LET THE GENIE OUT OF THE BOTTLE: A HACKATHON TO PROMOTE OPEN SOCIAL INNOVATION IN TIMES OF CRISIS

ABSTRACT

Crisis, such as the COVID-19 pandemic, causes numerous societal ills. Rather than solely relying on a top-down approach to manage the crisis, the German Federal Government accepted to serve as a host of a large-scale crisis hackathon organized by civil society organizations. This is a form of open social innovation: making an open call to actors in all societal domains to generate ideas on how to resolve the crisis. In this study, we investigate the organizing challenges of this online hackathon and its aftermath. Taking stock of this unique form of organizing open social innovation, shed light on the role of technology, the opportunity for agency in times of crisis, the challenge of moderating such large-scale join action and the effects of formalizing the process.

Keywords: hackathon; open innovation; social innovation; civil society.

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INTRODUCTION

Our society faces unprecedented challenges as regards its future viability. COVID-19 has further revealed this circumstance and in many ways aggravated existing

social problems, or made them particularly urgent. COVID-19 is the archetype of a crisis: A crisis is an exogenous shock. It is a complex, overwhelming event affecting all societal domains and questions practices we took for granted. High uncertainty accompanies any resolution of the crisis, and the actions societal actors take constitute a turning point – for "the better or worse" (Fink 1986, 15 in Coombs and Holladay 2010; Micellota, Lounsbury and Greenwood 2017).

The pandemic produces and fuels problems such as strained capacities in national healthcare systems, difficulty in protecting and providing care to older people or facing the challenge to organize for large-scale behavioral change to slow down the spread of the virus. Policy makers, civil society and businesses desperately search for potential solutions to the challenges and the willingness to act quickly and to innovate has increased. As a crisis rips apart the fabric holding society together, the urgency and stakes may cause actors to draw on alternative and novel forms of organizing to stimulate social innovation mending holes in the fabric if not alter its shape and function (Mair and Rathert 2019; Rao and Greve 2018).

This urgency also applies to governments, whose actions are critical for resolving crisis. The German Government accepted a proposal of civil society organizations to organize the #wirvsvirus [#wevsvirus in English] hackathon. Germany's lack of progress in digitalization and high level of professional bureaucracy constitute a fertile soil to experiment with this novel form of organizing, mobilizing a large number of diverse actors to rapidly enhance social problem solving. The results: 42.968 citizens signed up for the hackathon and 26.581 participated – the largest (online) hackathon the world has seen to this date. Participants generated 1.494 project ideas, from which a jury pre-selected a long list of 197 entries and finally awarded 20 projects. The hackathon has been completed, the best projects have been selected and now is the time for them to develop further, establish formal structures and create real impact.

A hackathon is an event, where in participants engage in problem solving through rapid prototyping within a specific time frame, ranging typically from 48 to 72 hours (Johnson and Robinson 2014). It is a fluid form of organizing that emphasize flexibility and self-organizing (Trainer et al. 2016; Lifshitz-Assaf, Lebovitz and Zalmanson 2020). While originating in the private sector, governmental agencies also use hackathons to foster innovation. For instance, the NSF used a hackathon to bring cyberinfrastructure and data visualization together with polar research communities (Mattmann 2014). Arguably, the idea that governments can open up to collaborating with civil society and

business is not new. Indeed, open government and innovation literature documented that formats such as innovation tournaments are viable instruments to arrive at solutions (Hilgers and Ihl 2010). The advantages: Firstly, mobilizing external actors allows for rapidly scanning the solutions space, thereby potentially tapping into expertise that otherwise would remain unheard (Afuah and Tucci 2012; Jeppesen and Lakhani 2010). Secondly, opening up in times of crises enables government to mobilize societal resources which would otherwise remain idle (Bauer and Gegenhuber 2015). At the same time, screening of ideas comes with considerable costs and organizations often face challenges when absorbing ideas outside their organizational boundaries (Keinz, Hienerth and Lettl 2012; Lifshitz-Assaf, Lebovitz and Zalmanson. 2018).

Although the social innovation literature has as of yet paid such forms of "Open Social Innovation" (Chesbrough and Di Minin 2014) scarce attention, this literature lends a repertoire to assess the viability for hackathons in general and the #wirvsvirus hackathon in particular for solving societal challenges. First, the hackathon is a prime example of why "doing it alone won't work" in social innovation (Phillips, Alexander and Lee 2019). it is likely that different viewpoints, competences and social contacts need to be brought in by the participants to move beyond solutions that already exist. Second, in particular the further development of potential social innovations will depend on an iterative process, in which new practices emerge, which shape the structures they are embedded in (Cajaiba-Santana 2014). Third, as social innovations evolve, the actors engaging in the process and the roles they are taking are likely to revolve. Civil society organizations are particularly important at the beginning of the process to sense needs and broker connections between actors, but as innovations mature "more resourceful" actors from government or business are often stepping in. In other words, governmental agencies need to proactively embrace solutions to allow for scaling-up and transfer (Krlev, Anheier and Mildenberger 2018; Ometto et al. 2018).

By joining insights from the openness literature (i.e. open government and innovation) with the social innovation literature, we set out to analyze the #wirvsvirus hackathon. We understand it as an open social innovation process that moves from the open call for action, to the generation of ideas during the hackathon, to the selection of the best ideas, ideally followed by the implementation of ideas. In this process a hackathon transits from being messy at the very beginning into a consolidation phase in which the best projects crystallize. We broadly explore: *How was the #wirvsvirus open*

social innovation process organized and how did it evolve over time? What were the main challenges in this organizing process?

The lack of research, combined with the unprecedented scale and urgency of the #wirvsvirus hackathon warrants a qualitative, explorative grounded theory approach. Note that the object we study is still a moving target, as the post-hackathon phase is still ongoing (e.g. the implementation of projects). Nevertheless, we think we can generate (preliminary) insights to our research question.

METHODS

Given that the phenomenon is still novel and empirical evidence in the literature is scarce (Edmondson and McManus 2007) we choose a qualitative research approach. At the heart of our research design is an in-depth case study of the phenomenon at hand (Yin 2017). In line with prior research in such a domain (Lifshitz-Assaf et al. 2020), we base our analysis on participant observations on the #wirvsvirus hackathon. Two of the authors proactively participated in teams, two were only involved in minor tasks and instead focused on observing the process from "the outside". One author did not participate in the process to ensure a neutral perspective within the team.

