

Chapter 9

Exploring the Ambivalent Nature of Diversity in Social Experimental Settings: First Insights from Social Labs Established to Promote Responsible Research and Innovation



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9.1 Introduction

Research has provided ample evidence for the performance-enhancing effect of diversity on a wide range of organizational outcomes (Terjesen et al. 2009). The positive effects are manifold and range from better decision-making and corporate governance through better financial performance (Post and Byron 2015), more creativity and innovativeness to more responsible and ethical business conduct (Pechersky et al. 2016). In the context of Research & Innovation (R & I), the cooperation of a diversity of stakeholders has been shown to promote more responsible or ethical business practices (Wood 2002).

In this light, diversity plays an essential role in the theoretical concept and policy ideal of Responsible Research and Innovation (RRI). RRI can be understood as a process that, among others, aims to increase the variety and diversity of stakeholders in R & I by considering different societal needs, interests, values and perspectives. RRI has recently received increased attention in the field of R & I policy (European Commission 2017) and academic research (Timmermans and Blok 2018; Timmermans et al. 2020). However, it can still be characterized as an emerging social phenomenon and fragile concept that lacks conceptual clarity. Timmermans et al. (2020) point out that its ‘conceptual and empirical immaturity’ (2) poses a barrier to the uptake of RRI by R & I practitioners (Novitzky et al. 2020). In the context of Horizon 2020 (H2020), the European Framework Programme for Research and Innovation, RRI is being experimentally implemented in so-called social labs, which are suitable spaces for experimenting with emergent social phenomena such as RRI (Timmermans et al. 2020). Such social labs that revolve around

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RRI are built upon the diversity of their participants, since addressing the social challenges at the heart of the social lab approach requires a multitude of complementary perspectives, views, knowledge and individuals. Even more importantly, it requires the space, opportunity and appropriate (pre-) conditions for productive exchange and collaboration – even under difficult circumstances.

Hassan (2014) states that a high degree of diversity implies that diverse perspectives are present in the discussion. Although greater diversity of individuals and perspectives is associated with a higher potential for divergence and friction, it is highly desirable and beneficial to social lab processes and the promotion of social and responsible innovation. In contrast, high consensus and similar perspectives are less suited to problems that require out-of-the-box thinking and creativity and usually result from an insufficient mix of stakeholders). Blok emphasizes that, particularly in the ‘case of complex public problems’ (2019: 255) where harmony and alignment are very difficult to achieve, difference and constructive conflict can be beneficial to (an ethical approach on) stakeholder collaboration and cooperation.

Apart from a predominantly relative (and mostly hierarchical) description of ‘differing degrees of diversity’, the concept of diversity remains very abstract and difficult to operationalize. The challenge of managing, moderating and measuring a concept that lacks granularity raises the question of ‘how much’ diversity – in terms of the exact composition of actors and stakeholders – is actually needed or sufficient to promote innovative behavior by interaction and collaboration in complex settings.

Timmermans et al. (2020) point out the lack of evidence and knowledge on the ‘what-how-and-who’ of social labs, raising the need for further research into which actors and stakeholders to include in social labs and the barriers and enablers affecting their functioning. A better understanding of the functioning and interactive dynamics of diversity appears crucial to create the right conditions to promote the emergence of creative exchange and thus, social innovation. From an epistemic point of view, an investigation of the underlying dynamics is essential to generate new knowledge on how to manage diversity to make the best use of its potential in agile, complex experimental settings.

In order to address the question of whether and how diversity affects social lab dynamics and under which conditions responsible innovation can thrive, we use the theoretical lens provided by Granovetter’s social network theory (1973), and Kanter’s critical mass theory (1977), both of which offer explanations for significant differences in performance across differently diverse groups and their complex interactive dynamics.

In his groundbreaking research, Granovetter showed that the characteristics of the links between actors within a given network significantly influence the exchange of information and the resulting effects. Whereas the strong ties that typically emerge between homogeneous actors lead to trust and quick decision-making, the weak ties that link heterogeneous actors contribute to more creative exchanges and knowledge creation and thus stimulate innovation.

Kanter enriches the debate by further differentiating degrees of diversity. In her research on power distribution in mixed groups, she shows that the relationship between group diversity and outcomes follows a curvilinear, inverted U-shaped

function: Diversity was only found to be beneficial in a state of balanced diversity, while both lower and higher degrees of diversity, i.e. homogeneity and heterogeneity, were shown to impair performance. The decrease in performance in less diverse groups is explained by a lack of creativity, perspectives and critical voices, while the lower performance in very diverse groups is explained by conflicts, lack of consensus and the time needed for coordination.

Our analysis builds on the premises of social network theory and critical mass theory that explain variance in group-performance based on their degree of diversity. So far, neither theory has been applied in a RRI or social lab context, but combining them seems a promising approach as it focuses on the dual aspects of ‘real’ diversity including friction, conflict, and creative and innovative potential. We apply this to a specific social experimental setting, so-called social labs, to investigate whether and how diversity plays a role in achieving social change and (responsible) innovation.

The core assumption we derive from these is that the social lab processes and outcomes differ according to the homogeneity or heterogeneity of participants. We argue that the more homogeneous a social lab is, the easier and quicker it solves problems, since homogeneous labs reach consensus faster and act according to the same agenda. Accordingly, these labs are expected to develop outputs in a shorter time, but with a lower level of novelty, originality and innovativeness. Heterogeneous labs, in contrast, are expected to need more coordination due to diverging agendas and the associated power struggles, but may be more innovative and produce particularly outstanding, valuable and creative outputs.

