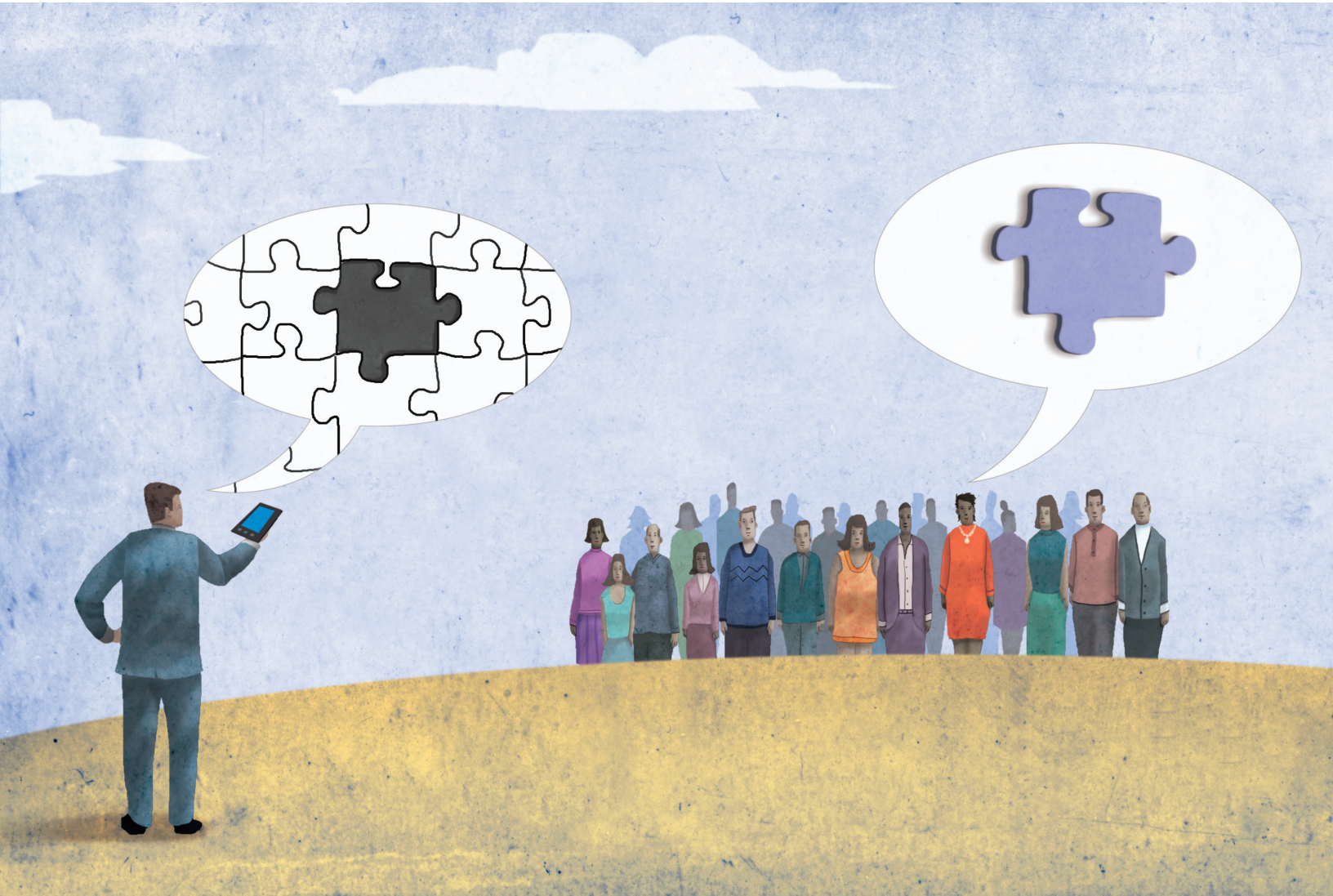




IBM Center for
The Business of Government

Collaborating Across
Boundaries Series

Using Crowdsourcing In Government



Daren C. Brabham
University of Southern California

Collaboration Across Boundaries Series

2013

Using Crowdsourcing In Government

Daren C. Brabham

Annenberg School for Communication and Journalism
University of Southern California



IBM Center for
The Business of Government

Table of Contents

Foreword	4
Introduction	6
The Basics of Crowdsourcing	7
Processes and Tools	9
Four Approaches to Crowdsourcing	10
Type One: Knowledge Discovery and Management	11
Type Two: Distributed Human Intelligence Tasking	14
Type Three: Broadcast Search	17
Type Four: Peer-Vetted Creative Production	19
Best Practices and Considerations for Executing Crowdsourcing Applications	21
The Planning Phase	21
The Implementation Phase	24
The Post-Implementation Phase	27
Conclusion	29
References	31
About the Author	38
Key Contact Information	39

Foreword

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, *Using Crowdsourcing in Government*, by Daren Brabham, University of Southern California.