The #wirvsvirus hackathon took place from Friday, March 20th to Sunday March 22nd. The general process of the hackathon was the following: First, the potential participants registered for the hackathon via the #wirvsvirus website (WirVsVirus 2020a) until March 20th, 2pm. On that first day, the organizers sent out an email with information about how to participate and an overview of the challenges via the spreadsheet database Airtable. In the beginning, participants needed to find a team and work for 48 hours on a chosen challenge. Along the 48 hours, the hackathon organizers conducted several check-in calls to keep the participants informed about the overall process. At the end of the hackathon, the organizers asked the teams to submit a short video on the platform Devpost explaining their idea plus a description of the developed solution.

Through our observations we collected 111 pages of notes in an observation journal, including visual material such as screenshots of key events. In our analysis, we draw on a variety of data sources. These include our observations, online documents (e.g. announcements of organizers in their Slack Channel, video material released by the organization team on Youtube and Twitter communications), media reporting (i.e. reception in various media outlets) and internal documents the co-organizers provided

(e.g. organizers' "handbook" collecting their lessons learned). Table 1 summarizes all data sources:

Table 1 –

Data Sources

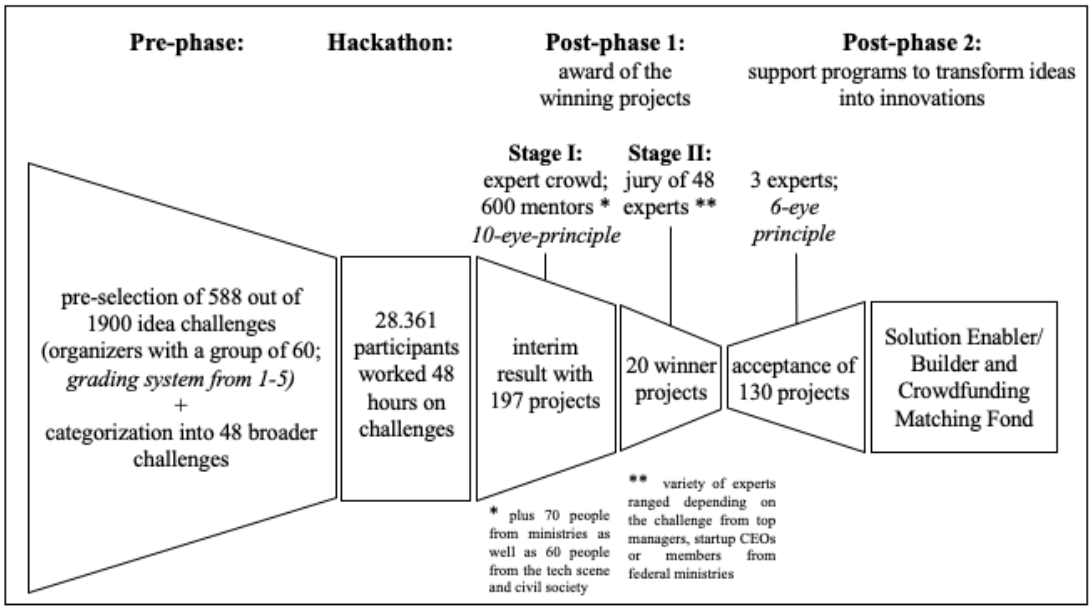
PRIMARY DATA	Field observation	Field notes	▪ 4 sets of field notes about personal experiences before, during and after the hackathon including collected materials such as screenshots, conversation documents and pictures
SECONDARY DATA	Documents	Public documents	▪ 8 challenge sheets from Airtable ▪ List of the Top 20 winner projects ▪ Handbook about the organizational process of the Hackathon
		Internal documents of the organizers	▪ List of existing tools and platforms similar to submitted challenges
		Project data	▪ Documents and reports about specific projects of the hackathon
	Online data	Slack	▪ Slack feed of organizational channel „0_ankündigungen" („0_announcements")
		Website	▪ 6 landing pages with different information about the hackathon
	Social Media data	Twitter Feed	▪ 441 tweets from @wirvsvirus official Twitter account with comments
		Youtube Videos	▪ 15 videos and transcripts
	Media articles	Pre Hackathon	▪ 29 articles and posts

	Post Hackathon	▪ 22 articles and posts
	Official press statements	▪ 7 press releases

Our data analysis consisted of the following steps: First, we crafted a detailed case description of the hackathon. In writing up this case description, we understood the specific role of technology (e.g. using various tools) as a critical factor for understanding the organizing processes. Based on this case description, we also conceptualized distinct phases that the hackathon consisted of. In the second step, we applied a temporal bracketing strategy (Langley 1999, 703), allowing us to examine "how actions of one period lead to changes in the context that will affect action in subsequent periods." The following phases were central: (1) a prologue building up momentum before the actual hackathon, (2) the main 48h hackathon phase, (3) a first post-hackathon phase focusing on the idea selection by the jury, and (4) a second post-hackathon phase that served as the starting point for the subsequent support program.

FINDINGS

In line with our analytical approach, the finding section is structured as follows: First, we start out with a brief explanation of the various technological tools used during this online hackathon. We do so because understanding the role of the technologies is critical for understanding the open social innovation organizing processes. Second, we then switch to a narrative account examining the organizing processes in each of the phases, that is the pre-phase (prologue), the Hackathon phase and two distinct post-hackathon phases. Figure 1 provides an overview of the phases and the associated idea funnel and serves as the reference frame for the sections below.



Technology Enables the World's Largest Hackathon – in Times of Crisis

We identified technology as the essential socio-material fundament of the #wirvsvirus hackathon. Technology made it possible to remotely bring 28.361 participants together. Challenges associated with COVID-19, in particular social distancing created a new status quo: Citizens were encouraged to stay at home and many social interactions started to rely on technological solutions. Considering this situation and "organization" as a social or socio-technical system, the hackathon was only feasible because of a substantial technological infrastructure. As a result, the organization, coordination and communication took place via an ensemble of various tools. Table 2 illustrates the technologies used, their purpose and the phase in which they were introduced or predominantly applied.

In addition to the phase-wise use of tools displayed in Table 2, we can group technologies by purpose. Some were used mainly for process coordination. For example, the platform Airtable, on which the challenges were collected, or Devpost that enabled the submission of the final ideas. Others were meant to ease the process of collaboration. Besides Slack which functioned as the main tool for communication and collaboration, participants also used other web applications such as Trello or Miro. Yet others were primarily meant for outside communication, visibility and engagement with public discourse, such as the official Twitter account and the #wirvsvirus website. A couple of tools took a hybrid position in that they served several purposes at the same time, most prominently Slack, Youtube and Twitter.