By applying a combination of social network and critical mass theory to the social experimental environment of social labs, we deliver new insights into the role of diversity in highly uncertain settings, as RRI is an emergent topic and social labs are uncertain contexts per se. We also show that friction and divergent voices are beneficial to effective stakeholder collaboration as they stimulate creative and critical thinking and productive interaction, supporting earlier research on constructive conflict in stakeholder collaboration (Blok 2019). These insights can help to further ground the social lab approach presented by Timmermans et al., and contribute to improve the understanding of ‘the construction of emerging social phenomena itself’ (2020: 12).

9.2 State of the Art

9.2.1 *The Emerging Policy Concept of Responsible Research and Innovation*

RRI is a policy concept that has been defined as ‘societal actors (researchers, citizens, policymakers, business, third sector organizations, etc.) work[ing] together during the whole research and innovation process in order to better align both the

process and its outcomes with the values, needs and expectations of society' (European Commission 2017). RRI draws on previous activities such as anticipatory governance (Karinen 2010), constructive, Real-Time and other forms of technology assessment (Rip et al. 1995). In the UK context, Stilgoe and colleagues (2013) have characterized RRI as having four dimensions, nicely summarized by the UK's Engineering and Physical Sciences Research Council as 'Anticipate, Reflect, Engage, Act' (EPSRC 2013).

Timmermans et al. (2020: 2) emphasize that RRI, despite its increasing presence and popularity in R & I policy and academic research, still lacks conceptual clarity and evidence and faces a 'paradoxical challenge': in order to make RRI – an abstract ideal that is conceptually and empirically immature – practical reality, 'we have to presuppose that the approach already exists in practice'.

Besides its status as a policy concept/ideal, RRI can also be understood as an emerging social phenomenon that results from complex, distributed social interaction, especially amongst academics, policymakers and researchers and innovators (Timmermans et al. 2020). Thus, the concept of RRI reflects the enlargement of the core set of actors within R & I systems. In this way, RRI can increase diversity in research and innovation processes. Ultimately, this should help to address societal challenges more efficiently. Blok (2014, 2019) discusses the necessity to acknowledge the singularity and thus non-redundancy of actor diversity, whereas most of the literature on Corporate Social Responsibility (CSR) and Responsible Innovation shows a tendency to emphasize harmony, consensus and alignment between actors. Thus, Blok's reflections highlight the need to keep differences among stakeholders in order to realize the full potential of diversity.

9.2.2 Diversity as a Driver of Creativity and Innovation

Diversity in groups and organizational settings has been shown to be a powerful and versatile source of creativity, innovation and competitive advantage. The term 'diversity' is rooted in the corporate context and refers to distinctive features of staff members such as age, gender, ethnicity, disability or different normative values and attitudes (Krell 2004). In an organizational context, diversity has developed into an overriding term referring not only to workforce diversity, but also to the diversity of skills, competences, approaches and perspectives.

The organizational benefits of a conscious and proactive approach to diversity are multifaceted (Bühner and Yorulmaz 2019). The literature provides ample evidence for the performance-enhancing effect of diversity on a wide spectrum of measures, ranging from corporate governance, employer attractiveness, corporate social responsibility, environmental sustainability and various financial measures to a company's innovative potential (Kassinis et al. 2016; Terjesen et al. 2009). The economic benefits of gender diversity, in particular, have been thoroughly analyzed. Studies provide evidence for a higher likelihood of radical and disruptive innovations in organizations with a diverse management (Díaz-García et al. 2013) and an

overall higher propensity to innovate compared to companies with a high concentration of one gender (Østergaard et al. 2011). Diverse teams are much more likely to consider and implement alternative approaches and uncommon ideas. This contributes to the development of ideas, products and solutions that are more creative and ingenious, and often leads to more innovative outcomes (Terjesen et al. 2009).

As mentioned earlier, Granovetter (1973, 1983) attempts to explain the underlying mechanisms for the positive impacts of diversity. He states that the characteristics of the links between actors within a given network significantly influence the exchange of information and the resulting effects. The concept of the “strength of weak ties” (Granovetter 1973; Granovetter 1983; Burt 1992) shows that not only the strong ties that typically exist within groups with a high level of similarity (= homogeneous actors) are advantageous, as they lead, for example, to a high level of trust and fast decision-making. The new insight was that weak ties (that are typically observed between heterogeneous actors) have the potential to build bridges to previously unconnected fields of knowledge and thus promote innovation.

9.2.3 The Ambivalence of Diversity: Varying Performance Effects at Different Levels of Diversity

However, the overall body of diversity research delivers inconsistent results, as studies have found positive, negative or even no relationship between diversity and performance measures (Bear et al. 2010; Ryan and Haslam 2005). Hence, the research does not support a universally positive effect of diversity – particularly when diversity is treated as a binary concept and isolated from its context. However, studies with a more finely nuanced concept of diversity have been able to detect positive effects at intermediate levels, which remained undetected in studies that did not account for different levels of diversity.

In her pioneering fieldwork on power distribution in mixed groups, Kanter (1977) explored how subgroups with different degrees of representation interact and influence group processes. She showed that, in order to exert influence on processes and outcomes, minority groups need to be sufficiently represented in an optimum balance of diversity, and that both very low and high degrees of diversity, i.e. high homogeneity and high heterogeneity negatively affect group dynamics. Many scholars have adopted her framework and examined the relative dynamics of subgroups in various settings, providing evidence for a non-linear, frequently inverted U-shaped relationship between group diversity and outcomes.

These findings imply that diversity can only unfold its full potential if there is an optimum balance of diversity – a state in which behavioral and power mechanisms are most suitable for representatives of minority groups. In contrast, too low and too high levels of diversity can result in no effects or even impair performance, mostly due to a lack of representation and voice or higher levels of conflict, coordination, mistrust and divergence. Kanter’s theory explains why ‘some’ diverse groups have more synergistic and positive dynamics, while others perform worse.

