Complements: Introduction

Peter Troxler

After having completed my initial submission, I asked a few friends and colleague scholars to shed a different light on the data I presented and my interpretation of it. Four of them found the time to add their perspective to the matter. Thanks go to:

- Cristine Dyhrberg Højgaard (Copenhagen Business School) who looks at the organisation of peer production as collective civil action,
- Yana Boeva (University of Stuttgart) who highlights developments in Germany, and particularly to whom innovation gets attributed,
- César García (La Hora Maker) and David Cuartielles (Malmö University) who describe the specific development of the Corona Virus Makers initiative in Spain.

Comment on Plan C – 'Makers' response' to COVID-19

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In this comment, I address the theme of transition from the perspective of the organization of peer production in the described COVID-19 responses, rather than the inquiry into transition of the dominant sociotechnical regimes, which Troxler's article scrutinizes. I suggest that the radical innovation of the COVID-19 response amongst makers, is that it transforms what is understood as collective civic action. Whereas some literatures see the dynamics of distributed manufacturing and design, which these responses are based on, as representing 'a nonmarket sector' alternative to market and state (e.g. Benkler, 2006, p. 7), I instead approach it as an alternative way of performing collective civic action. As Yochai Benkler noted, the networked information economy enhances *capacity to do more in loose commonality with others, without being constrained to organize their relationship through a price system or in traditional hierarchical models of social and economic organization* (p. 8)*.* These loose commonalities organize differently than the formats typically cherished in civil society policy. Yet in spite of this, they perform civic action through the entanglements they enter into in their practice of covid-19 response. I will argue that this way is radically different, when it comes to the subject of accountability.

As I shall illustrate below, I find that the vocabularies typically applied in civil society literature are not adequate to capture the mode of organizing in loose commonalities. Therefore I approach the phenomenon with a performative perspective on practices (Chia & Holt, 2008; Gherardi, 2019; Nicolini, 2009, 2013), as meaning-making and order-producing activities, through which the world transpires. In this perspective, collective civic action does not have predefined ontological status but is continually constituted in social situated processes. Inspired partly by Lichterman and Eliasoph and partly by Kjølsrød, I define collective civic action as *coordinated ongoing action that addresses societal concerns* (Kjølsrød, 2019, p. 24; Lichterman & Eliasoph, 2014, p. 809). With this performative perspective we can conceive of collective civic action, which is produced through variated procedures, aims and engagements (Egholm

et al., 2019; Egholm & Kaspersen, 2021). I use this approach to move beyond the confinements of concepts and assumptions normally applied in civil society literature.

The first assumption of the civil society literature, that the COVID-19 maker response does not fit, is the sector divide that for so long has been foundational of the definitions of civil society (Egholm & Kaspersen, 2021, p. p 4ff). Instead, in the data from the Plan C panels presented in Troxler's article, we see that private enterprises, public institutions and individual home-based makers enter into joint coordinated venture to address the social concerns of reducing covid-19 exposure. This leads us to the second assumption, which regards the organizational formats of collective civic action. The Plan C panels portray a mode of organizing that is non-profit, non-hierarchical (at least not in a formalized sense) and decentralised. This decentralised mode of organizing emerges out of simultaneous actions on various platforms, which all aim to share knowledge and secure coordination. This is done by connecting decentralised actors – consumers, design developers, printers and distributers - in what some of the panelists describe as an 'open production line'. This type of organising exposes the limitations of two dominant conceptualisations of civic action, namely voluntarism and activism, because the aims of the COVID-19 responses resemble those of volunteering and organisation in loose commonalities of activist social movements. Definitions of voluntary action often include a formal organizational setting (e.g. Fridberg & Henriksen, 2014; van Daal, 1990, p. 7), and research in the field of volunteering has overtly focused on engagements in formal settings (Egholm & Kaspersen, 2021, p. 8). Meanwhile the non-hierarchical way of organizing in these COVID-19 initiatives more closely resembles that of activist social movements. However, social movements are typically characterized as sharing a contentious political message, that argues for structural change (Eliasoph, 2013, p. 44ff), which does not appear to be the central feature of these COVID-19 responses. To be sure, practicing peer production can and has been argued to be activist in a prefigurative sense, where actors reflect the change they want from the world in their own actions rather than by advocating for such changes (se for instance Lindtner et al., 2016; Taylor et al., 2016). However, from the data in Troxler's article it does not seem that such prefigurative action is the core aim of the initiatives. Instead the strong emphasis the panels put on the developed designs and scale of output, indicate that these responses are centered around solving a concrete problem – a

characteristic that Eliasoph describes as inherent in volunteering (Eliasoph, 2013, p. 40ff).