It needs to be stressed that certain technologies were more central to the hackathon process throughout than others. Slack for instance, an instant messaging service that allows video calls, functioned as the main communication hub between organization team, participants and mentors. As the organization team emphasized: "This Slack workspace is the central communication tool for all participants and supporters for the next three days" (WirVsVirus 2020b). On the other hand, the community virtually onboarded and self-selected into tasks during the Pre-Hackathon-Phase. During the Hackathon-Phase, participants deepened collaboration and communication via virtual meetings, prototyped initial software solutions and virtually organized tasks through technological applications.

Main relevance in phase	**Technological tools**	**Purpose of tool**
Pre-Phase	Twitter	Generate reach and legitimacy through retweet of the government. In the further course also used as communication medium with the broader community
	Website	Official online presence of the #wirvsvirus and information for participants. Function maintained throughout all phases
	Guaana	Submission of the challenges and first evaluation by organization team
	Google Forms	Formal participant registration for the hackathon and submission of onboarding emails
	Airtable	Participants overview of the 809 summarized challenges. Clustering of fields of action and transition from challenges to ideas
Hackathon Phase	Communication tools	Teams used self-chosen communication tools such as Zoom, Skype and phone calls for virtual remote meetings
	Collaboration tools	Teams used self-chosen collaboration tools such as Trello, Miro or virtual mind-maps to organize and manage tasks
	YouTube	a.) Announcements in form of live videos. Videos represented official corner stones of the hackathon such as welcome onboarding and the joint virtual after party. b.) Participants uploaded short video pitches representing their ideas. These, in return, formed the basis for the later jury's judgement of the competition

	Devpost	Registration of projects that have been worked on and overview of teams. Additionally, Devpost served as a platform for the submission of the final ideas besides YouTube pitches.
	Slack	Main hub for announcements from the organization team, hackathon onboarding, team selection, skill recruiting, communication and orchestration in teams
Post-Phase		Slack remained the main channel for community management allowing interactions between community, organization team and mentors
	Front-end web development tools	Developers used a variety of self-chosen front-end web development tools. Developers tended to agree upon a common coding language.
	Open source development platforms	Open source software development tools like Github to further develop the prototypes from the weekend
	Infrastructure & SAAS cloud services	SAAS cloud services such as Amazon Web Services functioned as the development infrastructure.

Table 2: Used technologies in before, during and after the hackathon

Explanation: White background: tools officially used by the organization team; grey: various tools self-chosen by the teams

It is important to note that the organizers called upon the participants for their technological outputs to be open source. This should ensure that all solutions developed are visible and assessable for everyone and that other participants or even external parties can continue to work on these solutions.

Prologue: Organizing a hackathon within a week

On Sunday, March 15th, proponents from the arm's-length governmental organization *Tech4Germany* and from the civil-society tech organization *Prototype Fund*, discussed the idea of organizing a hackathon in a phone call. The reported narrative of how the idea was born is a colloquial chat among three friends and leaders in the two organizations (Groh 2020). In Estonia, a hackathon of this kind took place a few days earlier and served as a first mover example (WirVsVirus 2020c). On Monday, a consortium of seven civil society organizations approached the German Federal Government with a concept to organize an online hackathon to find solutions to the COVID-19 crisis. The Federal Government did not hesitate and agreed on Tuesday, 17th March, to serve as a host. Some of the initiating organizations already had established working relationships with relevant political actors, which facilitated the project realization (WirVsVirus 2020c).

Tech4Germany and Prototype Fund were joined as initiators and organizers by the following organizations:

- Code for Germany, an organization with the goal of fostering transparency, open data and civic tech
- D21, a network organization promoting digitization
- Impact Hub Berlin, a branch of a global network fostering the founding of impact-driven ventures
- Project Together, an innovation platform for the solution of social challenges
- The German Social Entrepreneurship Network (SEND)

On Wednesday, 18th March, the #wirvsviurs hackathon website went live (WirVsVirus 2020d). Therefore, the organizers had only a few days to prepare. This is quite unusual – typically it takes two weeks to three months to organize a hackathon (Polina 2018).

The core concept of the hackathon: issue an open call for civil society volunteers to work for 48 hours on creative solutions to the COVID-19 crisis. Initially one of the hackathon's co-organizers stated: “If we have around 1.000 participants, it will become messy” (WirVsVirus 2020e).

In their first announcement tweet, the hackathon organizers wrote:

> “Use your time in a meaningful way. Submit challenges, mobilize your friends, digitally work on solutions that bring us together. Join us. We need your ideas and skills (WirVsVirus 2020f).”

After only three hours, there were 1000 applications, 600.000 website visits and requests from press and potential supporters. Within five hours, there were 2425 participants and 1.329.501 visits to their website (WirVsVirus 2020g, h). The massive attention for the hackathon was fostered by political leaders, such as the Head of the Chancellery and Federal Minister of Special Affairs, Helge Braun, retweeting the announcement.

Prior to the hackathon, the organizers asked the public as well as ministries to submit challenges to be solved. From the more than 1,942 submitted challenges (of which 200 challenges came from Federal Ministries), the organization team together with more than 30 volunteers chose the best 588 and combined them into about 48 challenges, lying in the areas of e.g. “protection of risk groups”, “medical care” or “solidarity and cohesion” (WirVsVirus 2020c). These challenges were collected in an Airtable database, a web-based table listing all entries, access to which was subsequently shared with the

participants on Friday, 20th March, to give them an overview and let them choose a challenge to work on (WirVsVirus 2020i).

By Friday, 42.968 participants had registered for the hackathon (WirVsVirus 2020j). The organization team grew from 7 people on Monday to 100 people on Friday (WirVsVirus 2020c).

Hackathon Phase: 48 hours of Creative Buzzing

On the 20th of March 2020 at 6.30 pm, the #wirvsvirus organization team officially started the hackathon with a live streamed welcome call via Youtube (WirVsVirus 2020k). Co-organizer Cristina Lang, head of tech4germany, emphasized: "This weekend we all want to set an example for our ability to tackle the corona crisis."