9.3 Materials and Methods

In this paper, we explore the ambivalent nature of diversity, which can function as a driver of creativity and innovation but also as a source of considerable conflict, friction and divergence (Hassan 2014, Kanter 1977). Addressing the complexity inherent in social labs as spaces where diversity ‘drives and thrives’, we investigate the influence of social lab participants’ diversity on social lab processes and outcomes. We also reflect on how diversity can be instrumental in fostering social change through social experimentation and the promotion and application of RRI. Our use cases are 19 social labs that were set up in the H2020 project NewHoRRizon. *Social lab methodology in the NewHoRRizon project.*

The NewHoRRizon project (“Excellence in science and innovation for Europe by adopting the concept of Responsible Research and Innovation”, 2017–2021) aims to promote the integration of RRI into European, national and local R & I practice and EU funding. Methodologically, it is built around 19 social labs, each of which is dedicated to a different section of H2020, the current European Framework Programme for Research and Innovation.¹

The term ‘social lab’ was first coined by Zaid Hassan (2014), who described them as ‘platforms for addressing complex social challenges’ (3). In social labs, the subject and object of the lab are ‘social in nature’, as they involve societal actors and address social challenges – the heart of social labs – by supporting social innovation (Timmermanns et al. 2020, 5). They can be characterized as complex and emerging, meaning that ‘their properties arise from the interaction of the many parts’ (Hassan 2014, 19).

The social lab approach adopted in the NewHoRRizon project differs from more traditional approaches and offers the theoretical grounding needed by combining the defining features of social labs emerging from the literature such as action research and experimental learning (Timmermanns et al., 2020). This allows the simultaneous investigation and propagation of RRI, circumventing the earlier described paradoxical challenge by utilizing the circularity.

Each lab consists of a team, a process, and a space where social innovation and experimentation are supported and implemented. Its design and format are informed by the specificities of the complex challenges, which require out-of-the-box

¹ The 19 programmes are: European Research Council, Future and Emerging Technologies, Marie Skłodowska-Curie Actions, Research Infrastructures, including e-Infrastructures, Leadership in Enabling Industrial Technologies, Access to Risk Finance and Innovation in SMEs, Health, Demographic Change and Wellbeing, Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy, Secure, Clean and Efficient Energy, Smart, Green and Integrated Transport, Climate Action, Environment, Resource Efficiency and Raw Materials, Europe in a changing world – Inclusive, innovative and reflective societies, Secure Societies – Protecting Freedom and Security of Europe and its citizens, Spreading Excellence and Widening Participation, Science with and for Society, The European Institute of Innovation and Technology, Non-nuclear direct actions of the Joint Research Center, Instruments of H2020 and EURATOM.

thinking, novel and original solutions, and hands-on experimental approaches as well as a diverse group of individuals committed to addressing the challenge.

Each social lab includes a variety of societal stakeholders, ranging from policy-makers, representatives of businesses, civil society, funding organizations, SMEs, research organizations and other experts. This variety ensures a large repertoire of expertise, backgrounds, and approaches (Hassan 2014), but also perspectives, viewpoints and values. In the NewHoRRizon context, the social lab teams have been created and recruited with the aim of achieving a good balance between different stakeholder groups and hierarchical levels.

In this RRI-focused lab context, R & I is the object, while its subjects include ‘all types of actors involved in R & I as well as experts from different disciplines encompassed by RRI’ (Timmermanns et al. 2020, 5). Stakeholders, i.e. societal actors that are involved or affected by the R & I processes addressed by a particular social lab, have the opportunity to address complex social challenges related to RRI, experimentally and systemically. Together they co-design social experiments in the form of suitable interventions, so-called pilot actions. They can engage in focused exchanges to address specific societal challenges by systematically integrating aspects of RRI. Pilot actions emerge fully bottom-up based on the stakeholders’ interests and the identified challenges. They have a clearly defined goal and are aimed at practical implementation in a particular context. They gather a group of interested persons and are coordinated by a responsible person/team.

As of July 2020, a total of 60 pilot actions were listed in the project documentation. These pilot actions are either ongoing, in their final stage or already finished. As the pilot actions pursue specific objectives, we are able to collect their outcomes (in terms of number and type of output) and can relate them to the composition of the group that co-developed them according to diversity characteristics.

9.3.1 Data Collection and Analysis

Our research is descriptive and exploratory, and aims to capture and describe the diversity of the 19 social labs, their diversity dynamics, the lab process and the manifold outputs manifested in the pilot actions. Our analysis builds on a thorough examination and synthesis of existing quantitative and qualitative data extracted from two main sources. The first main source are three internal post-workshop reports for all 19 social labs. The reports contained information about the participants at the three workshops held over the course of the project. A total of 57 multi-page reports that are accessible exclusively to social lab managers served as the basis for the extraction of quantitative information related to participant diversity in each social lab. To capture a social lab’s diversity as an umbrella concept, we considered the following three reported diversity categories as components of our overall diversity category:

- Gender diversity in terms of the share of women per lab,
- Geographical diversity in terms of the country of residence (institutional affiliation) of participants,
- Stakeholder diversity in terms of affiliation with the following stakeholder categories captured by the reports: research/academia, policy, business, civil society, other experts.

We extracted and reorganized this information in a master list and complemented it with additional specific information from other main sources. Since the workshop reports included additional valuable information in the form of the social lab managers' reflections on the dynamics, challenges, conflicts or opportunities related to diversity, we thoroughly reviewed the 57 reports and complemented the above-listed quantitative data with the responses given to questions asking explicitly about group diversity, diversity dynamics, and experienced conflicts. Since diversity was a recurring theme in other questions, we systematically reviewed the reports for diversity-related reflections on social lab dynamics. We grouped the individually selected quotes into eight new categories and recurring themes, as listed in Table 9.1. Given the limited space and scope of the paper, we selected and presented only a limited range of quotes, which were, however, considered the most 'extreme'/explicit and thus, representative for their respective category.

