

Using Crowdsourcing In Government

By Daren C. Brabham

There is growing interest in “engaging the crowd” to identify or develop innovative solutions to public problems. This trend has been inspired by similar efforts in the commercial world to design innovative consumer products or solve complex scientific problems, ranging from custom-designing T-shirts to mapping genetic DNA strands. The Obama administration, as well as many state and local governments, have adapted these crowdsourcing techniques with some success.

Crowdsourcing is an online, distributed problem-solving and production model that has grown in use in the past decade. While many of the exemplar cases of crowdsourcing highlighted in the scholarly research have been for-profit companies or ventures managed by for-profit companies, crowdsourcing has been gaining traction as a public participation tool for governance and planning, as well as a method for building common resources or processing large batches of data to streamline government functions.

Simply put, crowdsourcing happens when:

- An organization has a task it needs performed
- An online community voluntarily performs the task
- The result is mutual benefit for the organization and the online community.

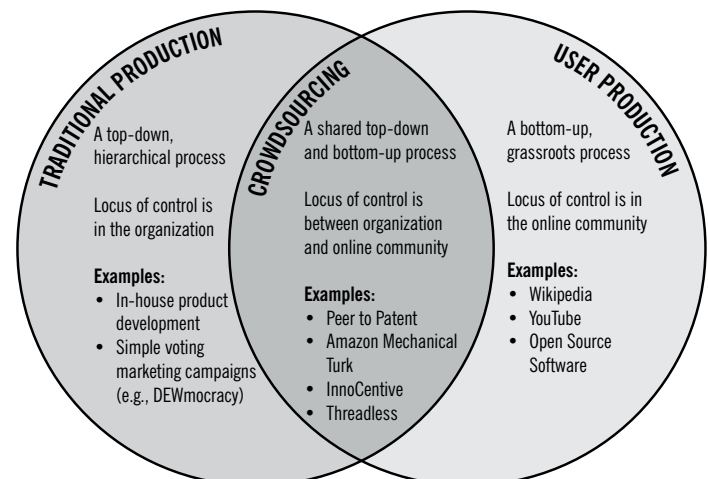
An important distinction between crowdsourcing and other, similar forms of online participatory culture and user-generated content activities is that crowdsourcing entails a mix of top-down, traditional, hierarchical management process and a bottom-up, open process involving an online community. In crowdsourcing arrangements, the locus of control must reside between organization and online community rather than primarily in one or the other (see figure). An example of a high degree of organizational control that made insufficient use of the online community’s input is the “vote for your favorite flavor” marketing contest, such as Mountain Dew’s DEWmocracy campaign. And examples of a high degree of online community control with insufficient organizational directive are Wikipedia or open-source software projects such as Mozilla Firefox.

It is important to distinguish crowdsourcing as a process, rather than a tool. Crowdsourcing is an online process for connecting online communities and organizations in pursuit of a product or solution to a problem. Crowdsourcing can be accomplished through any number of new media tools, including wikis, blogs, websites, social networking sites (e.g., Facebook, Twitter), mobile apps, mapping software, and so on. Many tools enable communication, and so many tools can make crowdsourcing possible.

When an organization embarks on a crowdsourcing venture, it is important to consider first the kind of problem it wants to solve and the kinds of solutions it wants to receive.

The author has developed a problem-based, four-part typology for crowdsourcing. This typology is problem-based in the sense that a practitioner can use it to assess what kind of problem he or she needs solved, identify whether crowdsourcing may help solve the problem, and decide

Crowdsourcing as a Blend of Traditional Top-Down Production and Bottom-Up User Production.



Source: Brabham et al., 2013



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which type of crowdsourcing approach is most useful. You first need to determine whether a problem at hand is (a) an information management problem, where the challenge is to locate or analyze existing knowledge; or whether it is (b) an ideation problem, where the challenge is to develop entirely novel ideas or solutions.