Given the short preparation time for the organizers together with the high number of participants, it comes as no surprise that the beginning of the hackathon was chaotic and posed several challenges for participants as well as for organizers. Two simple but effective and mutually reinforcing coping strategies, on the side of the organizers and on that of the participants, were key to mastering the challenges that ensued. The organization team communicated the problems openly and transparently and tried to manage expectations, worries and demands of the participants at speed, e.g. "Please be patient! We have a delay of about 1 hour in our plan BUT we are on it!" (WirVsVirus 2020l)". The participants in turn, with exceptions, showed a high level of understanding for the difficulties of the situation and a willingness to support each other: for example, a Twitter user stated as response to the technical glitches: "I think they're just extremely busy...it's also an extreme load to put everything on. I think they just need a little more (time)". Another twitter user summarized his personal hackathon experience and referred to the hackathon's spirit with a Nietzsche quote: "chaos gives birth to dancing stars" (private Tweet by user).

All Beginnings are Difficult: The Limits of Technology

Despite deliberately chosen platforms and tools, the first technological problems occurred at the very beginning and during the hackathon. Before the official start in Slack, the participants should receive an email with the Airtable link and information about the hackathon process from 2.30 pm onwards. However, due to technical problems, many participants received the email late in the evening or not at all. The eventual solution was

to post it publicly on Twitter (WirVsVirus 2020m) on Friday evening. Since it was only mentioned in the email that Twitter was being used as a central channel for sharing organizational information, the organizers seem to have decided to share the Airtable on Twitter so late.

The next challenge was to bring 42.968 participants onto one Slack workspace. The messenger service was overstrained with this, so the organizers contacted the CEO of Slack, Stewart Butterfield, via Twitter (WirVsVirus 2020n). Butterfield reacted immediately: "(...) Adding 40,000 all at once to a single instance seems like … a bad idea (Butterfield 2020)". The problem was not the number of participants per se, but to add a large number of participants to one Slack workspace at the same time. The organizers then explained to the participants via Twitter: "You can only invite 2,000 people to Slack per link. You are over 40,000. We are trying to figure out the best way to coordinate this and let you know ASAP (WirVsVirus 2020o)". On the 21st of March, the second day of the hackathon, the organizers stated in their update call that about 20.000 participants finally received their access information to join Slack and that they were working on closing the remaining gaps (WirVsVirus 2020p). The organizers stated in a Twitter Post: "Numbers beyond our wildest dreams, people" (WirVsVirus 2020q).

Navigating through the Slack Information Jungle

If one could access to Slack, the next challenge was to find a team. During the welcome call on Youtube, the organizers predicted that team-building process "will be messy" – and they should be right.

As the first email with information about the Welcome Call on Youtube and the link to the Twitter channel arrived already too late for many participants, it was not clear at first where to get the necessary up-to-date information about the hackathon and the procedure. This created confusion, people kept switching back and forth between the different communication channels and consumed the participants' time and attention. The situation quickly led to an information overload and it took a while to understand which information could be found where and when. Twitter user commented for example "I can't handle it, don't know how to get into the channel (WirVsVirus 2020q)" or "How exactly do you get into a group now? Just write to them and wait until you are added? (WirVsVirus 2020q)".

In the Slack channel for announcements, an organizer explained (WirVsVirus 2020b):

> "Team building is particularly bustling today, so we have created four different channels (A - D) for each challenge 001 - 048 for this first phase. Please use the search bar to find the number of the challenge you are interested in (…): 1_Challenge number_Letter of the challenge_Subgroup_Name of the challenge. For example: 1_034_B_Example channel".

Ultimately, more than 200 group channels matching the submitted challenges on Airtable were created (WirVsVirus 2020r) amongst which each participant had to find the right one for the challenge he or she chose to work on.

In some channels, there were several hundred participants after a short time, so that soon nobody was able to keep up with the flood of messages. In other channels, there were only a few members, or there was no reasonable discussion. As a participant, you had to click through the channels and try to read the news feeds to be up to date. It was often not clear who was responsible for the coordination in the channel. In many project teams, the initiators of the project challenges took over this task, but there were also moderators and mentors in order to support the team building and work during the hackathon.

Anchor in Distress: Mentors and Moderators

Before the hackathon you could either register as a participant or mentor. Mentors were responsible to support the project teams during the hackathon with their professional expertise in a specific thematic area. The opportunity to register as a mentor for the hackathon remained throughout the whole weekend (WirVsVirus 2020c). The organization team engaged some of the registered mentors as moderators (hackathon Handbook). The mentors, who were also active as moderators, thus had a dual role.

For those who serves as moderators, one task was to assist users to find their way in Slack. Each challenge had its channel and was supervised by 1-3 moderators whose task it was to control the number of participants in one channel, offer help for coordination if needed, and close a channel if more than 100 people had joined it. The moderators were also responsible for closing or merging channels when there were too few members or activities. Due to the high number of participants, the moderation was crucial to bring order into the Slack organization and to facilitate the team-building process.

As to be expected of a virtual meeting of this size, users also disturbed the process by making inappropriate statements. An organizer thus announced on Slack: "In some channels, especially the #fun channel, there were, unfortunately, statements and

tendencies that do not correspond with our values (...). We will remove these, and we have already started to exclude individual participants". The moderators set up communication rules in the Slack Channels. They helped to coordinate tasks and encouraged the participants to work together.

The main role of mentors was to provide advice and vital skills to the teams. Besides the mentors who also functioned as Slack channel moderators, there were in total 2.922 mentors supporting the project teams in Slack. The mentors registered for the hackathon, just like the participants, via the #wirvsvirus website. There was no particular test of skills or a check of the professional background. "I'm really curious about the questions the teams will be asking me in legal terms (Tutschka 2020)", said a mentor coming from the legal industry before the hackathon. The project teams could look for mentors via specific Slack channels and also on Devpost, where both teams and mentors were asked to create a profile. "To make it easier for you to get an overview and to promote your exchange, we have created a separate channel for each competence cluster that we checked in the (mentor) application" (written by an organizer in the "0_ankündigungen" channel on Slack) (WirVsVirus 2020b). In many Slack Channels, mentors entered and left the project from time to time, supporting the teams only on a particular issue. Others supervised the project from start to finish.