Table 9.1 Diversity of the 19 social labs

	Min	Max	Mean (average all labs)	Sum (all 19 labs)
<i>Participants in all 19 SLs (not individuals, but workshop (WS) participants)</i>	13	59	35.68	678
<i>WS1</i>	9	22	16.06	N = 257
<i>WS2</i>	7	24	13.94	N = 521
<i>WS3</i>	3	21	11.33	N = 170
<i>Number of women</i>	6 (SL6)	37 (SL3)	21.5	
<i>Share of women</i>	30	71	50.84	
<i>WS1</i>	31.25	76.47	51.78	
<i>WS2</i>	28.57	83.33	53.55	
<i>WS3</i>	16.67	68.75	47.81	
<i>Number of stakeholder groups</i>	1	6	3.42	
<i>WS1</i>	2	6	3.7	
<i>WS2</i>	2	8	3.3	
<i>WS3</i>	1	6	2.7	
<i>Number of countries of residence</i>	4	11.3	7.13	
<i>WS1</i>	4	14	8.43	
<i>WS2</i>	4	11	7.28	
<i>WS3</i>	2	11	6.33	
<i>Number of pilots</i>	1	5	3.16	N = 60
<i>Number of dropouts (WS2 + WS3)</i>	0	23	9.26	N = 176

Our second main source were internal excel lists on the pilot actions' status, which contained information on their classification (type of output): these comprise documents, proposals, case studies/best practices, papers, institutional change, tools, awareness and websites, and vary in their degree of tangibility, complexity or innovativeness. We matched the information on the pilot actions with the diversity information per social lab, which allowed us to statistically and graphically analyze and describe their relationship.

We compiled an extensive table using SPSS software listing all the named quantitative and qualitative data/information available in June and July 2020. The aggregated and comparative level of our analysis was the social lab level.

9.4 Results

In a first step, we analyzed the composition of the 19 social labs according to the diversity dimensions gender, stakeholder groups, and countries. Table 9.1 shows the results differentiated by the single workshops that took place over the entire social lab process and in sum. In total, the labs mobilized 678 participants.² The total number of workshop participants decreased over time and across the workshops, whilst the variance between labs increased over time. Furthermore, we observe a large variation in the total social lab size, operationalized as workshop participants, ranging from 13 to 59. The total number of participants in each lab is important as it determines, at least to some extent, the potential level of diversity.

Table 9.1 also shows that the number of women that participated in the workshops does not vary significantly, and their share is constantly around 50%. However, the number of women participating in a single workshop ranges from a minimum of 3 to a maximum of 37. The number of countries represented in the different social labs and workshops is much lower (between 2 and 14).

Figure 9.1 shows the sum of workshops participants for each social lab and the number of pilot actions. It underlines the large heterogeneity of the SLs in terms of the number of their participants, while Fig. 9.2 indicates that a high number of participants does not necessarily mean that the number of pilot actions is high as well.

The following graphs show the distribution of pilot actions by type of output. Figure 9.3 shows that the most frequent output is awareness raising (31%), followed by activities that aim at institutional change (24%). Concrete tools make up 13% of the pilot actions, and 11% mention a concrete practice case. The majority of other tangible outputs are below 10% and include websites, papers, documents as well as proposals that were developed on a team basis.

²The calculation is additive and focuses on *participants per workshop*, not on individuals. It cannot be excluded that, in certain cases, individual persons were counted more than once, if they have participated in more than one of three workshops.

