structured into four levels, as described in Table 3. At the end of the workshop, participants provide feedback through a questionnaire, which investigates agreement and understanding about the following trajectories (i.e., from values to innovation), as well as the engagement mechanisms. The researchers then elaborate and share with the participants a report containing the lessons learned in the form of take-aways. In detail, through the handout analysis, the researchers identify the good practices that the firm has already implemented or could easily implement to promote SOI. Then, the report is complemented by including the shared values that can drive SOI, as far as they emerge from the interactions among the workshop participants. Researchers also collect and evaluate the ideas proposed by the participants. The most promising ideas are supplemented by the list of opposing forces (as discussed in the last workshop activity) to help managers in assessing their feasibility.

Table 3. Workshop structure.

Level	Objective	Preparation	Playing	Facilitator's Role
1	Participants use the Fishbowl tool to listen and observe. This is an effective way to activate attention, as people are used to conversations but most are not used to listening, observing and generating insights from their observations. This is a revisited version of this game that focuses on practices, values and sustainability.	<ol style="list-style-type: none"> 1. Give pens and handouts to each participant: one for each team other than their own. 2. Assign speakers to the members of one team and observers to the other teams. 3. Arrange the chairs in two concentric circles in the workshop room. 	<ol style="list-style-type: none"> 1. The inner circle seats the speakers engaged in conversation; the outer circle seats the people acting as observers. 2. The speakers have a discussion around the area of innovation and actual practices for sustainability problems. 3. The observers pay close attention and write down on the handouts all the values and evidence or the practices where the values come out of the conversation. 4. When 20 min are up, another team becomes the speaker and switches seats. Then, start another 20 min discussion on the topics, until all groups have played the role of speakers. 	The facilitator plays a crucial role in the success of this game. Very good research work is needed even before the workshop, based on input from the participating organizations, to select and develop dilemma questions or stories that allow values to emerge. Keeping the focus on sustainability, move from a personal to a corporate dimension. Try to bring out the explicit and implicit values of the organizations. It is also necessary to ensure that the conversation remains within the scope of current problems and practices, without moving into the realm of solutions or innovations that will be addressed in later stages. Update the creativity leaderboard by checking all the handouts and awarding points to those who have identified the most values in the handouts: three points for first, two for second, one for third.
2	Identifying a set of shared values. 'Show me your values' is focused on creating awareness of how decision-makers perceive the values of the different organizations, departments or initiatives. In addition, participants reflect on their values and those that have been assigned to them in search of the values that can best guide the process of creating a culture of sustainability.	<ol style="list-style-type: none"> 1. Prepare and stick posters on the wall on which the teams can write and post pictures. One poster for each team. 2. Provide participants with masking tape and a values deck (a set of cards with pictures on them to which values can be linked). 	<ol style="list-style-type: none"> 1. Participants take their handouts and try to describe, in pictures, their perception of the values identified during the Fishbowl game by using the values deck. 2. Players write and then hide with a post-it the values found and stick a corresponding value card on the poster of each organization. 3. Players try to guess the values represented based on the corresponding value card. The person who guesses the value earns one point. 4. The teams examine the values of their organization that the other groups have identified and look for overlaps and gaps in their perception. 5. Teams will select some values present in all posters. The selection mechanism will be point voting. Participants will have five stickers and will be able to put three of them (votes) on their team's poster and two on those of other teams. 	<p>Push people to use cards because it gives players a kind of comfort zone in which to express themselves since they can choose images that represent the full spectrum of comedy and tragedy around a topic. Help people express their creativity and guide them in choosing values.</p> <p>Update the creativity ranking, awarding one point for each value guessed.</p>

Table 3. Cont.