In short, new ways of organising do not appear to match old ways of conceptualising. A performative perspective on practices, however, can better help us understand these COVID-19 responses by inquiring into what these practices do in socially situated processes. I argue that the practices of the maker responses were evoked as collective civic action, by means of their close interactions with formal entities. Formal institutions entered into these initiatives in the roles of manufacturers, donors of filament, co-developers, consumers and, in some instances, regulators grating CE approval. These interactions were however not necessarily formalized in contractual partnerships, so esteemed in modern civil society policy (Babiak & Thibault, 2009, p. 119). Rather they were ad hoc entanglements in continuous development. These entanglements produced such loose commonalities as performing collective civic action, notwithstanding that their loosely organized structure counters the formal organizational formats cherished in civil society policy (for examples from Danish policy context see Grubb & Henriksen, 2019; Højgaard, 2021). Such practices reproduce civil society in a slightly different way, because they challenge some fundamental dynamics with regards to the ideal of accountability.

In formal organisations, accountability is enabled via written or otherwise explicitly recognised or prescribed limits to work roles. Through these roles, members know what decisions they are authorized to make and be held accountable for (du Gay & Vikkelsø, 2016, p. 12). Correspondingly, in the representative democracy of civil society associations, elections allow members of a community to hold the actors that make decisions on behalf of that community responsible. To the contrary, in the loose commonalities of distributed design and manufacturing, authority is not granted via elections or clearly delegated authority. Aiming to adjust accountability theory to these non-hierarchical relations, Blijleven argues that in a commonality of self-organization, the purpose of accountability must be to contribute to self-organisation (Blijleven, 2016, p. 45). Hence, a lack of ability of the group to accommodate to participants' concerns about unsatisfactory effect or processes should ideally lead to those participants acting differently – either within or outside the group. The inference of that is, that loose commonalities are not necessarily coherent, since variations might develop within them. And hence they fluctuate, since the aims and processes can change not through collective decision but simply

through divergent action. This threatens external accountability, since stakeholders cannot be completely sure what to expect from such commonalities (se also Blijleven et al., 2019; Kornberger et al., 2017). The same goes in the entanglements of the responses described in Plan-C. Consenting to engage in these non-accountable entanglements is quite a different way of practicing civil society than through formal partnerships and public support schemes, which weave voluntary engagements into a regulatory frame, through which the organisational constellations and target groups addressed in the sector are shaped (Grubb & Henriksen, 2019).

In sum, these COVID-19 crisis responses represents a transition, because their practices perform civic collective action in a way that cuts across distinctions typically applied in civil society policy, and breach with norms of accountability. The fact that some initiatives did not last long is not necessarily an indication of them not being transformative. One might contemplate if perhaps it is even a defining component in such loose commonalities, that their collective action is episodic - a surging flow that de- and in-creases over time. Furthermore, from a performative perspective of how this transforms what constitutes collective civic action, it is of lesser importance whether responses focused on producing the simpler Prusa face shields or more complex products, than it is in Troxlers' inquiry into a potential transition of the dominant sociotechnical regime. What the initiatives did was to give occasion for public institutions, administrations, hospitals, universities, schools, government bodies, and private business to entangle in a loose commonality and via this produce it as a legitimate format for collective civic action.

That these loose commonalities were evoked as collective civic action has implications for a grander social transition in two ways. First, because it potentially enables a similar trajectory for other initiatives in the broader trend of more loosely organized collectives in civil society (Dobusch & Schoeneborn, 2015 p. 1005; Grubb & Henriksen, 2019, p. 1; Hustinx & Lammertyn, 2003, p. 176; Stolle & Hooghe, 2005, p. 159), of which the loose commonalities of distributed design and production are one variant. Such entanglements between formal organisations and loose commonalities are imperative, if we are to leverage all the engagements that are pushing for transformation towards more sustainable ways of living. Second, by way of these changes in what formats that can constitute collective civic action, we would also be moving towards a society where contributions to the commons are more valued, which in turn can

contribute to relocalisation and degrowth. Obviously, the context of the COVID-19 crisis might have made the formal partners more agreeable with regards to engaging in unusual organisational formats in this particular case. Time will tell if such reiterations of collective civic action will continually be enabled in less extreme contexts. Nonetheless, it certainly has brought attention to the merits of such entanglements.

