

# Knowledge co-creation in participatory policy and practice: Building community through data-driven direct democracy

Big Data & Society  
January–June: 1–6  
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DOI: 10.1177/20539517211019430  
journals.sagepub.com/home/bds

Myron A Godinho<sup>1</sup> , Ann Borda<sup>2</sup>, Timothy Kariotis<sup>3</sup> ,  
Andreea Molnar<sup>4</sup> , Patty Kostkova<sup>5</sup> and Siaw-Teng Liaw<sup>1</sup>

## Abstract

Engaging citizens with digital technology to co-create data, information and knowledge has widely become an important strategy for informing the policy response to COVID-19 and the ‘infodemic’ of misinformation in cyberspace. This move towards digital citizen participation aligns well with the United Nations’ agenda to encourage the use of digital tools to enable data-driven, direct democracy. From data capture to information generation, and knowledge co-creation, every stage of the data lifecycle bears important considerations to inform policy and practice. Drawing on evidence of participatory policy and practice during COVID-19, we outline a framework for citizen ‘e-participation’ in knowledge co-creation across every stage of the policy cycle. We explore how coupling the generation of information with that of social capital can provide opportunities to collectively build trust in institutions, accelerate recovery and facilitate the ‘e-society’. We outline the key aspects of realising this vision of data-driven direct democracy by discussing several examples. Sustaining participatory knowledge co-creation beyond COVID-19 requires that local organisations and institutions (e.g. academia, health and welfare, government, business) incorporate adaptive learning mechanisms into their operational and governance structures, their integrated service models, as well as employing emerging social innovations.

## Keywords

COVID-19, digital participation, public participation, community engagement, citizen engagement, e-democracy, internet of things (IoT), legitimacy, public institutions, social capital

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While the COVID-19 pandemic has highlighted the danger and scale of the infodemic, digitally engaging citizens in knowledge co-creation has become an important strategy for COVID-19 policy responses (Gilmore et al., 2020). This aligns with the United Nations’ agenda to encourage the use of digital tools as mechanisms of direct democracy for achieving the Sustainable Development Goals by 2030 (Le Blanc, 2020). ‘Direct democracy’ entails the direct participation of citizens in policy decision-making, unlike ‘representative democracy’ (Clarke and Foweraker, 2001). Recognising that many participatory interventions for COVID-19 are yet to be fully evaluated, we draw them together with previous research and theoretical

<sup>1</sup>WHO Collaborating Centre for eHealth, School of Population Health, UNSW Sydney, New South Wales, Australia

<sup>2</sup>Centre for Digital Transformation of Health, University of Melbourne, Melbourne, Australia

<sup>3</sup>Melbourne School of Government, University of Melbourne, Melbourne, Australia

<sup>4</sup>Department of Computer Science and Software Engineering, Swinburne University of Technology, Hawthorn, Australia

<sup>5</sup>UCL Centre for Digital Public Health in Emergencies, University College London, London, UK

## Corresponding author:

Myron A Godinho, Faculty of Medicine, WHO Collaborating Centre for eHealth, School of Population Health, UNSW Sydney, NSW 2052, Australia.

Email: [m.godinho@unsw.edu.au](mailto:m.godinho@unsw.edu.au)



literature into an evidence-based framework which explains how citizen ‘e-participation’ in knowledge co-creation across the policy cycle can address info-demic issues of mis/disinformation, the legitimacy of democratic institutions and social capital (Khemani, 2020). In doing so, we can collectively build resilience, accelerate post-pandemic recovery and facilitate the ‘e-society’.

### **Unboxing the convergence of ‘data’, ‘participation’ and ‘policy’**

As the pandemic unfolded, examples of digitally-enabled citizen participation became widely practised (Liu, 2020). Having previously explored the role of digital participation in health (e.g. for policymaking (Godinho et al., 2020b), service co-production (Godinho et al., 2020a) and serious games participation (Borda et al., 2019)), we observe that similar mechanisms enable digital participation for knowledge co-creation in COVID-19 responses, and place several frameworks in conversation with each other to demonstrate this. While definitions vary widely, ‘knowledge co-creation’ is essentially the bi-directional, interactive development of new knowledge, together with diverse stakeholders, e.g. experts and the public (Abbate et al., 2019).