Level	Objective	Preparation	Playing	Facilitator's Role
3	<p>Generate ideas for values-based SOI. Value mapping is a tool used to generate ideas for sustainable innovation by mapping captured value and missed or negative outcomes for any stakeholder. It enables understanding of the positive and negative aspects of value in a stakeholder network and identifying conflicts (i.e., when a benefit for one stakeholder creates a negative effect for another stakeholder). Facilitates sustainable business thinking by integrating social, environmental, and economic sustainability into business thinking and operations. It aims to help organizations generate shared sustainable value for all stakeholders. In this special version, the ideation process will be oriented toward achieving the goals of the SDGs through the sustainable value map.</p>	<ol style="list-style-type: none"> 1. Divide the room into a few workstations equal to the number of teams. 2. At each station stick two posters on the wall with the business value map and the sustainable value map and provide enough sticky notes and pens for everyone. 	<p>Each team works on three stages of brainstorming and reports ideas, with sticky notes, on value maps. The business value map is used for the first two phases to assess the current value proposition of the organization represented. The sustainable value map for the third phase uses divergent thinking to ideate values-based sustainable innovations. This brainstorming is driven by the values identified in the second level. Shown below are the questions that will guide the ideation process.</p> <ol style="list-style-type: none"> 1. The current value proposition. Why is the business here in the first place? What is the product or service offered? What value is created for different types of stakeholders? 2. What is the value missed or negative outcomes for any of the stakeholders? Is the business missing an opportunity to capture value or wasting value in its existing operations? For example, are assets, capacity and capabilities underutilized? 3. What can organizations implement to achieve the SDGs? What new positive value could the company create for its stakeholders through collaboration with other teams? <p>All the sustainable value maps resulting from the previous brainstorming are brought together and an open discussion, mediated by the facilitator, can take place between the teams to identify shared sustainable innovations and practices—the value that can be created through collaboration. Use the dot voting, three votes for each person, to decide on the best options, which will then be analysed with the next tool.</p>	<ol style="list-style-type: none"> 1. Move between stations and facilitate the smooth running of the brainstorming. Remind the players to write their name on the post-it with their idea. Play a key role in the last phase to choose the best solutions in the value maps and use the dot voting method to choose the best solutions if the teams do not agree. Dot voting is a method used to describe voting with dot stickers or marks with a marker pen. If there are similar ideas in the same value map, merge them before the last discussion. 2. Update the creativity leaderboard; points will be given to those who had the most ideas during the brainstorms. Three points to the first, two to the second and one to the third. Three points also to the people who proposed the innovations to study.

Table 3. Cont.

Level	Objective	Preparation	Playing	Facilitator's Role
4	Assessing ideas of values-based SOI. The fourth level of play is force field analysis, in which the forces influencing change, represented by the innovations chosen in the previous stage, are assessed. It is necessary for players to approach the challenge with a holistic approach that aims to make a deliberate effort to see the system surrounding the change that can help identify the direction to pursue. To this end, De Bono's thinking hats [42] are used in this version to stimulate the characters' creativity, breaking down barriers and preconceptions to evaluate new points of view and analyse change more systematically.	<ol style="list-style-type: none"> Shuffle the teams and form two new teams: one with all the people who are above the middle of the individual ranking and the other with those who are below the middle. The first team will wear the opportunity hat (the yellow one) and evaluate the forces for change and the other team will wear the prudence hat (the black one) and evaluate the forces against change. Draw a picture of a potential new solution in the centre of a poster on the wall. On the top left of the poster, write forces for change for the enabling forces of change. On the top right, write forces against change for the barriers to change instead. Draw arrows on both sides pointing toward the image in the centre, like the following. 	<ol style="list-style-type: none"> The opportunity team generates ideas about which elements drive change. The prudence one generates ideas about what elements are restraining it. A discussion opens up about each force: groups try to defend their position for or against change, demonstrating the goodness of the force. Indicate one if the forces are weak and 10 if the forces are strong. Each participant assigns a score to the sum of the forces for and against change. The objective is to assess the feasibility of the change. Restart the process with another selected innovation. 	<p>Take a key role during the discussion to mediate the position, emphasizing the importance that both new teams play at this stage. Do not let participants with fixed perspectives on one side or the other dominate the conversation. This tool is used to explore the feasibility of change in an open manner. If there are similar forces, merge them before the review and voting stage. Do not assume that numerical totals will decisively answer the question of whether change should take place. Use them as a basis for further conversation and evaluation.</p> <p>Update the creativity leaderboard. Facilitators score the sum of the forces for and against change. Three points will be awarded to those who belong to the group that found the forces with the best score.</p>

5.3. Validating the Workshop

In the activities initially carried out (level 1), the workshop participants discussed and identified the values that primarily guide the work of their respective teams, and then shared them with the participants from the other team. For example, in the simulation, one team suggested collaboration, sustainability and dissemination of knowledge as key values while the other team suggested concreteness, awareness and encouragement. Significant mismatches and misalignments were found with respect to the values indicated as priorities and those that the company included as the guiding values of its identity and legitimacy. For example, it emerged among the company's primary guiding values, the productivity of the individual rather than the team/business function of which the individual is a part, incentivizing competition and conflict rather than alliances and collaboration.

Thus, in the second level, among the shared values, some were identified from both groups that appeared more related to the goals of sustainable innovation. Specifically, collaboration among different actors (introducing the concepts of collaborative network and alliance), communication, reciprocity (using more co-working spaces), inclusiveness, openness to others, etc.