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Responding on the German institutional and industrial "makers' response"

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Like many of us, my interaction with the "maker's response" to Covid-19 was informed by my research network on peer production which is drawn from previous research on maker cultures. I barely study maker cultures anymore, but still follow the so-called "makers' response" in different media accounts. The first ones obviously included the DIY communities in Italy and Spain or the creation of the Prusa medical shield in the Czech Republic. The local peer network response there seemed unquestionable given Italy and Spain's grave situation in the hospitals as well as their strong participation in DIY open health initiatives oriented towards inclusivity and care (e.g. Milan's makerspaces WeMake and OpenDot have been involved in DIY health projects for five years now). Prusa's openly distributed files and manuals for 3D printing further illustrated how opening up peer production might enable "everyone" to participate in this collective, global struggle.

Handling the Prusa files and 3D printing the shield parts, however, was less straightforward and accessible as the "maker movement" likes to propagate. Indeed, an acquainted university innovation center struggled to produce the PPE shields by themselves without the support of the university's engineering design department, ending up fully outsourcing the task. Instead, they focused on establishing and coordinating a partnership network with local research institutes, companies, and hospitals (LEONARDO-Zentrum 2020), as also described in the "Plan C-Live" panel. Similar developments repeated across Germany. Simultaneously, Germany's largest industrial corporations, known for their mechanical engineering and automotive products, reorganized production lines for hygienic solutions or pushed their R&D departments to design other Covid-19-related solutions. For instance, three weeks after the first curfew and restrictions Bosch had developed a Corona quick-test (Bosch 2020). This seems unsurprising knowing that many German companies like Bosch or Siemens were providing technical solutions for the healthcare sector before the pandemic.

What seemed surprising was the public attention institutional and corporate undertakings in response to Covid-19 were receiving from broader media.

Although my peer production social media feed continued showing varied responses from non-profit maker communities and makers, institutional social media accounts, newsletters, or newspapers were heavily reporting on solutions from institutions, companies, and their makerspaces, innovation hubs, or R&D departments. Control over public relations and outreach size still matter but not exclusively. While the broader media attention drawn by the first examples from Italy, Spain, and Prusa was quickly enlisted into the public relations strategies (on innovation) by universities, research departments, and corporations, I argue that particularly in the German sociotechnical and economic context there were two other relevant factors for this development.

The first factor is the "right timing" for response if there is anything like that in a pandemic. Owing to Germany's academic calendar, however, the major closure of shops, schools, and other non-essential activities took place in the midst of the term break. In addition, all universities jointly postponed by a few weeks the beginning of the summer term to 20 April 2020 in order to prepare for online learning. Despite many university employees being in home offices, access to research labs and facilities was not entirely ruled out if specific hygienic measures were followed. The fact that the pandemic-mandated closure occurred in a lecture-free time and also extended for a few more weeks, resulted in some available resources allowing for the production of PPE shields. Drawing upon Prusa's open data, on the fact Prusa is also the most popular 3D printers in research environments, and on the close partnerships with industrial partners from the automotive, aerospace, and engineering applications, for instance, my home institution quickly established a scalable production line to support local hospitals (University of Stuttgart 2020). Given 3D printing's slow printing pace, scaling up production to equal industrial amounts and standards requires a coordinated endeavor in the end.

This brings me to the second factor specific for Germany, namely the country's protracted response to change and still very traditional interpretation of innovation. As a global economic and industrial powerhouse, Germany continues to perceive innovation as the result of its manufacturing and engineering strength. Built on a longer tradition of engineering expertise, knowledge frameworks, testing facilities, and imaginations of precision and efficiency, thus resulting in certified products valued for their "German" quality, the cultural and social barriers to innovation, digital transformation, as well as other societal crises appear bigger than elsewhere. New spaces for peer production and the

"new economy" approaches are preferably institutionalized within innovation hubs, in universities, and further stabilized through government funding policies (see Baybrooke & Smith 2018, JoPP issue 12), thereby making it more difficult for non-profit spaces to deliver broadly accepted solutions – echoing Anke Domscheit-Berg's comment.