However, mentors, like moderators, helped in the coordination process and the project management, announcing or changing submission deadlines and procedures too. On occasion, the organizers changed plans and rules at short notice during the hackathon and these changes were not always communicated in the same way on all channels. Since the mentors were included in an internal organizational Slack Channel, they could inform the project teams quickly on organizational updates, as for example, during the submission process about the shift of deadlines (WirVsVirus 2020b):

> "We get many questions from you about the exact time of delivery. Therefore, the info: If you do not manage to upload the video on Youtube until 6 pm due to technical or other problems, you will get another hour until 7 pm to upload it".

Technology as a Double-Edged Sword

Although the moderators and mentors took on many coordination tasks within the teams, announced deadlines and organizational information, and summarized what had been worked out to provide structure, a significant barrier to the successful development of

solutions in the project teams remained the lack of coordination. This was also largely due to the technology used.

A major challenge was the number and diversity of tools used within the project teams. This quickly led to different participants starting to use different tools and thus losing track of who was working on which tasks. In many cases, it took some time until it was clear to the team which tools were mainly used. On top of that, some participants used certain tools for the very first time and had to learn how to use them. Even the main communication tool Slack was certainly not known to all participants—posing a challenge of its own. It was necessary to find coordinators in the project teams, who posted the links and summarized the state of work from time to time. “The numerous tools were a real challenge (Slack group feed)”, a participant in a project stated at the end of the hackathon.

Also, in terms of the organizational process, the already mentioned different communication channels and technical problems led to problems in the process. An example is the final project video upload on YouTube. Concerning this, one of the organizers wrote in the "0_anküdigungen" (WirVsVirus 2020b) channel on Slack: “Hi everyone, short update from Google regarding video uploads to YouTube: Sorry that things went a little slow for some of you. We have got the YouTube video processing servers all over Europe working flat out. The situation is now under control; we will keep watching!”.

So, while technology was the factors making the hackathon possible at all, it provoked a number of challenges, which were mainly tied to three factors: limitations of the technological platforms and services, unfamiliarity with (part of) the technology among the participants, and disorientation in the teams because of the range and diversity of technologies used.

Despite the messy start and the challenges, the participants presented more than 1.500 solutions on Sunday evening. Even Dorothee Bär, the Minister of State and Federal Government Commissioner for Digitization, was impressed by the hackathon’s successful team collaborations (Bär 2020a):

> “If our country always worked like this, if we managed to always make decisions so quickly in the Federal Government, this would certainly be something to take with us, even after the crisis”

Post-Hackathon Phases

The Post-Hackathon Phase 1: The Challenge of Idea Funneling

The Post-Hackathon Phase 1 started with the submission of the developed solutions. In case of the #wirvsvirus hackathon, the organizers evaluated the multitude of ideas in a two-stage process. Both stages helped to effectively evaluate the multitude of ideas according to expert criteria. In the first stage, the organizers, experts from civil society and representatives from several federal ministries screened all solutions on Devpost (1,494 projects), as well as the corresponding video pitches (1,221 videos). To accomplish this, a selection committee consisting of 600 mentors and 70 government members as well as 60 people from the tech scene and civil society screened the project solutions. Five mentors with expertise in the respective field evaluated the solutions. 197 projects were pre-selected as an interim result. In the next stage, a jury of 48 experts from different areas of society reviewed the shortlist and awarded 20 winning projects one week after the hackathon weekend. The winners solely received recognition, in contrast to other hackathons, there was no cash prize.

The Top 20: A Lack of Diversity?

The variety of experts in the jury ranged, depending on the challenge, from top managers, startup CEOs or members from federal ministries such as the Federal Ministry of the Interior. Both stages were based on a thematic matching which ensured that for instance a medicine practitioner was in the jury board of health care related ideas. Since all ideas were meant to create public value, the organizers sought to rule out misguided self-interest of expert crowd and jury.

However, taking a closer look at the winning projects, it is noticeable that the diversity of ideas might have become restricted by categorizing and generalizations in the choice of the jury. Pre-hackathon the problems/ideas had been clustered into 48 challenges as for instance “Social Distancing: How can we become creative in times of social distancing?” or “e-Learning: How can we offer training opportunities/online learning?” (WirVsVirus 2020i). In the *Post-hackathon phase 1*, however, the organizers (had to) use more generic field labels to match experts to projects. The developed solutions were squeezed into five broad areas, namely *Health, Food and Care* or *Public administration, Digitalization, Data and Law and Economy, Labor and Education.* The expert groups in some of these areas, for example Economy, Labor and Education were characterized by homogeneity

(WirVsVirus 2020a). For instance, none of them came has direct experience with users in the education sector. This might also explain why e-learning solutions were not among the nominated top 20.

On top of that, the professionality and appearance of the submitted project results varied significantly due to the non-standardized submission form. Participants needed to pitch the project with a 2-minute video to the expert crowd and jury (accompanied with further information on Devpost). Among the top 20 videos, a noticeable pattern emerged. Nearly all of these videos showed a visually appealing prototype and were produced in a rather professional manner. In contrast to this, videos by non-awarded projects were far less professional. For instance, the idea creators briefly filmed themselves and presented the idea verbally. Against this backdrop, teams who lacked professional video production capabilities may have been discarded because the jurors equated appeal with potential impact of the projects.

The Cancellation of the Public Voting

In addition to the lack of diversity within the jury, the organizers also changed the voting rules at short notice during the hackathon in response to participants' voices. The initial selection procedure, which included a public voting, was designed to count the Youtube likes in the first step and then, in the second step, a more refined jury selection should follow.

According to the organization team, this was to ensure that "all projects and not only those that have a direct impact on the public" are honored (WirVsVirus 2020s). This policy emphasized the public as part of the process. During the hackathon, however, parts of the community demanded the abolition of public voting, as this did not, in the view of many participants, correspond to the "spirit of a hackathon" (WirVsVirus 2020s). As one participants put it: "This only helps people like influencers who have many followers and therefore automatically get more/ more positive feedback" (WirVsVirus 2020t)." The organizers responded and changed the voting rules during the hackathon.

Although the team showed great flexibility and responsiveness to the community, the whole issue was a delicate one because the cancellation of the public voting also meant the loss of the opportunity to involve the public in the hackathon's aftermath. Furthermore, it is unclear whether the majority of the participants actually were against the public voting, or whether only some parts of the community made themselves heard.

Nevertheless, as a positive gesture of transparency, the organizers mentioned the public voting on the website and explained their decision to cancel it.