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. Two other previous IBM Center reports describe elements of these techniques:

- Kevin C. Desouza, *Challenge.gov: Using Competitions and Awards to Spur Innovation*
- P.K. Kannan and Ai-Mei Chang, *Beyond Citizen Engagement: Involving the Public in Co-Delivering Government Services*

Those two reports, as well as the new report by Professor Brabham, demonstrate the promise of the intersection of technology tools, problem-solving techniques, and the participatory spirit of citizen engagement—all of which are embodied in crowdsourcing. This new report goes further, providing a strategic view of crowdsourcing and identifying four specific types:

- **Knowledge Discovery and Management:** collecting knowledge reported by an online community, such as the reporting of earth tremors or potholes to a central source
- **Distributed Human Intelligence Tasking:** distributing “micro-tasks” that require human intelligence to solve, such as transcribing handwritten historical documents into electronic files
- **Broadcast Search:** broadcasting a problem-solving challenge widely on the Internet and providing an award for its solution, such as NASA’s prize for an algorithm to predict solar flares



Daniel J. Chenok



Lori V. Feller

- **Peer-Vetted Creative Production:** creating peer-vetted solutions, where an online community both proposes possible solutions and is empowered to collectively choose among them

Dr. Brabham assesses the strategic use of each type of crowdsourcing to assist public managers in determining the appropriate crowdsourcing approach for responding to different kinds of problems. By understanding the types and approaches of crowdsourcing, public managers will have increased their success rate in leveraging this tool.

Dr. Brabham focuses on the strategic design process rather than on the specific technical tools that can be used for crowdsourcing. He finds that when done right, crowdsourcing can be an effective approach to problem-solving. He concludes by setting forth 10 emerging best practices for implementing a crowdsourcing initiative.

We hope that this report will help public managers and federal agency leaders in understanding how to best use crowdsourcing to both solve problems and engage the public in developing innovations.



Daniel J. Chenok
Executive Director
IBM Center for The Business of Government
chenokd@us.ibm.com



Lori V. Feller
Partner, Organizational Change Management
IBM Global Business Services
lori.feller@us.ibm.com

Introduction

As understanding of new media technologies advances, there is a growing interest in how best to take charge of the creative, productive capabilities of Internet users for specific purposes. In the past decade, a number of online businesses have actively recruited individuals in online communities to design products and solve problems for them, often motivating an online community's creative output through the use of an open challenge with rewards.

Organizations that issue specific tasks to online communities in an open-call format engage in the practice of crowdsourcing. As argued by the author elsewhere (Brabham, 2008, 2009) and by other scholars as well (Brito, 2008; Fritz et al., 2009; Haklay and Weber, 2008), crowdsourcing is a model for problem-solving, not merely a model for doing business. It is important to understand how crowdsourcing works, but perhaps even more important to understand best practices for implementing it, so that the collective intelligence of online communities can be leveraged in participatory governance.

The Obama administration's commitment to transparency and open government (Obama) has been a driving force in the growth of crowdsourcing applications and online public participation programs in the U.S. Other countries have also tested open, collaborative governance processes with citizens in recent years. There are now many cases of government crowdsourcing to add to the already large body of business cases, yet no coherent set of best practices or recommendations exists for public managers to use to determine whether and how to go about launching a crowdsourcing endeavor for government.

The purpose of this report is to categorize some of these government crowdsourcing cases into a four-part, problem-based typology, encouraging government leaders and public administrators to consider these open problem-solving techniques as a way to engage the public and tackle difficult policy and administrative tasks more effectively and efficiently using online communities.

This report begins with an overview of crowdsourcing, what makes crowdsourcing work, and what distinguishes it from other instances of participatory culture often mistaken for crowdsourcing. A problem-based typology is then presented to make sense of crowdsourcing and understand when and how to deploy crowdsourcing in the business of government. This typology is illustrated with several cases from the public sector, and other possible applications for crowdsourcing by government are presented. The report concludes with 10 best practices and considerations for crowdsourcing, drawn from research on recent private and public crowdsourcing applications.