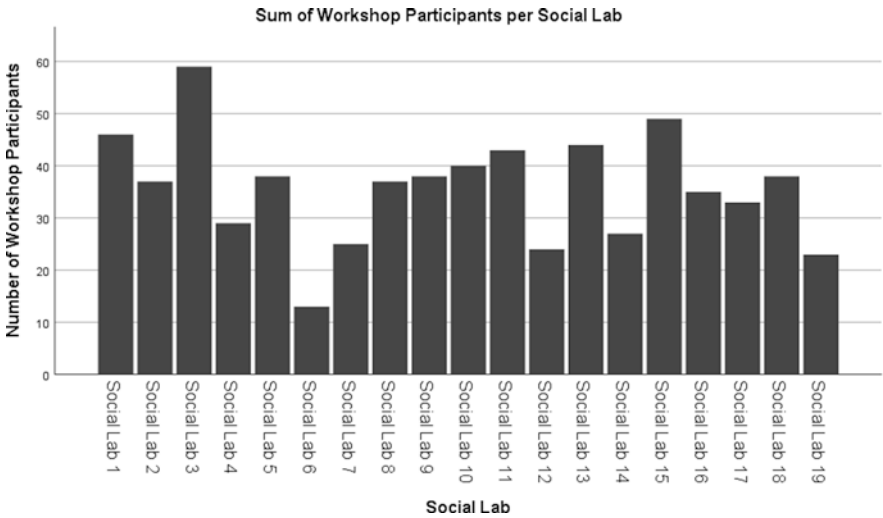


Fig. 9.1 Sum of workshop participants across 19 social labs

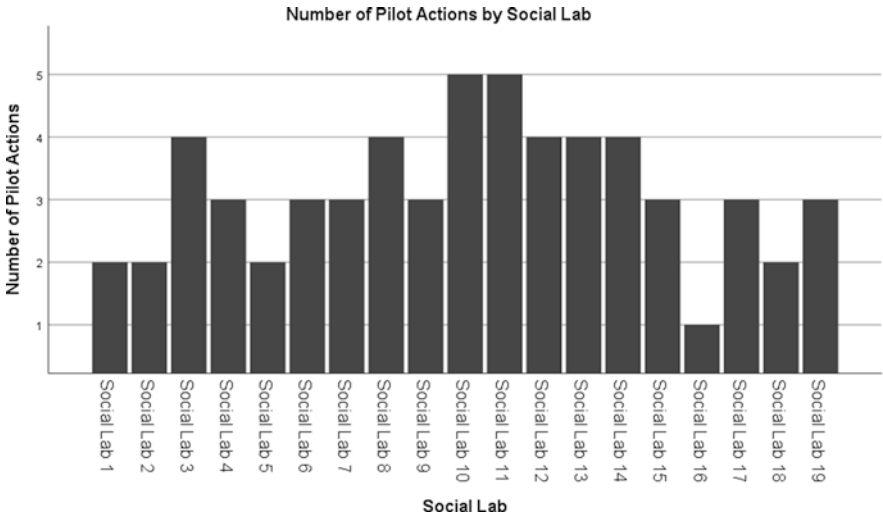


Fig. 9.2 Number of pilot actions by social lab

For a more comprehensible presentation, we summarized some of the categories shown above. The group of ‘tangible results’ now includes tools, documents, papers and proposals, whereas the other categories remained unchanged.

This classification was used in order to differentiate between two categories of results of social labs: tangible and intangible. The group of less specific, less tangible results such as ‘website, awareness, institutional change and practice cases’ is considered less innovative because they are easy to achieve or are unspecific

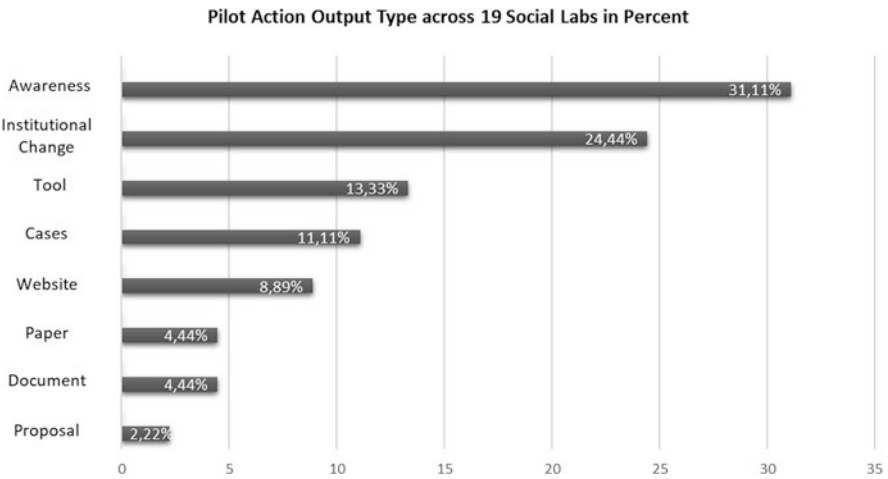


Fig. 9.3 Type of outputs reported for the pilot actions

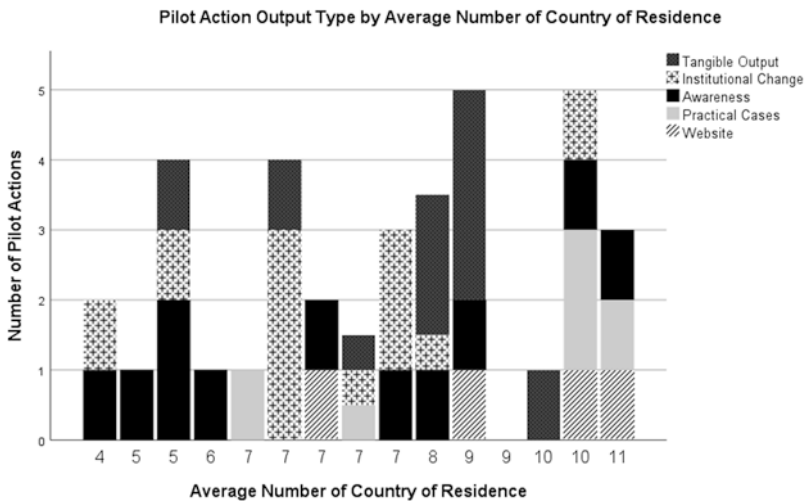


Fig. 9.4 Country diversity and pilot action outputs

(institutional change). On the other hand, the group of tangible results such as tools, documents, papers and proposals require an active contribution from different perspectives in order to achieve a corresponding quality.

Figure 9.4 shows the relation between different types of outputs and the diversity dimension country of residence: We see that outputs aimed at increasing awareness are more frequent in social labs with lower country diversity, whereas tangible outputs occur more in social labs with moderate to high country diversity.

A similar pattern emerges when we look at the results for gender diversity (see Fig. 9.5): Again, the frequency of tangible results increases with increasing gender