These four problem-based crowdsourcing approaches—the Knowledge Discovery and Management approach, the Distributed Human Intelligence Tasking approach, the Broadcast Search approach, and the Peer-Vetted Creative Production approach—cover the range of problem-solving activities suitable for government to crowdsource (see Table 1).

Table 1: A Typology of Crowdsourcing Problem Types for Governance

Type	How it Works	Kinds of Problems	Examples of Uses in Government
Type One: Knowledge Discovery and Management	Organization tasks crowd with finding and collecting information into a common location and format	Ideal for information gathering, organization, and reporting problems, such as the creation of collective resources	Example: See ClickFix; USGS's <i>Did You Feel It?</i> ; USPTO's <i>Peer to Patent</i> Possible Uses: Reporting conditions and use of public parks and hiking trails; tracking use of public transit; cataloguing public art projects and murals for historical boards
Type Two: Distributed Human Intelligence Tasking	Organization tasks crowd with analyzing large amounts of information	Ideal for large-scale data analysis where human intelligence is more efficient or effective than computer analysis	Example: Transcribing digital scans of old handwritten census records Possible Uses: Language translation for documents and websites; data entry; behavioral modeling
Type Three: Broadcast Search	Organization tasks crowd with solving empirical problems	Ideal for ideation problems with empirically provable solutions, such as scientific problems	Example: White House <i>SAVE Award</i> ; NASA's use of InnoCentive for a solar flare prediction formula Possible Uses: Finding better algorithms for timing traffic signals; improving actuarial formulas for Social Security
Type Four: Peer-Vetted Creative Production	Organization tasks crowd with creating and selecting creative ideas	Ideal for ideation problems where solutions are matters of taste or market support, such as design or aesthetic problems	Example: <i>Next Stop Design</i> bus stop shelter design competition; ITS Congestion Challenge for alleviating traffic congestion Possible Uses: Designs for public structures and art projects; urban plans; transit plans; policy proposals; school redistricting plans

Source: Adapted from Brabham, 2012a

Type One: Knowledge Discovery and Management

In type one crowdsourcing, government agencies can use online communities as a way to extend their abilities, relying on communities to bring new information into play in efficient ways that lead to better decisions and resource allocation. In this arrangement, an organization issues a clear information management task to an online community with clear instructions for how that task is to be performed, and the online community responds by finding and reporting that information in the specified format.

An example of the type one approach is the U.S. Geological Survey's (USGS) Community Internet Intensity Map, known more fondly as the *Did You Feel It?* map. *Did You Feel It?* is a website that automatically maps reports of user-submitted seismic activity. When the first tremors of an earthquake are felt, citizens visit the site and report their locations and an estimate of the intensity of the tremors. In combination with a network of sensors around the world, these user-submitted reports allow USGS to assemble a more nuanced map of the intensity of an earthquake's activity, deepening the agency's understanding of how earthquakes work and informing emergency response planning and modeling budgets for disaster relief. Where *SeeClickFix* allows citizens to fill information gaps for city maintenance departments and improve government efficiency, USGS's *Did You Feel It?* project allows citizens to fill information gaps about the impact of earthquakes that sensors cannot fully capture.

Type Two: Distributed Human Intelligence Tasking

Type two crowdsourcing extends the data-analytic capabilities of government, decomposing and distributing large batches of information to an online community that performs small tasks, often for small financial rewards. Similar to type one crowdsourcing, type two crowdsourcing deals with information management problems, except with type two the challenge lies in how to process a batch of data that is already in hand. Type one crowdsourcing is for finding and assembling information, while type two crowdsourcing is for efficiently processing information.

For example, the U.S. Census Bureau released raw digital image files from 1940 Census records and made them available to the public for the first time. The handwriting from seven-decades-old scanned documents required manual transcribing, since computerized optical character recognition

(OCR) was not feasible. Taking a cue from Luis von Ahn et al.'s (2008) human computation reCAPTCHA system, which revolutionized the digital transcription of books by weaving transcription micro-tasks into security tests on several social network sites and blog comment functions, McHenry, Marini, Kejriwal, Kooper, and Bajcsy (2011) proposed that the government use a crowdsourcing approach to employ an online community in the rapid, accurate, inexpensive transcription of the Census records. The way such a system works is by decomposing the massive data set—the entire corpus of scanned records—into smaller tasks and distributing them online to people willing to transcribe a few words or sentences for small monetary rewards, say, transcribing a dozen words for a few pennies.

