



# CITIZEN SENSOR NETWORK

## GUIDE TO CREATING A CITIZEN SENSOR NETWORK

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# Citizen Sensor Network

Citizen sensor networks provide real time feedback which is essential to managing complexity and can be used to help identify potential solutions to be explored, tested and monitored. Networks created for an ordinary purpose can then be deployed in times of extraordinary need—when a natural disaster or a pandemic hits, a trusted network providing a real-time situational assessment is readily available to deploy or tap into.

Citizen sensor networks are key to gaining a greater understanding of our democracies. Continuous engagement with citizens leads to more trust and thus more cooperation.

Using SenseMaker®, a citizen sensor network can be established within a variety of different organisations such as companies, schools, universities and colleges, communities centres, sports clubs, neighbourhoods, regions, countries or just about any other kind of community you can think of.

## WHAT IS A CITIZEN SENSOR NETWORK?

A citizen sensor network is a network of engaged people who are collecting and sharing observations on an ongoing basis. Rather than just capturing a snapshot in time, our SenseMaker® software enables continuous story collection over long periods of time, much like a virtual journal.

A citizen sensor network can be used to capture a continuous account of what a large proportion of the target community/population is observing and experiencing, and what that means to them. SenseMaker® provides people with a framework through which they can reflect on their day to day experiences and interpret their own data. This engages citizens in making sense of the system which they are a part of. We call this 'distributed cognition'—when a network of people make sense of what's happening around them and what it means to them. This approach draws on a diverse range of situated knowledge and wisdom.

Citizen sensor networks powered by SenseMaker® can collect ground-level, real-time stories, experiences, observations and perceptions which can be used to inform policy formulation, testing, and strategic implementation. It enables multiple safe-to-fail experiments running in parallel to illuminate pathways towards a desired outcome. A key aspect of creating a citizen sensor network is citizen journalism.

## What is citizen journalism?

In a globalised world, how do we gain nuanced, localised understanding? How do we respond to the unheard or unarticulated needs of those who feel excluded from power? SenseMaker® empowers citizens to become ethnographers in their own communities by collecting the stories of friends, family, or other community members. Equipped with a smartphone (or other device), Citizen journalists can become the bedrock of their communities' citizen sensor network using this scalable, sustainable, distributed, ethnographic approach.

Anyone in a community can become a citizen journalist. The Cynefin Centre has trained people of all ages to become citizen journalists, including many young people. citizen journalists can extend the citizen sensor network beyond the usual suspects and reach those who wouldn't normally take part in citizen engagement activities. Citizens have privileged access to their communities and often unearth stories which would not be shared with outsiders. Young people can engage those who are less technologically literate, such as their grandparents. Challenges could be set in order to reach certain populations, such as people with specific demographics or beliefs, to ensure a more representative sample.

Engaging young people in decision-making and peer-to-peer knowledge-sharing is mutually valuable, empowering, and it's needed more than ever. It may be just what we need to break down epistemic bubbles in which people are not exposed to views contrary to their own, and echo chambers in which the source of contrary information is discredited (Nguyen, 2018). Building trust with those with differing views is a key way to break out of narrow, polarised conceptions of the world and how it works, and Citizen Journalism could be a useful tool to aid that process.

## WHY USE A CITIZEN SENSOR NETWORK?

### Mass consultation with real time feedback

A citizen sensor network provides an opportunity to gain real time situational assessment across a large group of people. Real time feedback is essential for evidence-informed decision making and informing strategy in complex environments, especially where there is rapid change, e.g., during times of crisis or emergency. It enables measurement of what is happening on the ground and underlying ideation patterns which provide insights into strategic interventions before ideation patterns become visible to conventional monitoring techniques that rely on retrospective research and evaluation. Immediate feedback about the impact of decisions and interventions enables faster responses to dampen negative outcomes and amplify desired ones.

### Localised sense-making

No-one has a better understanding of the real needs and concerns of a local community than the community themselves. In the past, agencies and governments have imposed well-intentioned interventions from afar, often with little effect and unintended consequences. This is a bottom up approach rather than a top down, impositional, neo-colonial one, which implies communities need the help of external experts to assess the situation, generate solutions and apply them. Sometimes communities do need help, but not always, and often bringing experts in can have a negative impact. We aim to help communities understand their context so they can determine whether external experts are needed and how to include them in a way that manages negative consequences. This approach draws on the knowledge, experience and wisdom that exists within communities and enables communities to make sense of their own patterns and co-create initiatives that will make a real impact. Putting the power of sensemaking in communities' own hands is a key part of what the Cynefin Centre does.

### Taking stock to take action

A citizen sensor network allows communities to take an **asset based development** approach; to take stock of existing assets and capabilities (which are often unrecognised) and to consider how they could be grown, developed and used to solve the community's challenges. This counteracts the convention to parachute in external resources/ideas which is often underscored by a more impositional, neocolonial way of thinking. Communities are empowered to take ownership of the solutions and manage them themselves.