The Basics of Crowdsourcing

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.

Journalists Jeff Howe and Mark Robinson first coined the term crowdsourcing in early 2006, and the term first appeared in print in Howe's June 2006 article in *Wired* magazine, where he wrote about a number of now iconic for-profit crowdsourcing cases, including Threadless and InnoCentive (Howe, 2006a). Scholarly research focused specifically on crowdsourcing first appeared in 2008 (e.g., Albers, Ramos, and Hervas, 2008; Brabham, 2008a; Kittur, Chi, and Suh, 2008), though the concept is rooted in longer discourses of open innovation (Chesbrough, 2003), lead user innovation (Von Hippel, 2005), new forms of online problem-solving (Jeppesen and Lakhani, 2010), human computation (von Ahn, Maurer, McMillen, Abraham, and Blum, 2008), and participatory culture (Jenkins, 2006).

Scholarly interest in the term has exploded in the past five years. According to Google Scholar, today there are more than 24,000 research articles, mostly in the computing and business disciplines, using the term crowdsourcing, and there are entire interdisciplinary academic conferences and government grant programs dedicated to the concept (Brabham, 2013a).

A 2012 paper synthesized the scholarly literature on crowdsourcing to come up with a widely used definition:

Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken. (Estellés-Arolas and González-Ladrón-de-Guevara, 2012, p. 197)

Simply put, crowdsourcing happens when:

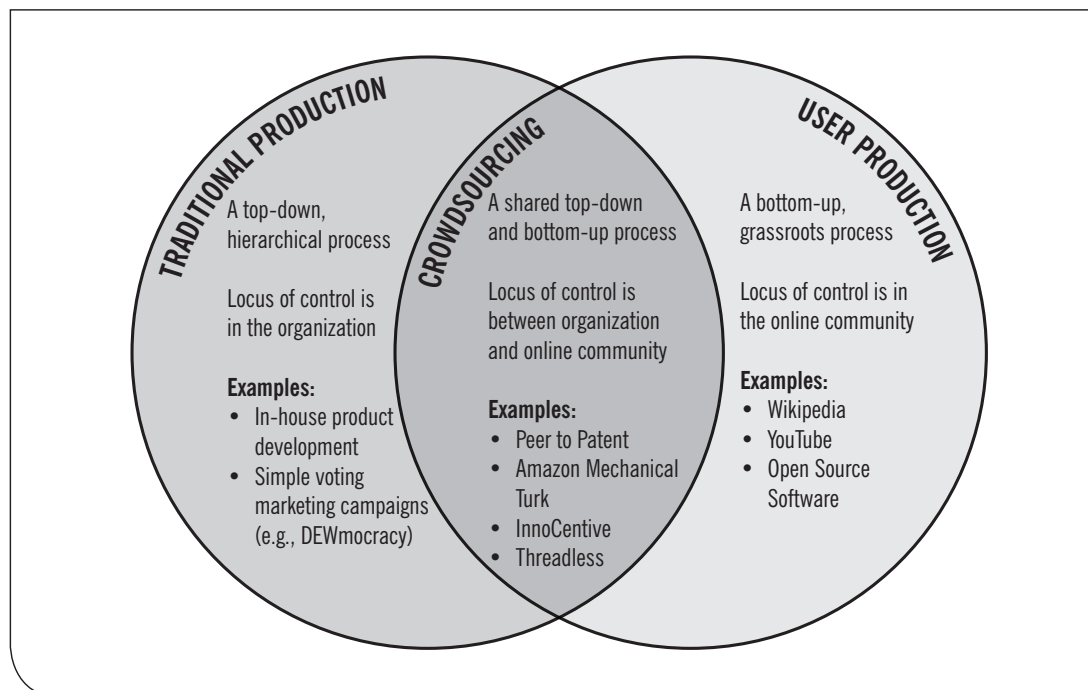
- An organization has a task it needs performed
- An online community voluntarily performs the task
- The result is mutual benefit for the organization and the online community.

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 1). 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 (Zmuda, 2009). 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.