Post-Hackathon Phase 2: Gaining Momentum

In post-hackathon phase 2 (ongoing) the ideas are gaining momentum and efforts are being made to transform them into long-term social innovations. In order to avoid that the participants discard their prototypes after the hackathon, the organizers sought to set up a support structure aiming at turning the prototypes into lasting solutions to social problems.

Setting up a support structure

The support structure seeks to bring together public authorities and private actors in a strategic partnership. The organizers announced at the end of the hackathon: "In the next weeks and months we will work together with the federal government to set up a program by supporting 100 to 150 selected teams and by providing a maximum of help to test your solutions, to validate together with others and to put them into practice." (WirVsVirus 2020u). This support structure, consists of three elements: (1) Solution Enabler, (2) Solution Builder and (3) Matching Fund. It took the organizers about two weeks from the end of the hackathon to the official launch of the first element of the implementation program.

First, an implementation program called *Solution Enabler* (Figure 1) was established to support the "fastest possible implementation" (WirVsVirus 2020v) of the ideas. All projects developed within the 48 hours of the hackathon could apply (the top 20 nominated by the jury automatically got a seat). In total, 400 projects applied and, in the end, 130 projects were admitted to the Solution Enabler program. At least three experts evaluated each application. Table 3 provides an overview of the admission criteria to the Solution Enabler Program. In the program, teams have access to a platform where they can get in touch with public or private partners, weekly community-building calls, feedback and network support from mentors as well as opportunities for teams to expand their skills. So the Solution Enabler is essentially a networking and skilling tool.

Evaluation criteria	**Support for ideas**	**Conditions of participation**

● Added social value ● Degree of innovation ● Feasibility ● Scalability ● Needed support	● Programmatic support & individual coaching: ● Uncomplicated and need-based support with resources ● Rapid transfer of expertise and know-how ● Systematic networking, clustering and exchange ● Support during piloting and implementation ● Financial support (amount depends on the amount of funding)	● Support of solutions from independent teams (or individuals, not companies) ● Precisely matching solution to a challenge defined by the competition ● Motivation to contribute to the common good ● Flexibility to respond to changing requirements ● Time commitment ● Source code is permanently available as open source

Table 3: Conditions for admission to the Solution Enabler program (Source: WirVsVirus 2020v)

Teams who did not make it into the program, looked whether they could join forces with teams in the program, as following statement illustrates: “We are unfortunately not in the solution enabler program, but the team [with a similar solution is]. And as our call yesterday showed, our solutions can complement each other very well. I look positively into the future that we can integrate our solution.” (Slack group feed). This means that the visibility and accessibility of all projects allowed collaborations of this kind.

Second, in addition to the Solution Enabler, the Solution Builder program provides more intensive support for urgent solutions (hackathon Handbook). The Solution Builder is the fast lane track granted for in total 10 promising projects from within the Solution Enabler pool (WirVsVirus 2020v). In this program, rather than advice and training, the teams directly receive resources from companies, such as assistance with coding or marketing.

Third, the #wirvsvirus team set up a crowdfunding Matching Fund to provide financial support to participants. Project teams are encouraged to create an own crowdfunding

campaign on the platform *Startnext* (Startnext 2020), which provides citizens the opportunity to co-finance projects. The organizers provide knowledge about the use of crowdfunding via webinars. In addition to the crowdfunding as such, that is investments into the ideas by individuals, the matching fund works on a 4-to-1 principle. This means that the Matching Fund composed of investments from foundations, companies or other institutional investors will add a quarter of the amount raised in the crowdfunding and make it available to the projects. For example, if individual sponsors donate 10 euros in the crowdfunding, the fund will add another 2.50 euros, so that the overall amount raised makes 12.50 euros.

Lastly, the organizers further continue to manage the community in Slack to provide a central place for information and exchange: “Slack remains the linchpin of the #wirvsvirus community! We will therefore continue to support the virtual location of the #wirvsvirus hackathon until around June (3 month after the hackathon weekend)”. (WirVsVirus 2020v). The community is the core resource of the hackathon and keeping it alive fosters further spillover effects. The community managers engage in a number of actions to update and maintain the community. For instance, about a month after the hackathon, the community management still informs and motivates in weekly news updates: “Currently we have about 5,000 active members per week - WOW! Over 500,000 messages from members have been sent" (WirVsVirus 2020w). In addition, the community management continues to be responsive to inquiries and updates the community via Slack. Many of the teams continue to use the general slack channel for remote collaboration. Also weeks later, we could still see activity in the slack channel "*0#offer_support*” as an indicator for a continued community (management): “Hi, everybody, if a team is still looking for a software developer with experience in backend development and C#, I can help.” (WirVsVirus 2020x). Surprisingly, the community still brings forth new topics: “Are there actually teams here to take care of the worries and needs of pregnant women in the corona crisis? I think we need solidarity here” (WirVsVirus 2020x).

How far will they get?

In Post-hackathon Phase 2, the hackathon impressed by quickly realizing results. On April 10th, the first project was successfully realized when the Federal Employment Agency added one of the winning technologies - UDO, an online tool that helps employers apply for short-term labor grants - to its website. These grants enable employers to reduce employees’ working hours while receiving funding to compensate them for lost earnings.

Though UDO is an add-on to an existing service, its development timeline was still impressively short: about two weeks from conception to implementation.

However, only few projects reached the same degree of rapid development like UDO. One factor that may limit the implementation of other #wirvsvirus projects is the time commitment that participants have to make. Many of the solutions do not represent one-time results, but require further support and implementation of the team. The organizers stressed in the final call "and for all of you who take this seriously, the journey continues" (WirVsVirus 2020y). The official website states: "In order to ensure successful implementation, we particularly recommend a high availability of the team lead (ideally approx. 30 hours per week, if possible). However, each team is best able to judge for itself what is necessary for a successful implementation." (WirVsVirus 2020v). Putting aside personal leisure time and daily duties for one weekend was obviously feasible for many participants, but doing that for weeks or months might pose a significant hurdle. Especially against the backdrop that at the beginning it was unclear to what extent financial support would be provided and given the uncertainty about how the own career and family situation might evolve. It took some time to figure out the details for the financial support. One month after the hackathon the official website does not provide clear information on the financial support: "We are still working on possibilities for further financial support for the Solution Enabler Program, which will allow us to provide explicit financial support for the teams in the form of scholarships and implementation costs if required." (WirVsVirus 2020a).