A year into the OVID-19 pandemic, my intention is not to belittle the contribution and amounts of voluntary effort of all academic and corporate employees providing COVID-19 healthcare solutions. Instead, I want to draw attention to a problem that continues to exist and consolidate even in a pandemic. I refer to the infrastructural and media co-optation of peer community work, whatever that might entail, into the service of corporations and institutions. Societal resilience based on a do-it-together ethos, community sense, and diverse actors involved in peer production requires more than policies and funding schemes that primarily target profit-oriented actors or public institutions which likely reproduce conventions. What responsibility do we have, a corporate or a societal, for instance in a publicly-funded education system such as in Germany? Should institutionalised makerspaces and research institutes reach out to local non-profit makerspaces to establish production networks first? Certainly, local spaces can barely match up the production capacities of companies and their R&D innovation centers if this all we want to achieve through peer production. Our responsibility as researchers and academics, I believe, is also to channel public tax money and corporate funds towards smaller non-profit initiatives in a distributed network sense via our research activities and thus to ensure societal resilience.

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Coronavirus Makers and citizen science

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Coronavirus Makers - emergent group manufacturing in a distributed fashion

Coronavirus Makers (CVM) is an initiative emerging in Spain during the early days of the Spanish COVID-19 lockdown and state of emergency in March 2020. Several members from different DIY communities, after a public exchange of messages on the Twitter social network, decided to move the conversation to faster communication channels, namely the Telegram social network. Through oral communication, just in a couple of days, more than 10.000 people were exchanging opinions and tips about ways to fight the pandemic through their skills and using their personal tools.

The community's first goal was the creation of ventilators to improve the availability rates of such machines at Spanish intensive care units in hospitals. The initial designs by the community mixed existing materials at hospitals, like Jackson-Rees manual breathing system and intubation equipment, with DIY elements, such as 3D printed parts and open hardware electronic components. However, the size of the group made people specialise and join smaller groups, devoted to different types of tasks, mainly the creation of personal protective equipment (PPE). Besides the self-organisation that happened in terms of what to do, there was a second way of organising work looking at which steps in the process to take care of. Some teams went into designing physical elements or software, others focused on production, and yet another set of groups took care of logistics of both materials and manufactured goods.

At the time of reaching the pandemic's first peak, CVM's Telegram main discussion channel grouped over 16.000 people involved in the creation of solutions to fight COVID-19. The majority of participants, and thus the majority of the groups working within CVM, were 3D printing enthusiasts. They put their machines to the production of PPEs. Other groups, however, were devoted to

research and development (R&D) work, investigating how to create better designs, the scientific evidence to support these creations, optimising the use of materials while still respecting the minimum regulatory aspects. Such groups included people with experience in various fields like medicine, mechanical and electrical engineering, software design, etc. The open question for research is how could such a large group of people self-organise in such a short time? Which were the conditions that lead thousands of professionals to focus in the creation of these citizen driven innovations? And, more importantly, how did society in general react against the pandemic? Did society accept the solutions proposed by CVM?

Previous 3D printing ecosystem (DIY spaces) and competences

Spain has a strong Do-IT-Yourself (DIY) culture and heritage. Starting with hacker culture in the 1980s, Spain has witnessed a techno-ideological transition when it comes to meeting spaces for people with interests in DIY. From the initial hacklabs which popped up in the big cities, we have ended up with fab labs located almost anywhere, passing through makerspaces, and after school programmes in robotics, programming, and 3D design for kids and youngsters.

This distributed technological knowledge ecosystem has brought the creation of industry, fostered academic research, and -more importantly- has brought digital manufacturing to people's homes, schools, and vocational training centres. Therefore, it doesn't come as a surprise that the civic response to the challenges presented by COVID-19 were not just of a social nature - where neighbours help with daily chores or caretaking of elderly and kids - but included a strong technologistic component once people started manufacturing PPEs from their living rooms to share them with those sectors of society in need; medical professionals being the number 1 recipients of the outcome of this distributed manufacturing effort.

Among the skillset of the Spanish DIY communities we find 3D printing, basic digital electronics, mid-level software programming, the ability of creating and maintaining websites, management of software repositories and other collaboration platforms, and the design using computer aided design (CAD) tools, but also techniques coming from arts and crafts like woodwork, metalwork, or sewing.