Because crowdsourcing draws input and insight from individuals in online communities, it has the potential to be a useful digital tool to complement traditional public participation programs for governance (Brabham, 2009; Messina, 2012; Takemoto, 2010). At most, public participation can be seen as a logical extension of the democratic process, engaging local citizens in direct and deliberative activities to guide public administrators and planning projects (Creighton, 2005; Pimbert and Wakeford, 2001). And at the very least, involving citizens in the planning process can lead to outcomes that are more widely accepted by future users (Brody, Godschalk, and Burby, 2003; Burby, 2003).

Traditional, face-to-face public participation methods, such as town hall meetings and workshops, come with their own set of hindrances, including logistical issues for holding meetings that are maximally inclusive and accounting for the realities of peer intimidation, interpersonal dynamics, identity politics, special interests, and facilitator influence in the course of a meeting (Brody, 2003; Burby, 2003; Campbell and Marshall, 2000; Carp, 2004; Hou and Kinoshita, 2007; Innes, Connick, and Booher, 2007). As a mediated alternative that can

Figure 1: Crowdsourcing as a Blend of Traditional Top-Down Production and Bottom-Up User Production.



Source: Brabham et al., 2013

complement traditional participation methods, crowdsourcing can ameliorate many of these difficulties in participation programs for governance while bringing new insights and innovation to a public problem.

Processes and Tools

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 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. Only then should the organization consider the tactical means for executing that kind of arrangement. Crowdsourcing is a strategic approach to problem-solving, while specific tools (e.g., websites, social media, wikis) are tactical implementations of strategies. Many crowdsourcing ventures have taken place with relatively simple websites or existing social media tools. Embracing crowdsourcing is about embracing a way of thinking about a problem through open means that bring online communities into the problem-solving process, not necessarily about a commitment to any single tool or toolkit.

The confusion between crowdsourcing-as-process and crowdsourcing-as-tool is due in part to the rise of dedicated third-party platforms, such as InnoCentive, Top Coder, Amazon Mechanical Turk, and others. These platforms function as flexible crowdsourcing spaces for companies to launch ad hoc crowdsourcing ventures. For example, a market research firm may turn to Amazon Mechanical Turk for a single project, paying a fee for using the platform to reach an online community of workers ready to perform tasks for money or prizes. This is different from in-house crowdsourcing operations, such as Threadless, where the crowdsourcing activity occurs on the company's own turf and drives the entire business. In the future, it is conceivable that third-party, ad hoc crowdsourcing platforms will become normal business vendors, in the same way companies contract with Xerox for printing and copying services.

Related IBM Center Reports on Social Media Tools

[*Challenge.gov: Using Competitions and Awards to Spur Innovation*](#) by Kevin C. Desouza

[*Beyond Citizen Engagement: Involving the Public in Co-Delivering Government Services*](#) by P. K. Kannan and Ai-Mei Chang

[*Managing Innovation Prizes in Government*](#) by Luciano Kay

[*Using Online Tools to Engage — and be Engaged by — The Public*](#) by Matt Leighninger

[*Using Wikis in Government: A Guide for Public Managers*](#) by Ines Mergel

[*Working the Network: A Manager's Guide for Using Twitter in Government*](#) by Ines Mergel

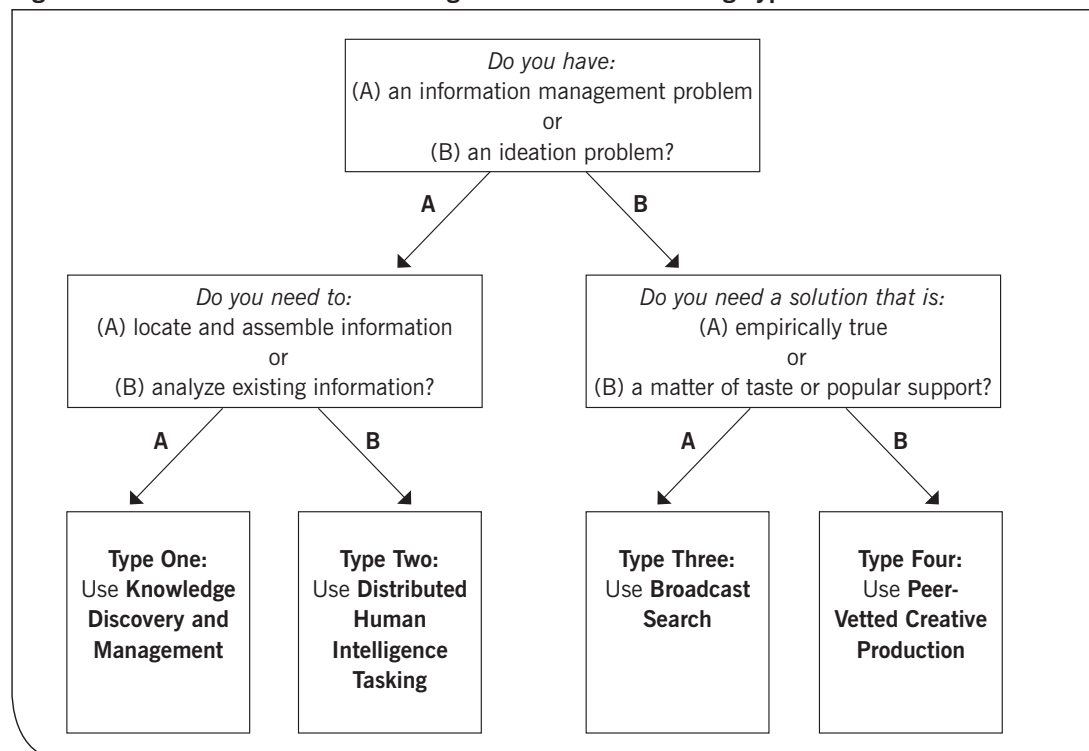
[*The Blogging Revolution: Government in the Age of Web 2.0*](#) by David C. Wyld