A while later, the hackathon organizers published a press release that the Ministry of Finance (BMBF) would fund 34 projects with about 1,6 Million Euros and that the hackathon organizers were able to raise money for 16 individual scholarships (6000 Euro for three months per person each) (WirVsVirus 2020z).

Epilogue: Crisis enabled Open Social Innovation

The urgency of the COVID-19 crisis put pressure on the Federal Government to find new ways of communicating and working with citizens. Driven by this urgency, the Federal Government announced its support for the hackathon ideas in the early pre-launch phase. Even though at the beginning and during the hackathon, nobody knew how extensive the support needs to be, politicians pledged their support and entered a highly unusual collaborative setting.

State secretary for digitization, Dorothee Bär announced shortly after the main hackathon phase: "For promising projects we are also happy to take over sponsorship" (Bär 2020b). Further statements by Helge Braun, the head of the Chancellery, and Frank-Walter Steinmeier, the Federal President, backed the hackathon's results. The hackathon was under the official auspices of the head of Chancellery (Braun 2020). In a public speech the Federal President announced: "This weekend, over 40,000 of you virtually put your heads together and developed hundreds of creative solutions to the worries and hardships of this time of crisis. All of you are the heroes in the Corona crisis.". At the award ceremony, the organizers once again declared the political commitment: "partnerships are extremely important [...] the ministries and authorities will provide support where they can and will also be mentors, that means you don't have to make the solutions big on your own and, last but not least, we are there to provide financial support" (WirVsVirus 2020aa).

The reasons for the government's unusual and risky engagement are as of yet unclear, but we suppose they lie in two broad areas: First, the crisis demanded creative solutions and the hackathon offered an attractive tool. It was also one of the few, if not the only instance, when societal and policy action could be framed in a positive light in a public discourse, which as in many other countries was mostly negative. The media reporting we screened in fact suggests that the hackathon offered an opportunity to introduce a positive turn in a tense situation. Second and as outlined in the introduction already, the German state has been wrestling with a lack of speed and innovation as regards the process of digitization. The hackathon not only offered the opportunity to set a counterexample, but also to test out new processes of collaborative innovation, social problem solving and higher degrees of citizen participation.

DISCUSSION

The #wirvsvirus Hackathon stimulates discussions and topics for future research in four areas at the intersection of the social innovation and openness literature: (1) the role of technology, (2) the role of crises and individual agency, (3) moderators of joint action, and (4) effects of formalization in open social innovation.

The role of technology in open social innovation

The idea generation phase of #wirvsvirus was arguably messier that that of other documented open innovation processes (Lifshitz-Assaf et al. 2020). This was not only because of the number of participants, but also due to the multiplicity of challenges to be

solved and the diversity of participant backgrounds (e.g., not only professionals from a similar sector). These circumstances provoked a large number of issues the organizers had to cope with in governing the processes of the hackathon by means of technology.

First, many unexpected difficulties arose (such as registering such a high number of participants on Slack), which led to considerable delays. Delays were also produced when setting up teams and getting them to actually work on the challenges. However, in open innovation it is important that potential members can self-select according to their motivation and skills in projects (Afuah and Tucci 2012, Baldwin and Clark 2006). The organizers realized this fact and despite the challenges they confronted, maintained this policy. Mentors and moderators as a "human factor" were crucial to steering this process (see also Langner and Seidel 2015).

Second and in reaction to the unexpected shifts, the organizers had to adapt their communication quickly. As common in hackathons or open source projects (Shaikh and Vaast 2016), transparency was one of the guiding principles. While the different communication channels used by the organizers increased their communication's reach, it also led to inconsistencies in communication, which created confusion. This confusion and irritation could only by constant explanation and justification, honest and credible behavior including apologies for unintentional misinformation, as well as mobilization of the community character of the endeavor and compassion on the side of participants.

Third, transparency to allow participants to execute their tasks and coordinate action with others (Puranam, Alexy and Reitzig 2014) was even more difficult to uphold at all times, which led to a significant amount of friction. For example, not all participants were familiar with all of the technology. Several types of technology were used alongside, which at times created more confusion than it aided the process. Resolution of conflicts or friction in the work process could only be resolved as a function of the self-regulating capacity of the teams.

Limited human capacity of managing a process of this size and simple mistakes resulting from this circumstance played a role in producing problems and challenges in the process, but also the restrictions that even the most recent technology brings when it comes to administering processes of this size. At the same time, it was exactly the interplay between human agency (for example honesty, mutual help, compassion) and the application of the full range of available technologies, which enabled the governance of such a highly complex process. Technology and social innovation are often only used as a counterpart in the current literature to explain the differences between innovation

processes leading to one or the other (Edwards-Schachter and Wallace 2017). Future studies instead could turn more to the intersection between the two, for example how technology is employed in order to create social innovation. On the other side, aspects that are not much at the center of open innovation are those of engagement and community building, which were particularly crucial in a setting with no external incentives other than to help others deal more effectively with the crisis. How could these driving forces be combined and harnessed to garner solutions to other grand challenges?

Crises and individual agency as enablers of open social innovation

#wirvsvirus has shown that realizing a project that most would have deemed impossible at the outset, namely engaging +26,000 people in a hackathon, and one where diversity of participant backgrounds was likely higher than in corporate hackathons for instance, requires a critical degree of familiarity between the initiating organizers. Although connections between the initiators were not uniformly strong, each organization had some individual ties with other initiators. Some organizations were also enablers of connections to governmental stakeholders. So, there is an element of path-dependency even in this seemingly spontaneous, almost random event. Similar patterns have been observed when studying innovative partnerships in work integration for example (Leca et al. 2018). In the case of #wirvsvirus, however, there is clearly a strong element of "path creation", where circumstance do not lead to a pre-determined state but are shaped by the actors (Garud, Kumaraswamy and Karnøe 2010). A specificity rarely observed, or potentially neglected, in the respective research is the role of individuals in shaping pathways. A major but latent influence was exerted by individuals designing and shaping the hackathon. This applies on the side of the initiators (especially the narrative of how three members of the organizers developed the idea of the hackathon in a colloquial chat), but also on the side of policy makers. Looking at it from outside, one had the impression that those individuals were almost acting on their own accord, and detached from their usual institutional confinements. It stands to reason that the crisis situation enabled these individuals to act more freely and rapidly than usual. We have for example observed how the German government deviated in speed and risk-taking from its usual behavior, or how the civil society organizations, while otherwise only more loosely connected, entered collaboration, which required particular initiative on the leadership level. While crises are typically seen as destructive forces and sources of deinstitutionalization (Davis, Diekmann and Tinsley 1994; Ruef and Scott 1998) – which COVID-19 inarguably is on

many levels—this observation stresses their potential enabling effects for motivating and permitting individual agency outside the usual confines of decision-making.