A fundamental concept in information science, ‘knowledge’ is generated by (i) capturing data; to (ii) create information (e.g. aggregating data, structuring, adding context, categorisation); which is then synthesised into (iii) knowledge (i.e. by comparing, contrasting, extrapolating, learning, drawing insights) (Liew, 2007). Various citizen engagement mechanisms can facilitate these data processes for participatory policy responses. Citizen participation is described as a series of progressive levels, beginning with citizens being informed, then consulted, involved, collaborated with and finally empowered (Table 1) (International Association for Public Participation, 2020). Each level facilitates public participation across the policy cycle stages of (a) agenda setting, (b) policy formulation, (c) implementation and (d) evaluation (Jann and Wegrich, 2007).

### **Data, participation and policy: participatory policy responses to COVID-19**

As the table illustrates, several participatory mechanisms are involved in transforming data into information, and then knowledge, to facilitate various policy responses to COVID-19 (Table 1).

### **Data capture, management and analysis**

Data is the raw material from which information and knowledge are derived. Citizens’ engagement with online health alerts produces passive data capture (Australian Government Department of Health, 2020a), while citizen-scientists’ role in participatory surveillance helps to fill gaps in local COVID-19 tracking (active capture) through the use of contact tracing apps, such as COVIDSafe (Australian Government Department of Health, 2020c; Wirth et al., 2020).

Safely storing and managing data is essential; to this end, open data collectives have established guidelines for data governance in COVID-19 responses (GovLab, 2020b).

### **Information generation**

Information is data that is aggregated, organised and structured. Examples of this are online forums where citizens collaborate to contextualise data with lived experiences to generate information for policy (Australian Government Department of Health, 2020b; Open Forum, 2020). Aggregating and merging data from multiple sources can generate actionable information, such as where to send critical resources for healthcare workers, e.g. personal protective equipment and ventilators (Salluh and da Silva Ramos, 2020).

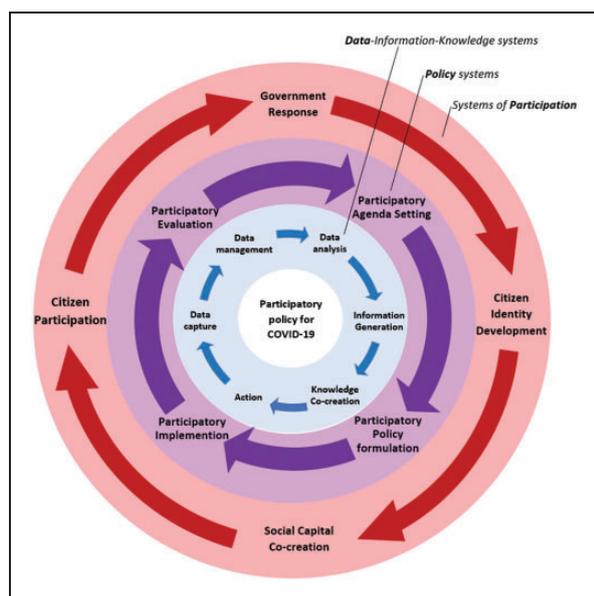
### **Knowledge co-creation**

Knowledge co-creation involves active participation by all partners. The process is facilitated by platforms (both in-person and virtual) for citizens to collectively brainstorm solutions to problems directly affecting them. This has been demonstrated in addressing the impact of COVID-19 on Australian businesses (New South Wales Government, 2020), and among universities (Group of Eight Australia, 2020).

A particularly salient example of how data is transformed into information and then into co-created knowledge is that of ‘open innovation’ in global online hackathons for developing crisis management dashboards, chatbots, heatmaps and even ventilators for COVID-19 response (CoVent-19 Challenge, 2020; Datavant, 2020; Hack Club, 2020). Hackathons leverage digital platforms and open **data** to enable ‘distributed computing’ (Semantic Scholar, 2020). The **information** generated is then used to co-create new **knowledge** in the form of technical solutions (e.g. low-cost ventilators) as well as policy solutions (e.g. in town halls and policy forums) (Seiler et al., 2020).