In the third level, a series of proposals and ideas came out to be evaluated against the value map to increase sustainability. For example, in the simulated workshop, in light of the common values and ideas that emerged in the previous stage, actions were proposed to spread a collaboration-oriented mindset such as using co-working and open spaces, introduction in the corporate vocabulary (in emails, sites or official speeches by HR or top managers) of "keywords" such as "network" or "partnership" that spread a collaborative spirit in the company starting from the top and the introduction of mechanisms for staff evaluation not (or at least not only) of the individual but of the team/function of which he/she is part.

Thus, in the last level, the forces for and against the implementation of the above ideas/initiatives were highlighted. For example, while there is growing sentiment among individuals about the need to innovate to carry out business activity and change decision-making processes, there is still a lack of incentives such as KPIs for evaluating one's performance and decision-making in terms of sustainable productivity.

Regarding the second goal of the AR process, i.e., the co-creation of sustainable innovations, an interesting result is the innovation that was chosen and then evaluated by the participants during the last level. The main idea has been stated as: 'Incubate only ideas that take sustainability into consideration'.

This innovation can be classified as system change because it has a focus on people and their values. Finally, it is a solution that looks beyond its functional area by prompting new entrepreneurs to consider sustainability in their business. Definitely, an ambitious innovation involving both groups is represented. In addition, the enabling forces and barriers identified in the last level for this innovation are shown in Table 4.

Table 4. Identified forces.

For Change	Against Change
Increased awareness	Do not consider ideas that might have greater profit but are not sustainable
Improved reputation	Ideas not considered seek support elsewhere
Lower environmental impact	Difficulties aligning with suppliers
Products more attractive for customers	Reduced participation
	Difficulty of measuring sustainability impacts

6. Discussion and Conclusions

The previous literature agrees that sustainability-oriented innovation (SOI) originates from radical changes to the corporate culture [2,3]. Unfortunately, there are a lack of models to guide and facilitate these transformations [6]. To fill this gap, this paper addresses two research questions, namely (RQ1) 'How can the culture for SOI be created and fostered?'

and (RQ2) ‘How can gamification be used to develop SOI?’ The paper presents a novel approach that combines concepts from gamification and the SOI literature. We adopt the Octalysis Framework to facilitate the unveiling, discussion and alignment of values and cultural aspects pertaining to SOI. More specifically, we respond to RQ1 by showing how a structured in-person workshop in which company managers and decision-makers can participate and interact under the guidance of sustainability experts who act as workshop facilitators, can enable communication, collaboration and idea generation (co-creation). In line with previous studies [19,20,25], we exploit the energy and creativity generated during the workshop to address the barriers to SOI, e.g. reticence to change and innovation (B4), openness to a well-rounded and holistic view rather than closed and restricted to one’s own work activities (B3), lack of communication (B2), collaboration (B5) and the spread of a culture under the banner of sustainability (B1). We also respond to RQ2 showing how the fun atmosphere of gamification can be used to create engagement and motivation. To this regard, we adapt the human-centred Octalysis framework [37] which has been identified among the best frameworks to introduce gamification in business contexts [38]. Specifically, we identify the five cores that are key for SOI and show how they can be used in the workshop (see Table 3).

Therefore, contributions from this research are twofold. From one side, we connect gamification and SOI and show opportunities for future theoretical intersections. On the other, we present the structure of a workshop that can be applied by innovation and sustainability managers, as well as by facilitators, to tackle the barriers to SOI.

This research comes also with some limitations. For instance, the AR has involved only a large industrial firm, which is a partner of the funded research project IMPACT. Validation of the workshop outcomes should therefore concern a larger sample of firms of different sizes and operating in different sectors. Future research should also address how values-driven SOI can become everyday practices at any company level.

In particular, the main limitation concerns the validation of the framework, which is limited to only one case, namely a large, global manufacturer that was among the partners of our IMPACT project. Future research could be aimed at generalising the contribution of this research (i.e., the design of the gamified workshop for SOI) through the application of the workshop in a larger sample of companies from different sectors and of different sizes.