Moderators of joint action in open social innovation

We have seen a critical role of the civil society organizations as initiators of the hackathon, but also the enabling role of policy makers that were giving the hackathon legitimacy, visibility and eventually resources. The vital role of these components and the achievement of mobilization in these areas through collaboration is stressed in the social innovation (Cajaiba-Santana 2014; Ometto et al. 2018) and open government and innovation literatures (Afuah and Tucci 2012; Jeppesen and Lakhani 2010; Hilgers and Ihl 2010). More explicitly, however, our insights connect to recently established streams in the social innovation literature, which stress that civil society organizations are essential in particular in the early stages of a social innovation process for two reasons (Krlev et al. 2018): First, they are often characterized by a high degree of openness and connectivity, making them ideal brokers. Second, they have a strong reach to target groups—here into the population, which was crucial for mobilizing not only participants for the hackathon but also moderators and mentors. The character and diversity of the civil society organizations initiating and organizing the hackathon might explain the wide reach and high number of participants, as well as diversity of moderators and mentors, the hackathon was able to attract. The initiating organizations offered a broad spectrum of competencies with the combination of a focus on technology by some and innovative responses to social challenges by others serving as the linking device. Future research could look into how these characteristics compare to other hackathons such as the one in Estonia which was conducted before #wirvsvirus, or #EUvsvirus which was conducted after, and what effect different constellations might have had on the process and effects of the hackathon, including its public perception. Krlev et al. (2018) furthermore show that as social innovations mature, which in the case of the hackathon happened at unusually high pace due to the acceleration program, “more resourceful” actors typically need to step in to lift the innovations to a higher level. The instant success and inclusion as institutionalized practice of the UDO app, or the financial commitment to invest in projects with high impact potential, are examples of the enabling effects of joint action in social innovation. However, the trajectories of the supported projects offer an anomaly in the sense that they have been selected in a structured process and are now fostered by engagement of external stakeholders. Usually in social innovation such a process would

happen more organically (Pel et al. 2020). This provokes the question: Do these types of governed and directed social innovation processes differ from "more natural" ones?

Formalizing an open social innovation process

Fast action, and almost unconditional backing of an open-ended process, was not only focused on providing quick hacks or responses as prevalent in technology hacking (King and Lakhani 2013), but that policy and a wider stakeholder network decided to support the hackathon and its outcomes to form lasting solutions to current challenges. The coordinated process by which this was done, however, resembled established institutional habits and practices much more than it did the initial character of the hackathon. What we observed as gradually evolving in the post-hackathon phases were instances of formalization that narrowed down scope (condensation of challenges into five topic areas) as well as selection mechanisms that provoked unintended gatekeeping in the selection process by experts. For example, missing diversity in the jury and a focus on newness and proficiency in the presentation of project ideas have biased the selection of projects that went on to the solution enabler. First, this has led to a practical neglect of relevant as underlined by the fact that not a single e-learning project was awarded. The civic hackathon literature points out that being attentive is critical for hackathon success. For example, Vakil and de Royston (2018) document how a hackathon aimed at resolving societal issues reproduced inequality; i.e. despite having similar solutions, the solutions of less privileged kids were neglected in favor of a solution from kids with privileged background. Second, the undermining of the crowd-based character of the hackathon, through the structured process may have damaged its legitimacy to some extent as we would expect from the social movement literature, where continuous engagement of the community can serve to push a certain practice by making it a social norm (Carberry et al. 2017). It was hard to establish clearly whether the cancellation of the public voting contributed to reinstalling legitimacy or further undermined it. Formalization overall may also have impeded the evolvement of "robust action" (Ferraro, Etzion and Gehman 2015), referring to the sustained engagement of multiple stakeholders. Finally, while many initiatives struggle to widen actor coalitions via crowdsourcing (Porter, Tuertscher and Huysman 2019), the hackathon might have missed the chance of embracing and carrying forward its initial inclusivity. While community was stressed as an essential part of the hackathon, even when moving into the post-hackathon phases, institutionalized support of a selected number of projects has gained precedence over time, making it difficult for the organizers to hold the community together and maintain or rekindle momentum in it.

At the same time, formalizing along the hackathon's "funnel" might have been a necessary step inherent to any open innovation process or crowd-based venture. There are examples of crowds such as Wikipedia that manage to uphold multiplicity while maturing and still innovate (Powell 2017). The more traditional view, however, is that open innovation systems must decide whether to open idea generation, idea selection or both, and that the mechanisms by which they govern either will differ (King and Lakhani 2013). In the #wirvsvirus hackathon the open idea generation phase was followed by a closed idea selection phase to regain control. The interplay between inclusivity and flexibility on one side and formalization on the other are still understudied in social innovation research, and open yet directed processes such as represented in #wirvsvirus, but also smaller scale organizational hackathons and similar formats during the COVID-19 crisis offer fertile grounds to enhance our understanding.

CONCLUSION

In this article we sought to shed light on the organizing challenges of the large-scale open social innovation initiative – the #WirVsVirus hackathon and its aftermath. Our results suggest that the organizers' unique approach to bringing together stakeholders from various societal domains is a viable option to stimulating social innovation. Some studies point out that although hackathons create a lot of enthusiasm, evidence of implemented projects after the hackathon is scarce at best (Johnson and Robinson 2014; Granados and Pareja-Eastaway 2019; Sastry and Penn 2015). While this does not seem to be the case here, more research is required to study the impact of initiatives such as the #WirVsVirus hackathon. Yet, we also need to better understand the boundary conditions of such initiatives. Such an approach is needed to address the criticism questioning whether this trend of applying organizing practices originating in Silicon-Valley and tech communities in other domains (Bodrožić and Adler 2018) is suitable for resolving societal issues at all. The concern is that the mindset that technology can resolve everything is too narrow to come up with solutions for complex societal problems (cf. Schrock, 2020). Hence, future research needs to uncover under what conditions the #WirVsVirus project in particularly, but also other (crisis) hackathons in general, can contribute to the emergence of projects successfully addressing societal needs. We hope this first analysis builds a solid foundation for others to build on.

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