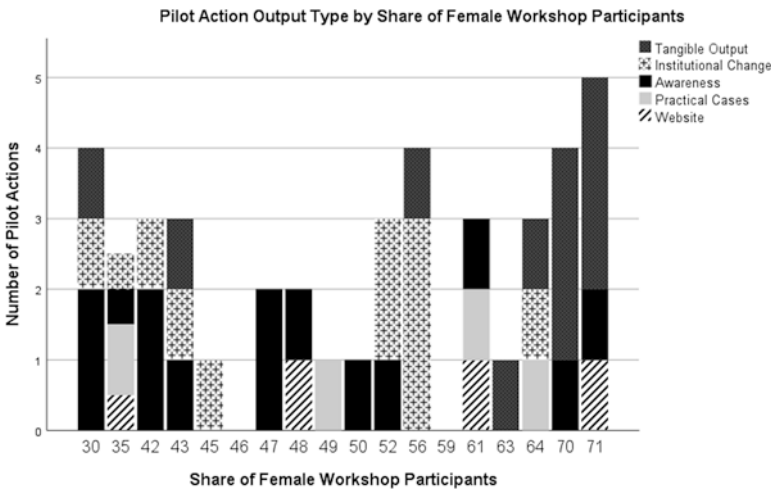


Fig. 9.5 Gender diversity and pilot action outputs

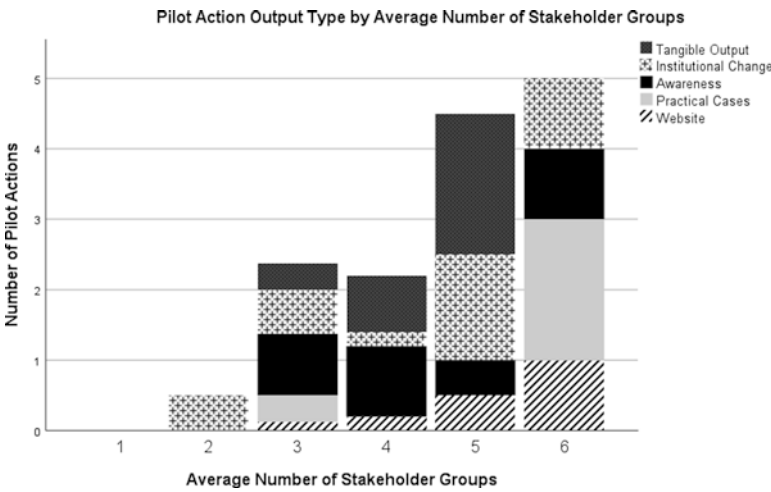


Fig. 9.6 Stakeholder diversity and pilot action outputs

diversity, whereas we find more awareness-related output types in social labs with lower gender diversity. Furthermore, the number of outputs that aim to stimulate institutional change is highest in SL with balanced gender distribution.

Finally, when it comes to stakeholder diversity, a greater proportion of practical cases can be found in groups with more stakeholder diversity, and tangible outputs are more frequently reported in social labs with moderate to high stakeholder diversity (Fig. 9.6).

In sum, we observe an influence of all three diversity dimensions on the type of pilot action output, namely that more tangible results are developed in more diverse groups, while awareness - as a rather weak output - tends to be more common in less diverse groups.

As a complement to the results shown above, Table 9.2 shows a compilation of examined qualitative data in the form of social lab managers' self-reported reflections on the pros and cons of diversity within the social labs.

Table 9.2 Social lab managers' reflection on diversity and social lab dynamics

Category	Quote by SL manager	Lab characteristics
Reference: The average lab has 50.84% females, 7.34 countries of residence, 3.42 stakeholder groups and 3.16 pilots.		
Low homogeneity	<i>'The last workshop was the least diverse of all three. Compared to the first workshop the gender composition has totally changed with only one female participant present. Three other women took still part in the Social lab communication between WS 2 and 3, but did not make it to the third workshop, due to a busy schedule. The participants present at WS3 were friendly and worked together very well. Only during the policy recommendation session at the end of the workshop, participants showed signs of fatigue, which affected the group dynamics towards a collective lack of creativity in solving this task.'</i>	30% female 5 countries 3 stakeholder groups 3 pilots
Proper balance	<i>'Social labs should not revolve only around different expertise. It should consider an integration of different ingredients able to facilitate the dialogue between different expertise. In this sense, it is important to foresee participants with different cultural backgrounds and peculiarities so to compensate with each other. Extroverted characters should be combined with more introverted ones. Furthermore, this can trigger diversity, a dialogue where perspectives are not imposed, and new ideas can emerge and flourish.'</i>	50% female 6 countries 4 stakeholder groups 4 pilots
Positive diversity	<i>'The very diverse group (both in terms of practices in which they are normally embedded, as well as stage of career and substantive research interests) really added to the diversity of viewpoints related to RRI and therefore to the creative tension during the workshop and (as we've gathered from participants) to new insights resulting from this friction.'</i>	30% female 5 countries 3 stakeholder groups 3 pilots
Excellent diversity	<i>'Group dynamics were fantastic: Only 4 participants were there for the first time, however 3 of them stepped in for active participants who had changed roles in their home organisations or could not make the date. There was a high commitment to the activities and an interest to contribute to the narrative reflection - despite the fact that participants admitted they were struggling to understand the Social lab and narrative evaluation methodologies. Social dynamics were easy and relaxed, somehow a Reunion of friends.'</i>	71% female 9 countries 5 stakeholder groups 3 pilots

(continued)

Table 9.2 (continued)