Governance: geographically organised production, original and replicated open projects

As mentioned above, CVM responded to the pandemic by setting up a distributed-type organisation. The governance mechanisms emerged when needed, nothing was planned in advance. The management structures included regional groups where anyone could participate. A national coordination group was created where all regions were represented with one or two members. During the moments of bigger need, the group would meet on a daily basis to share information, tasks, contacts, and resources. This structure helped the dissemination of material donations and solidarity among regions. It was instrumental in moving large amounts of raw materials, manufactured PPEs, and even people. It is thanks to the existence of this coordination group and the collaboration of thousands of volunteers that CVM got to manufacture and distribute over one million face shields.

In parallel, the different R&D groups continued to collaborate through Telegram. Sometimes the same solution would be prototyped in parallel by different groups to ensure a higher degree of success. Sometimes the disagreement in features around the design would get people to split and try different approaches. In order to avoid possible errors that could show because of such a redundant design organisation, yet another governance structure emerged. A so-called coordination group worked in decision making around resource sharing and future needs around R&D. This group would analyse new academic publications as well as news on the topic of the pandemic on a daily basis and report to the different Telegram groups. The coordination team focused also on validation processes; CVM has no legal entity which represents a challenge. Other topics covered by the coordination group included knowledge transfer to companies that could scale up production, institutional relations, communication with the press, and proposals for a sustainable model for CVM in the long run like the creation of a non-governmental organisation and a way to handle finances.

Makers respect the scientific method

As mentioned earlier, CVM includes many scientists, engineers, or medical professionals. Being in contact with highly-educated professions, it comes at no surprise that academic journals were systematically scanned for information by different members within the community. The makers would look for practical

implementations of ideas suggested in academic papers in an attempt to firstly produce valid solutions for the medical professionals, and the society in general secondly. The makers would look for a balance between cost and the capabilities offered by their tools.

There are many examples of conversations, sometimes turned into long online arguments, about the validity of the assumptions made on the many papers the CVM R&D coordination team went through. Some papers were contradicted overnight by new findings and forced full lines of work to be abandoned. Some teams made their own decisions and would not necessarily follow the advice of the coordination group. These are the challenges of distributed systems. Multiple viewpoints, information unequally distributed, unfitted communication mechanisms, and limitations in skills and tools consumed a lot of the time and sometimes challenged the basic premise of following the good old scientific method. In retrospect, large universities, research consortiums and the like, forced to work at a much higher pace than usual faced similar challenges. CVM was a reflection of the rest of the world, only working from home.

Flexible logistics and collaboration

One of the main aspects behind CVM's interventions has been flexibility, understood as the ability to change the course of a planned set of actions, or the realt-time change of contributors according to the personal skills of each individual. Despite being locked at home, or maybe because of that, personal circumstances were very influential in the way people could participate in different actions. These always changing personal conditions, required an unconventional mechanism for belonging to the group and being made responsible for things. Information had to be contained in multiple places in the organisation, people should be brought up to speed in no time, and everyone should be ready to move on and let go if things were not working as expected.

At a macro-level, the overall regulatory and legal framework was also changing. On the one hand, the national and European governments were constantly revisiting regulations -like the temporary cancelation of the CE-marking requirement for the purchase of medical equipment. On the other hand, CVM's collaborators -namely companies donating materials or services to the cause- could go bankrupt at any time, leaving CVM without materials or logistic capabilities overnight. Circumstances forced a constant non-stable equilibrium of sorts: decisions that could help save the situation one day, would not work the

day after. In terms of innovation language, makers were in a constant bootstrapping process that lasted over 100 days. The fictitious CVM startup fought, with success, for having the best go-to-market strategy, while waiting for the other institutions in society (government and companies) to regroup and launch their own offensive against the pandemic.

Formalisation and institutionalisation

The need for official validation of the generated products, and the lack of a sustainable structure became an ongoing debate among the members of CVM. The group followed an assembly-driven conversation that showed how a fraction of the members were interested in having CVM to continue in some form beyond the pandemic, while others preferred to end their volunteer work when the state of emergency should come to an end. Knowing the limitations, CVM took the basic steps to spin-off a non-governmental organisation (NGO) to continue activities beyond the pandemic. The only condition for its formation was that the name of Coronavirus Makers should remain untouched by the institution. It should remain as a techno-social movement limited in time to fighting COVID-19. The new NGO was instituted by the end of the Summer of 2020. About 1% of the members of CVM joined this new structure called MasQueMakers -meaning "more than makers" in English. What will happen with the NGO is subject for further research as its history has not been written, yet.