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References

1. Schroeder, P.; Anggraeni, K.; Weber, U. The relevance of circular economy practices to the sustainable development goals. *J. Ind. Ecol.* **2019**, *23*, 77–95. [[CrossRef](#)]
2. Breuer, H.; Ivanov, K.; Abril, C.; Dijk, S.; Monti, A.; Rapaccini, M.; Kasz, J. Building values-based innovation cultures for sustainable business impact. In Proceedings of the 2021 Conference of the International Society for Professional Innovation Management (ISPIM), Berlin, Germany, 20–23 June 2021; pp. 1–31.
3. Khurana, S.; Luthra, S.; Haleem, A.; Kumar, A.; Mannan, B. Can sustainability be achieved through sustainable oriented innovation practices? Empirical evidence of micro, small and medium scale manufacturing enterprises. *Sustain. Dev.* **2022**, *30*, 1591–1615. [[CrossRef](#)]

4. Freeman, E. Managing for Stakeholders: Trade-offs or Value Creation. *J. Bus. Ethics* **2010**, *96*, 7–9. [CrossRef]
5. García-Sánchez, I.M.; Amor-Esteban, V.; Aibar-Guzmán, C.; Aibar-Guzmán, B. Translating the 2030 Agenda into reality through stakeholder engagement. *Sustain. Dev.* **2022**, *31*, 941–958. [CrossRef]
6. Breuer, H.; Lüdeke-Freund, F. *Values-Based Innovation Management. Innovating by What We Care About*; Palgrave Macmillan: Hampshire, UK, 2017; ISBN 978-1137516619.
7. Rupeika-Apoga, R.; Petrovska, K. Barriers to Sustainable Digital Transformation in Micro-, Small-, and Medium-Sized Enterprises. *Sustainability* **2022**, *14*, 13558. [CrossRef]
8. Majid, S.; Zhang, X.; Khaskheli, M.B.; Hong, F.; King, P.J.H.; Shamsi, I.H. Eco-Efficiency, Environmental and Sustainable Innovation in Recycling Energy and Their Effect on Business Performance: Evidence from European SMEs. *Sustainability* **2023**, *15*, 9465. [CrossRef]
9. Brones, F.; Zancul, E.; Carvalho, M.M. Insider action research towards companywide sustainable product innovation: Ecodesign transition framework. *Int. J. Manag. Proj. Bus.* **2020**, *14*, 150–178. [CrossRef]
10. Adams, R.; Jeanrenaud, S.; Bessant, J.; Denyer, D.; Overy, P. Sustainability-oriented innovation: A systematic review. *Int. J. Manag. Rev.* **2016**, *18*, 180–205. [CrossRef]
11. Porter, M.E.; Hills, G.; Pfitzer, M.; Patscheke, S.; Hawkins, E. Measuring Shared Value: How to Unlock Value by Linking Social and Business Results. 2012. Available online: <https://www.sharedvalue.org/resource/measuring-shared-value> (accessed on 3 May 2023).
12. Breuer, H.; Lüdeke-Freund, F. Values-based stakeholder management: Concepts and methods. In *Rethinking Strategic Management: Sustainable Strategizing for Positive Impact*; Springer: Cham, Switzerland, 2019; pp. 217–239, ISBN 9783030060145.
13. Oskam, I.; Bossink, B.; de Man, A.P. Valuing value in innovation ecosystems: How cross-sector actors overcome tensions in collaborative sustainable business model development. *Bus. Soc.* **2020**, *60*, 1–33. [CrossRef]
14. Guldmann, E.; Huulgaard, R.D. Barriers to circular business model innovation: A multiple-case study. *J. Clean. Prod.* **2020**, *243*, 118160. [CrossRef]
15. Midgley, G.; Reynolds, M. Systems/operational research and sustainable development: Towards a new agenda. *Sustain. Dev.* **2004**, *12*, 56–64. [CrossRef]
16. Schwartz, S.H. An overview of the Schwartz theory of basic values. *Online Read. Psychol. Cult.* **2012**, *2*, 11. [CrossRef]
17. Landers, R.N.; Auer, E.M.; Collmus, A.B.; Armstrong, M.B. Gamification science, its history and future: Definitions and a research agenda. *Simul. Gaming* **2018**, *49*, 315–337. [CrossRef]
18. Dicheva, D.; Dichev, C.; Agre, G.; Angelova, G. Gamification in education: A systematic mapping study. *Educ. Technol. Soc.* **2015**, *18*, 75–88.
19. Seaborn, K.; Fels, D.I. Gamification in theory and action: A survey. *Int. J. Hum. Comput. Stud.* **2015**, *74*, 14–31. [CrossRef]
20. Deterding, S.; Dixon, D.; Khaled, R.; Nacke, L. From game design elements to gamefulness: Defining “gamification”. In Proceedings of the 15th International Academic Mindtrek Conference: Envisioning Future Media Environments (MindTrek), Tampere, Finland, 28–30 September 2011; pp. 9–15.
21. Ouariachi, T.; Li, C.Y.; Elving, W.J. Gamification approaches for education and engagement on pro-environmental behaviors: Searching for best practices. *Sustainability* **2020**, *12*, 4565. [CrossRef]
22. Patricio, R.; Moreira, A.C.; Zurlo, F. Gamification in innovation teams. *Int. J. Innov. Stud.* **2022**, *6*, 156–168. [CrossRef]
23. Bicen, H.; Kocakoyun, S. Perceptions of managers for gamification approach: Kahoot as a case study. *Int. J. Emerg. Technol. Learn.* **2018**, *13*, 72–93. [CrossRef]
24. Silic, M.; Back, A. Impact of Gamification on User’s Knowledge-Sharing Practices: Relationships between Work Motivation, Performance Expectancy and Work Engagement. In Proceedings of the 50th Hawaii International Conference on System Sciences (HICSS), Hilton Waikoloa Village, HI, USA, 4–7 January 2017; pp. 1–10.
25. Patricio, R.; Moreira, A.C.; Zurlo, F. Gamification approaches to the early stage of innovation. *Creat. Innov. Manag.* **2018**, *27*, 499–511. [CrossRef]
26. Sultan, Y.H.; Suhail, K.S. The impact of significant factors of digital leadership on gamification marketing strategy. *Int. J. Adv. Res. Dev.* **2019**, *4*, 29–33.
27. Woźniak, J. Gamification for sales incentives. *Contemp. Econ.* **2020**, *14*, 144–161. [CrossRef]
28. Huang, W.H.Y.; Soman, D. Gamification of education. *Rep. Ser. Behav. Econ. Action* **2013**, *29*, 37.
29. Breuer, H.; Ivanov, K. Gamification to address cultural challenges and to facilitate values-based innovation. In Proceedings of the 2020 Conference of the International Society for Professional Innovation Management (ISPIM), Virtual, 7–10 June 2020; pp. 1–15, ISBN 9789523354661.
30. Brydon-Miller, M.; Greenwood, D.; Maguire, P. Why action research? *Action Res.* **2003**, *1*, 9–28. [CrossRef]
31. Avison, D.E.; Lau, F.; Myers, M.D.; Nielsen, P.A. Action research. *Commun. ACM* **1999**, *42*, 94–97. [CrossRef]
32. Van Aken, J.E. Management research as a design science: Articulating the research products of mode 2 knowledge production in management. *Br. J. Manag.* **2005**, *16*, 19–36. [CrossRef]
33. Øien, T.B. Methodological considerations in collaborative processes: A case of ethnographic action research. *Int. J. Manag. Proj. Bus.* **2023**, *16*, 165–184. [CrossRef]
34. Kaplan, R.S. Innovation action research: Creating new management theory and practice. *J. Manag. Account. Res.* **1998**, *10*, 89.