Category	Quote by SL manager	Lab characteristics
Hindering heterogeneity	<i>'During the mingle exercise of our first day afternoon, participants expressed discontent with not having the time to hear from all people on all of the different ideas in the room.'</i>	70% female 8 countries 4 stakeholder groups 4 pilots
Imbalance or lack of representation <u>not</u> affecting or disturbing dynamics	<i>'The group had a very good diversity in different aspects, the only weaker aspect was gender, as there were far more women than men. This however, did not influence the group dynamics in a negative way.'</i>	71% female 9 countries 5 stakeholder groups 3 pilots
	<i>'No representatives from the EC or industry were present, this didn't appear to affect the workshop process negatively (although further perspectives would probably have been beneficial).'</i>	64% female 7 countries 3 stakeholders 3 pilots
Role of individual power, dominance and influence:	<i>'Generally speaking all of them participated in almost every action. The dominant voice from the first workshop was not able to attend, so the distribution of speaking time was more equally distributed this time.'</i>	30% female 5 countries 3 stakeholder groups 3 pilots
	<i>'Different cultural and social background can be an obstacle to a free and comfortable discussion. It is important to lighten the atmosphere as much as possible and address the crucial role of having different perspectives for the lab purposes. We observed different ways of intervening in the conversation: While some would raise their hand, others would directly speak and, sometimes, even interrupt the other person speaking. This generated a bit of inequality between participants, especially between those who are comfortable speaking in public and those who are less.'</i>	50% female 6 countries 4 stakeholder groups 4 pilots
	<i>'This group was very diverse in age, background and nationality. Three persons were rather dominant in discussing, but facilitators could still lead the discussions and enable everybody to talk.'</i>	61% female 11 countries, 3 stakeholders, 3 pilots
	<i>'[...] key multiplier-persons are of uttermost importance in order to activate other staff and to foster (pilot) action. In our case, some of these persons were from higher management positions and thus held institutional power - however, others were not in these type of positions but were still valuable in order to make the SL and the pilots a 'success:''</i>	45% female 4 countries 2 stakeholder groups 3 pilots
Task, topic, sector moderating diversity	<i>'More women participate than men, even though the ENERGY field is rather male dominated. This aspect was questioned by the participants and the gender aspect was repeatedly taken up in discussions.'</i>	61% female 11 countries 3 stakeholders 3 pilots

9.5 Discussion

This chapter aimed to explore the relationship between diversity in an experimental setting in the form of social labs and the outcomes generated in such environments. The starting point of our relationships as well as the findings from diversity research, according to which the relationship between diversity and quality of outcomes is complex and positive results of diversity can be expected above all when this diversity is well managed. To investigate our question of whether and how diversity affects social lab dynamics and under which conditions responsible innovation can thrive, we were able to draw on material from 19 social labs conducted as part of the EU-funded NewHoRRizon project.

We find that social labs with greater heterogeneity show similar tendencies in their behavior and output type: across the three examined diversity dimensions, the frequency of tangible results increased with increasing group diversity. Tangible outputs were more frequently reported in labs with moderate to high levels of stakeholder and country diversity, while labs with higher stakeholder diversity produced a higher number of practical cases. Against the background that outputs in heterogeneous groups are achieved under more ‘challenging’ conditions characterized by a higher potential for friction, divergence but also creativity, we considered tangible outputs as more original and innovative, and outputs related to awareness-raising as more easy to reach and thus more ‘ordinary’ / less original.

We also found indications for the existence of single participants who ‘dominate’ the discourse, ‘interrupt’ or hamper group dynamics through their ‘hegemonic position’ (quote by social lab manager). This finding contradicts the notion of ‘sufficient representation’ of individuals from underrepresented groups from diversity literature (Kanter 1977), which is assumed to be an important prerequisite to influence group dynamics. Individual reflections by social lab managers indicate that subgroups do not necessarily need to be sufficiently represented to have their voice heard and exert noticeable influence on group processes. In multiple cases, dominant individuals were perceived positively since their extraordinary commitment and contribution were highly beneficial for pilot action progress and success.

Thus, our results confirm the main assumptions from the literature that (1) different degrees of diversity have different effects on group outcomes and (2) that, under certain conditions, weak ties, which we find in groups that are more heterogeneous, lead to more innovative solutions, at least to some extent. We interpret the results as providing evidence for the theory that diversity stimulates the type of creative thinking that leads to innovative ‘products’ like new tools, publications or proposals.

By applying a combination of social network and critical mass theory to the social lab context, we provide new insights into the role of diversity, especially of degrees and proportions of diversity in highly uncertain settings. Results indicate that friction and divergent perspectives are beneficial to group processes and stakeholder collaboration as they stimulate creative and critical thinking, supporting earlier research on constructive conflict in stakeholder collaboration (Blok 2019).

With these findings, we shed more light onto the volatile nature and behavior of diversity in these complex, multi-dimensional experimental settings. The question of degrees and constellations of stakeholder groups, which, so far, has not been considered as a major explanatory variable for differences in group performance, might gain in importance in future lab designs.

Moreover, reported challenges associated with power relations and imbalances that can hamper the working climate and group dynamics, and certainly affect group performance, indicate that these have to be properly managed to fully exploit the benefits of diversity. These insights can contribute to improve the understanding of ‘the construction of emerging social phenomena itself’ (2020: 12). Social labs can benefit from the insights gained in earlier diversity research and the present paper, both from a practical and methodological point of view. These learnings can support future social lab design and stimulate a more conscious, deliberate selection of social lab participants – although we acknowledge the nature of social labs as open communities of practice. It might be worth coordinating and managing social labs’ participant base and engage in a process of ‘strategic diversification’, or, at least, adjustment. This could serve to recruit the right amount and set of stakeholders who are best suited for the respective challenge and context, and increase the likelihood of social and responsible innovation. The trade-off between the different and somehow complementary advantages and disadvantages of homogeneous and heterogeneous groups poses a dilemma: What is more important in experimental settings that involve diverse groups? Consensus, quick solutions and a smooth process, or the risk of divergent voices, frictions and conflict and perhaps no solutions at all, but the greater chance of generating more original, innovative and impactful solutions? The latter might be much in alignment with the nature and core design of social labs, which understand friction as indicating a ‘clash’ among a variety of perspectives and approaches. Finding solutions to complex social challenges is in itself a highly challenging task that requires creativity and out-of-the-box thinking, and hence, critical voices and perspectives – all this in a demanding but still inspiring ambiance where ideas can thrive (Blok 2019). Therefore, this might also be a question of quality over quantity in pilot action development and it might be more important to assess outcomes based on their fitness for purpose.