**Table 1.** Data capture, information generation and knowledge co-creation across participatory policy responses to COVID-19 in the Australian context.

| Participatory mechanism (IAP2)                                                                                     | Public contribution to knowledge co-creation      | Examples of policy responses to COVID-19                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Informed</b> (kept apprised of disease spread, response and developments)                                       | Data (passive capture)                            | Australian Government Coronavirus (COVID-19) health alert (Australian Government Department of Health, 2020a)                                               |
| <b>Consulted</b> (informed, listened to and acknowledged and feedback provided on public input to decision-making) | Data (active capture)                             | Australian Government COVIDSafe app (Australian Government Department of Health, 2020c)                                                                     |
|                                                                                                                    | Information (passive/active generation)           | Australian Government COVID-19 support (Australian Government Department of Health, 2020b)                                                                  |
| <b>Involved</b> (public concerns and aspirations are consistently understood and considered)                       | Information (active generation)                   | Open Forum Australia (Open Forum, 2020)                                                                                                                     |
| <b>Collaborated with</b> (partner with public services in policy implementation and evaluation)                    | Knowledge co-creation (recommendations)           | NSW Government – Have your say: impact of COVID-19 on businesses (New South Wales Government, 2020)                                                         |
| <b>Empowered</b> (entrusting public to decide, manage and co-produce own local pandemic response)                  | Knowledge co-creation (solutions)                 | Technical solutions: Hackathons, open innovation, distributed computing Policy solutions: virtual town halls and online policy forums (Seiler et al., 2020) |
|                                                                                                                    | Knowledge co-creation (planning & implementation) | Australian Universities’ Roadmap to Recovery (Group of Eight Australia, 2020)                                                                               |



**Figure 1.** Data, participation and policy: A framework of interacting systems.

**Data, participation and policy: A framework of interacting systems**

By involving the public in knowledge co-creation, participatory policy can generate public trust and social

capital in a self-reinforcing virtuous cycle (Figure 1). Social capital is ‘a collective asset in the form of shared norms, values, beliefs, trust, networks, social relations, and institutions that facilitate cooperation and collective action for mutual benefits’ (Bhandari and Yasunobu, 2009). The COVID-19 pandemic offers an opportunity for governments and social institutions to use digital tools to rally citizens to a common cause – i.e., eliminating the threat from COVID-19. Citizen e-participation for knowledge co-creation that is met with responsive feedback positively reinforces the individual’s ‘social identity’, motivates greater social participation and generates much needed social capital and knowledge capital (Khemani, 2020; Liu and Chan, 2011). Interactions across cycles also occur; for example, before data capture, it must be decided what data will be considered worth capturing – citizen participation in agenda-setting can play a defining role here (Green, 2019). In the scope of these interactions, there is a developing form of data-driven direct democracy in which the citizen is represented as a key agent in a full cycle of participatory processes. Direct democracy can also serve to sustain and strengthen the linkage between citizens and institutions across data-information-knowledge systems, policy systems and systems of participation (Figure 1), by using a systematic approach to participatory levels (Table 1).

## Additional considerations

To enable an environment that fosters a virtuous cycle of data-driven direct democracy, several prerequisites must be met. These include ensuring data trustworthiness, digital literacy and data privacy and governance.

### *Data trustworthiness*

All data is at risk of bias, depending on its origin, sampling method and data collection (Abreu Lopes and Handforth, 2020). Each data source is prone to its own biases, highlighting the need to triangulate data generated from different sources to build a more comprehensive picture. Even then, the absence of data from the digitally excluded skews most datasets towards representing younger, richer, better resourced and more educated citizens (Ada Lovelace Institute, 2020). Engaging a diverse range of citizens from various walks of life in data capture and creation can better ensure that data is representative of the society it claims to represent.

Being a form of public participation, participatory knowledge co-creation is also contingent on core values and a code of ethics (International Association for Public Participation, 2020), upon which the trustworthiness, (and thus, the quality) of the data depends (Liaw et al., 2020). Without these prerequisites, virtuous cycles can spin out of control and turn vicious, with unintended consequences: the rise of ‘fake news’ has highlighted how easily untrustworthy information can fuel digital participation that erodes social capital (de Zúñiga et al., 2017). This has further implications in the age of artificial intelligence: machine learning systems that are ‘trained’ using biased data run the risk of reinforcing the same underlying inherent biases (Silberg and Manyika, 2019). It is therefore essential that co-created knowledge be used to provide critical feedback on the participatory process of knowledge co-creation itself.