35. Somekh, B. *Action Research: A Methodology for Change and Development*; Open University Press: Berkshire, UK, 2005; ISBN 9780335216581.
36. Becerra, Z.M.; Fereydooni, N.; Kun, A.L.; McKerral, A.; Riener, A.; Schartmüller, C.; Walker, B.N.; Wintersberger, P. Interactive workshops in a pandemic: The real benefits of virtual spaces. *IEEE Pervasive Comput.* **2021**, *20*, 35–39. [[CrossRef](#)]
37. Chou, Y. *Actionable Gamification: Beyond Points, Badges, and Leaderboards*; Octalysis Media: Milpitas, CA, USA, 2015.
38. Tondello, G.F.; Kappen, D.L.; Ganaba, M.; Nacke, L.E. Gameful Design Heuristics: A Gamification Inspection Tool. In *Human-Computer Interaction. Perspectives on Design (HCII 2019)*; Kurosu, M., Ed.; Lecture Notes in Computer Science; Springer: Cham, Switzerland, 2019; Volume 11566, ISBN 9783030226466.
39. Araújo, I.; Carvalho, A.A. Enablers and Difficulties in the Implementation of Gamification: A Case Study with Teachers. *Educ. Sci.* **2022**, *12*, 191. [[CrossRef](#)]
40. Gray, D.; Brown, S.; Macanufo, J. *Gamestorming: A Playbook for Innovators, Rulebreakers, and Changemakers*; O'Reilly Media, Inc.: Sebastopol, CA, USA, 2010; ISBN 978-0596804176.
41. Bocken, N.; Short, S.; Rana, P.; Evans, S. A value mapping tool for sustainable business modelling. *Corp. Gov.* **2013**, *13*, 482–497. [[CrossRef](#)]
42. De Bono, E. *Six Thinking Hats: The Multi-Million Bestselling Guide to Running Better Meetings and Making Faster Decisions*; Penguin Life: London, UK, 2016; ISBN 9780241257531.

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