9.5.1 Limitations and Future Outlook

This study represents the first attempt to shed light onto RRI practice, social lab processes and outcomes through the lens of diversity thinking, adapted to the specificities of NewHoRRizon’s social lab design. Although the explorative approach taken opened up space for new perspectives, we are fully aware of its limitations.

Firstly, the selection of this specific set of diversity categories was guided by the availability of data in our main source of participant information, i.e. the internal post-workshop reports. The comparability of the data and the representativeness of our results are limited for various reasons. The data basis was a challenge, as the

available information relevant for our analyses varied within and across social labs. We created a dataset using data from documents that varied in their comprehensiveness, which is why the analyses might be inaccurate to some extent.

We are aware of the mismatch in levels of data collection and resulting inaccuracies. The participant base varied in diversity across the social labs, workshops and pilot actions and was not stable over time. Since we wanted to examine data on the social lab level, but only had participant information on the workshop level, we decided to aggregate these to the social level, taking into account that the NewHoRRizon project distinguishes between social lab members, workshop participants and pilot action groups. Thus, direct linkages and attributions of outcomes to closed/specific groups are hardly possible. However, this speaks to the nature of the social labs as communities of practice and open spaces for joint learning.

Given the very different constellations of variables and factors in every single lab, e.g. program line, topic, sector, ‘ideology’ and other factors, interactions, processes and outcomes are always specific to one single lab and hence limited in their comparability. Given the variation and heterogeneity of outputs generated in the project, the comparability of social lab success or the innovativeness of pilot actions is also limited.

Our analysis and results represent only a snapshot of the status quo and state of progress at a specific point of time. Given that the social lab activities and pilot actions are still ongoing, different dynamics and results might have emerged since our investigation, which are not considered in this paper.

We also recognize the importance of contextual factors in moderating the relationship between diversity and outcomes and therefore consider the social lab topic and size in terms of the number of participants, while acknowledging the complex, unique and non-replicable interactive dynamics in every single social lab. Given that different standards or norms prevail in each sector, domain or discipline, the very same construct or observation might be perceived differently depending on the respective context and perspective. What is ‘normal’ and common practice in one sector might be viewed as a deviation (even a disturbance or a disruption) in another context. The added complexity resulting from the social labs’ contextual embedding might further intensify our problem of limited comparability, since we cannot account for context dynamics or extraneous variables.

We did not aim to evaluate social labs based on their participant base or processes, and especially not based on their outcomes, as we are very aware of the difficulty of operationalizing ‘social lab or pilot action success’ or comparing performance across a highly heterogeneous set of outcomes and results.

Despite all the limitations discussed above, our approach of combining diversity literature with social lab practice reveals interesting findings and makes a valuable contribution to further research. Our attempt to link diversity with experimental lab settings provides signposts for future research. A more nuanced but also holistic view of lab dynamics offers more explanatory power than focusing solely on the examined diversity dimensions. Future research could assess the degree of ‘innovativeness, originality or novelty’ of outputs of social lab processes such as the pilot actions, and investigate how these are related to the diversity dynamics in a specific

lab or pilot action group. In our paper, the importance of the specific context in which the labs operate was not sufficiently addressed, but it can be assumed that context definitely matters in shaping group composition and dynamics within the labs. Finally, it might be worthwhile to investigate other dimensions and functions of diversity, for example diversity of expertise.

A future study that combines qualitative and quantitative aspects could benefit from the perspectives of a larger sample size, measured in terms of social labs as cases and a higher number of social lab managers. With their deep involvement in the social lab scene and expertise, the social lab managers could enrich future analyses with their detailed, implicit knowledge and profound understanding of the underlying mechanisms at work in social labs.

Such studies could build on and extend the approach taken in this chapter to contribute to the diversity and social lab literature and generate new insights for the RRI and wider scientific community. Future studies could dig deeper into the factors that are decisive for social lab performance, and shed light on the conditions under which we can establish and nurture social labs that are suited to tackle pressing societal challenges and create value for research and society.

9.6 Conclusion

The aim of this paper was to explore the interactive dynamics of social lab diversity and its effect on social lab processes and outcomes. Exploring social lab dynamics as an inherently experimental and therefore dynamic, volatile and multidimensional setting, we aimed to identify patterns and relationships between diversity and outcomes that would allow us to draw inferences about their explanatory power.

Our analysis was guided by the question of proportions and degrees of diversity or heterogeneity as a potential explanatory factor for social lab outcomes, especially with regard to the innovativeness of pilot actions as concrete outputs of social lab processes.

Building on the premises of social network theory and critical mass theory, we assumed that homogeneous groups (= strong ties) can achieve solutions easier and quicker, but generate less original outputs. In contrast, we assumed that more heterogeneous groups (= weak ties) experience more frictions and conflict but are more likely to generate original, novel and innovative outcomes.

Our analysis of quantitative information about the characteristics of social lab participants and outcomes, and qualitative information about group dynamics shows that the degree of diversity affects the type of output produced in social labs with regard to its innovativeness, originality or novelty. Supporting our main assumption, we found that groups with higher levels of gender, stakeholder and country diversity who cooperate under more ‘challenging’ conditions characterized by more friction, divergence but also creativity, were more likely to produce tangible and practical results. Less diverse groups primarily achieved results in terms of awareness-raising.

Our study provides new insights into the influence of diversity on creative dynamics and innovative behavior in social labs established to promote RRI. Further, it provides learning on how to redesign social labs and optimize the social lab experience /practice to bring about more innovative outcomes and social change through RRI and diversity. Diversity requires conscious and sensitive management to create the right conditions for innovation to thrive. If managed properly, we can exploit the potential of diversity in perspectives, knowledge and experiences to promote more responsible and social innovation in challenging and inspiring working contexts.

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