### *Literacy and participation across the digital divide*

Generating social capital requires a fuller understanding of the diverse actor–network relationships in the complex adaptive system, which are bidirectional and interactive (Abbate et al., 2019). A range of varyingly powerful stakeholder groups make different types of contributions through passive and active participation. For example, data can be captured via a passive, top-down approach by a government agency, but a more active approach could comprise a bottom-up, citizen-led initiative filling the data gaps (Borda et al., 2020). Ensuring such bottom-up participation on digital platforms underscores the need for data literacy, which only becomes more important as COVID-19

accelerates the digital transition across all social sectors (Hantrais et al., 2020). Moreover, when information is conveyed digitally without equitable and inclusive approaches, this risks exacerbating the digital divide, as seen during COVID-19 (Beunoyer et al., 2020). Digitally literate citizens are better empowered to access and ascertain authoritative information and trustworthy sources, and they gain agency to participate as an individual, and as a member of the community (GovLab, 2020a).

### *Privacy and data governance*

Data privacy is essential to prevent the loss of trust in data-driven participatory approaches (Kostkova, 2018). Even approaches that align with relevant privacy laws can fall foul of public perceptions. For example, the United Kingdom’s ‘care.data’ project, which involved extracting data from primary care medical records, failed to gain social license despite following formal regulations, as it failed to meet societal expectations of privacy (Carter et al., 2015). Through the implementation of participatory data governance frameworks, institutions can involve citizens in establishing the principles by which data is used (Micheli et al., 2020). Models such as civic data trusts, where data are held by an independent party and who facilitate participation by stakeholders in decisions regarding data access, sharing and use, could reduce the barriers to data governance (Kariotis et al., 2020). Such a process of citizen engagement in broader decisions around data privacy and governance is necessary to move beyond assumptions that privacy is simply about the limitations of data sharing. In the seminal theory of contextual integrity, Nissenbaum (2009) argues that privacy is about the appropriate flow of information in a specific context. Allowing the public to have input into what is defined as appropriate in a pandemic may open up new options in data-driven citizen-engagement (Kostkova et al., 2016).

### *Participation beyond COVID-19: Addressing coordination and continuity*

The ongoing use of participatory knowledge co-creation provides a means to address pertinent societal crises (Godinho et al., 2019, 2020c). Ensuring its sustainability requires its institutionalisation within existing and novel social structures. For example, patients and providers recognised the potential of telehealth to provide health services while physical distancing, leading global organisations to advocate for telehealth and professional organisations followed suit with policies for their own jurisdictions (American Academy of Family Physicians, 2020; Liotta, 2020). Here, the

bottom-up emergence of sociotechnical innovation was engaged by a responsive (top-down) leadership that ‘institutionalised’ it, thus mainstreaming telehealth within weeks and achieving what decades of work couldn’t (The Medical Futurist, 2020). Partnerships can play an important role in institutionalising practices, such as with Community Health Alliances (CHAs) in Australia (Godinho et al., 2020a). These alliances comprise partnerships between local councils, local health districts (LHD) and primary health networks (PHN) that are complementary and mutually beneficial. While all three partners have an interest in improving community health and well-being, only the local council has direct access to the community, while the LHD has the necessary infrastructure, resources and technical expertise, and the PHN offers access to health providers. Together, CHAs use established networks to engage the community for knowledge co-creation to inform not only the health alliance as an organisation, but also its initiatives (e.g. in care delivery and health promotion).

## Conclusion

Digital participation will play a key role in enabling the citizen engagement required for adaptive and responsive systems. In recognising the importance of community participation in combating COVID-19, we argue that the pandemic also offers an opportunity to rally citizens together in generating both knowledge and social capital needed to rebuild our collective community in an increasingly divided and inequitable world. We mapped the data capture, information generation and knowledge co-creation across participatory responses to COVID-19 and presented the interaction between information systems, policy systems and systems of participation in participatory policy responses for COVID-19. Only time will tell if this will be sustained to fully realise a vision of data-driven direct democracy for all.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iDs

Myron A Godinho  <https://orcid.org/0000-0002-0081-2506>  
 Timothy Kariotis  <https://orcid.org/0000-0001-7190-7564>  
 Andreea Molnar  <https://orcid.org/0000-0001-6107-9881>

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