Type Three: Broadcast Search

Broadcast search crowdsourcing applications help government agencies find the needle in the haystack, the one scientific mind that can see a solution in a difficult ideation problem, by broadcasting a challenge widely on the Internet. Scientifically oriented government agencies like the National Aeronautics and Space Administration (NASA) and the U.S. Geological Survey, agencies that deal with actuarial formulas, and other engineering agencies could take the most advantage of broadcast search crowdsourcing ventures, opening the problem-solving process to an online community often motivated by their enjoyment in solving difficult problems. In broadcast search, an organization poses a challenge to an online community, often with detailed scientific parameters in the form of a problem brief, and the online community offers up complete, original solutions to address the problem.

Many broadcast search crowdsourcing initiatives, as well as type four crowdsourcing (peer-vetted creative production) initiatives, take the form of contests or competitions, and prizes are common for winning ideas. The America COMPETES Reauthorization Act of 2010 added a provision for prize competitions to an existing technology innovation act, giving federal agencies the authority to offer prizes as incentives to spur innovation (Executive Office of the President, 2012). At the same time, Challenge.gov was launched as a flexible platform for a wide variety of government-sponsored innovation competitions and challenges, even using the language of seekers and solvers used by broadcast search crowdsourcing companies like InnoCentive. This legal and technological infrastructure has been responsible for a number of U.S. government-sponsored broadcast search and type four competitions from agencies as diverse as the Department of Health and Human Services and NASA.

Type Four: Peer-Vetted Creative Production

Not all ideation problems have empirically “right” answers. Policy, aesthetic, and design problems are matters of subjective taste or public support. For these ideation problems, this approach to crowdsourcing is most appropriate. In type four crowdsourcing, an organization issues a challenge to an online community, the community replies with possible solutions, and the community is also empowered to choose among the submitted solutions, often through a commenting and voting mechanism.

The most prominent, classic business case of this form of crowdsourcing is Threadless, a clothing company whose members submit graphic T-shirt designs and vote on the designs of peers. Threadless prints the top-rated designs and sells them back to the online community.

With support from the U.S. Federal Transit Administration and in cooperation with the Utah Transit Authority (UTA), the *Next Stop Design* project ran in 2009–2010 as an attempt to replicate the business case of Threadless in a transit planning context. At *Next Stop Design*, participants were asked to respond to the challenge of designing an ideal bus stop shelter for a real transit hub in the UTA system. In just a few months and with no tangible reward offered, nearly 3,200 participants registered on the site, submitting 260 high-quality architectural renderings for bus stop shelter designs and casting more than 10,000 votes in the competition.

Conclusion

For a term that did not exist seven years ago, crowdsourcing has enjoyed quite an enthusiastic embrace by government agencies in the U.S. and abroad. In the U.S., there have been high-dollar calls for proposals from the Departments of the Army, Navy, and Air Force; the Defense Advanced

Research Projects Agency (DARPA); the National Science Foundation; NASA; the Broadcasting Board of Governors; the Department of the Interior; the Department of Veterans Affairs; and other agencies that specifically use the word crowdsourcing, demonstrating a level of commitment to continue funding these innovative processes. Around the world, other governments have invested in crowdsourcing, too, and so has the United Nations, which held a meeting in 2012 to explore crowdsourced crisis mapping for disaster relief. Considering the common criticism that government moves slowly and is notoriously unwilling to take risks, the rate at which crowdsourcing has taken hold in government, in spite of its many risks, is perhaps a signal that there is a sea change happening in the business practices of government and the way citizens engage with elected officials and public administrators. In the spirit of participatory democracy, this is no doubt a good sign. ■

TO LEARN MORE

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