### Bridging the gap

SenseMaker® can be used to bridge the gap between top down and bottom up citizen engagement in realistic and coherent ways, through the use of citizen sensor networks. They can be used by citizens to connect with institutions and vice versa, thereby bridging the gap usually found between citizens and the institutions that serve them. They can also be used by citizens to reach out and engage with their community, or to inquire about and advocate for a specific cause.

### People-focused

A key aspect of our approach is that it is people-focused; using SenseMaker®, storytellers interpret their own story, hence, process their own data. This data can be further filtered to draw out insights that can be translated into action. Our approach also removes layers of professional curation and interpretation in a process known as '**disintermediation**'. This means knowledge and information can flow from those who have direct experience with a topic/situation within the network.

### Radical repurposing in times of crisis

A key aspect of a citizen sensor network is that it can be exapted (radically repurposed) in times of emergency or crisis, or simply when a new engagement process is needed. For example, a citizen sensor network infrastructure can be activated for emergency communications or a situational assessment. Radical repurposing draws on an evolutionary biology concept — [exaptation](#) — using something for a totally new purpose. Or more specifically, “a trait evolved/developed for other uses, and later ‘co-opted’ for its current role” (Vrba & Gould, 1986). One of our favourite examples is the theory that dinosaur feathers, which developed for other purposes such as warmth, were repurposed for flight. Exaptation is fast becoming a key concept in innovation because it means not waiting for slow, incremental changes, but making bigger advances by looking around for what you already know/have and applying it in a new context or to a new purpose.

### Paying attention to blind spots

In rapidly changing, high-stake, complex situations, decision-makers risk missing important information if they rely on familiar thinking, the perceptual lenses of their profession and dominant narratives, without considering **weak signals**—the outliers in the data where opportunities and challenges exist. We often miss things we're not looking for, which is known as [inattentional blindness](#). If we do not see what we are not looking for, we can miss opportunities and challenges.

SenseMaker® helps make weak signals clearer and easier to attend to all perspectives in order to make an informed decision.

We also need to consider what's totally in our blindspot: things we didn't know existed and so weren't looking for, 'unknown unknowns'. Citizen sensor networks can pick on new happenings/phenomena/situations as they begin to emerge.

### Further engaging communities in sensemaking

After stories and observations have been collected using SenseMaker®, there are a range of different participatory ways including (but not limited to) workshops, citizens juries and assemblies, online forums, and community knowledge repositories and workshops. These processes could bring citizens/community members together to read the stories that have been collected and generate insights and actions using a range of techniques and activities.

## HOW TO CREATE A CITIZEN SENSOR NETWORK?

A citizen sensor network can be created with any type of group of people. Individuals are also welcome to keep a journal, or act as a citizen journalist by interviewing others and collecting their stories via SenseMaker®.

**Schools & Colleges:** Most social science curriculums require students to do research and community engagement. The Cynefin Centre can help meet these requirements by providing teachers with a downloadable pack of exercises and assignments that enable students to become citizen journalists. For example, students could be asked to interview members of their community or people of their grandparents' generation, about the story of their life that they want the student to remember. This can provide students with an opportunity to gain valuable research experience for their CVs/resumes.

**Sports clubs:** In order to improve their service and grow their membership, a sports club may want to reach out and engage with their users to find out: Who plays sports? Why? Why not? What is parental engagement like in this community? What is the social impact? This would be useful information for any sports clubs trying to improve their services and secure more funding.

Similarly, community centres, civic organisations, church/religious groups, and companies employing most inhabitants of a town will need to engage their communities to explore questions related to service usage and engagement, in order to better manage their relationships. SenseMaker® could also be used by local governments to engage civil servants and staff working in other relevant capacities, whilst [MassSense](#) (powered by SenseMaker®) can be used to consult a large population, such as an entire nation.

SenseMaker® can be used as a sortition tool, which means that it can be used to ensure the sample is representative in terms of demographic variables such as age, gender, location. SenseMaker® also makes it super easy to ensure a diverse range of beliefs, attitudes and experiences on the issue at hand.

If you're a teacher, sports leader, church leader, decision-maker or community leader of any kind, please get in touch to [start using SenseMaker®](#).

## Creating a Network using SenseMaker®?

Our approach is very flexible and SenseMaker® can be applied in many different ways. Here are the typical steps involved in using SenseMaker® to engage your community:

1. **Initial consultation:** The Cynefin Centre talks with those leading the engagement project to understand what they want to explore within the community, along with their needs and goals.
2. **Design workshop:** In this step, the project leaders will decide what types of SenseMaker® capability to use such as a one-off, regular journaling for a specific time period, or long term engagement. It also includes designing the questions and dissemination strategy, and identifying the target sample. We have many templates, or a SenseMaker® framework can be designed from scratch. This can include support from The Cynefin Centre and consultation with members of the community.
3. **Test your framework:** Piloting the SenseMaker® framework is very important in order to check how participants respond to questions, whether they feel they are relevant to their context and story, and that they make sense to everyone, not just academics or policy wonks.
4. **Data collection:** Implement the dissemination strategy by inviting people from relevant communities to take part in a SenseMaker® framework. This may include citizen journalists who go out into their communities and collect stories from their communities.
5. **Analysis:** The raw SenseMaker® data is presented on our easy-to-use interactive dashboard so that themes and patterns can be readily interpreted. The Cynefin Centre can provide training and support on how to use the dashboard, and we can also produce reports.
6. **Further engagement & problem-solving:** Invite either those who participated in the SenseMaker® or others within the community to a workshop in which they explore the stories collected and options to address the issues in their community. In workshops, participants consider 'how can we create more stories like that and fewer like those?'. Community-led interventions like this are a key to creating buy-in. Alternatively, invite a wider proportion of the community/population to take part in a [MassSense](#) framework which is more refined and informed by analysis of the first SenseMaker® data collection.
7. **Exapting:** Once established, those who completed the SenseMaker® framework can act as a citizen sensor network which can be [exapting](#) for other purposes. For example, if there's a natural disaster or a terrorist attack, you can pulse people in that geographical area to get real-time, information about what's happening on the ground, or what stories are circulating about what is happening on the ground. Citizen sensor networks could also be exapting for a public decision making/consultation process.

The various components can be combined in many different ways. For example, you could just run a SenseMaker® collection by itself. Or run a one-off or ongoing SenseMaker® engagement, then MassSense and a community workshop to synthesise and draw learnings from both. Or a community workshop, then a SenseMaker, and finally a MassSense. We can design a bespoke research programme to meet your needs. Citizen sensor networks can also be used in combination with other deliberative democracy methods. Check out our [Citizen Engagement & Democratic Innovation white paper](#) for more info.

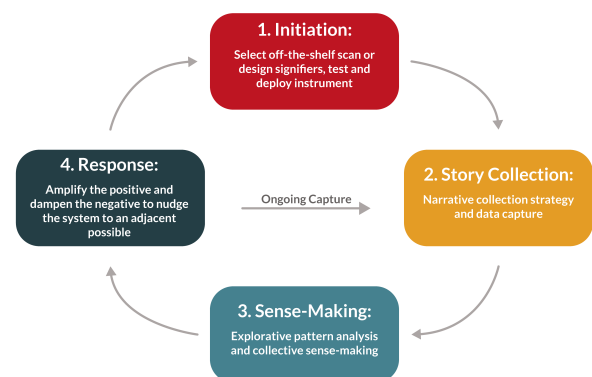


Figure 1. A streamlined version of our sensemaking process.  
Image reference: Van der Merwe, et al. (2019)

## ADVANCED ANALYTICS

SenseMaker® is a software ecology that integrates decision support, research, monitoring and knowledge management. The stories are collected anonymously and are directly uploaded to a secure, encrypted database.

### SenseMaker®'s data analysis dashboard

The data can be exported or analysed within SenseMaker®'s own analytic data dashboard and reporting tools. The combination of the visual representation of the results, the analytical support of our interactive dashboard, and the possibility to move between quantitative data and the deep specificity of individual stories makes it easier to turn information into action. The dashboard can be made available to a wide range of people including community members with varying restrictions on access. We provide training and direct support on using these tools. The Cynefin Centre can also produce emergent pattern reports on a regular basis.

Citizen sensor networks provide more reliable data than social media, due to our human buffering approach. Social media is an unbuffered feedback loop with no filters, no human synthesis and sensemaking. Often the sensemaking process is limited to obscured blackbox algorithms; or it takes time for the data to be downloaded, cleaned, visualised and reported. All of this is instantaneous with SenseMaker®'s dashboard which allows for fast decision making in complex environments. Our approach, which augments human intelligence rather than attempting to replace it, includes a human-buffered feedback loop wherein positive or negative aspects can be amplified or dampened quickly. Learn more about how The Cynefin Centre creates change using a method called [vector theory of change here](#).

## Do you want to know more?

You can learn more about our [Citizen Engagement and Democratic Engagement programme here](#).

Are you thinking of getting involved? Email us at [cynefin-centre@cognitive-edge.com](mailto:cynefin-centre@cognitive-edge.com)

Would you like to see how a SenseMaker® collection works for yourself? Try out our ongoing [local community public access project](#) to experience SenseMaker® for yourself!

## REFERENCES

Van der Merwe, S. E., Biggs, R., Preiser, R., Cunningham, C., Snowden, D. J., O'Brien, K., ... & Goh, Z. (2019). Making sense of complexity: Using SenseMaker® as a research tool. *Systems*, 7(2), 25.

Vrba, E. S., & Gould, S. J. (1986). The hierarchical expansion of sorting and selection: sorting and selection cannot be equated. *Paleobiology*, 217-228.

Nguyen, C.T. (April 9, 2018) Escape the echo chamber. AEON.  
<https://aeon.co/essays/why-its-as-hard-to-escape-an-echo-chamber-as-it-is-to-flee-a-cult>