Four Approaches to Crowdsourcing

There have been many attempts to develop a grand organizational scheme for crowdsourcing, whether according to functional features across several case studies, common motivations for participation in crowdsourcing, or project outcome (e.g., Carr, 2010; Davey, 2010; Geiger, Seedorf, Schulze, Nickerson, and Schader, 2011; Howe, 2008; Kazai, Kamps, and Milic-Frayling, 2011; Martineau, 2012; Schenk and Guittard, 2011; Wiggins and Crowston, 2011).

Charting the contours of crowdsourcing is surely an academic exercise worthy of continued scholarly debate, but political leaders and public managers need a practical framework for assessing the appropriateness of crowdsourcing as a possible tool for governance. In this light, the author has developed a problem-based, four-part typology for crowdsourcing, first presented in a 2009 white paper (Friedland and Brabham, 2009) and refined in recent years (Brabham, Ribisl, Kirchner, and Bernhardt, 2013; Brabham, 2012a, 2013b). 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 which type of crowdsourcing approach is most useful. Figure 2 illustrates these logical steps.

Figure 2: Decision Tree for Determining Suitable Crowdsourcing Type Based on Problem



Source: Brabham et al., 2013

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. Within the information management perspective, the next question is whether the information is outside of the organization and needs to be located, assembled, and organized in a common format or resources, or is already in hand and needs to be analyzed or processed. The appropriate crowdsourcing type for the former is the Knowledge Discovery and Management approach, while the latter would be the Distributed Human Intelligence Tasking approach. Within the ideation perspective, the next question is whether the outcome will be empirically, scientifically true or whether the outcome will be an aesthetic, policy, or design product that the market or constituency will support. The former points to the Broadcast Search approach, and the latter to the Peer-Vetted Creative Production approach.

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 <i>ClickFix</i> ; 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 <i>InnoCentive</i> 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.

SeeClickFix is a kind of “participatory geoweb” (Sieber, 2008) platform that demonstrates how the type one crowdsourcing approach functions. With *SeeClickFix*, citizens can report non-emergency issues that arise in their neighborhoods (A. Johnson, 2011; Smith, 2010). Such non-emergency issues include clogged storm drains in streets, downed traffic lights and stop signs, potholes, and graffiti. Citizens report these problems through the Internet or on a mobile phone to the *SeeClickFix* website, where city governments subscribe to track these emerging issues. Government agencies responsible for these problems use the information to better allocate resources to nip small urban problems in the bud before they escalate. *SeeClickFix* fills a government need at the city level, providing a convenient and orderly way for citizens to assemble reports in a common format and communicate them to the public works department. The city’s ongoing challenge is how best to identify these emerging issues early on, in ways that allow the city to target resources better than by embarking on regular rounds through town. *SeeClickFix* helps cities become more efficient and effective, all while providing an online citizen-government communication channel that functions like a “trouble ticket” system common in IT departments, where the city can indicate when a problem has been resolved.

Figure 3: The Web Page for Raleigh, North Carolina on SeeClickFix.com

Source: SeeClickFix.com

Another example of the type one approach, again in the participatory geoweb vein, is the U.S. Geological Survey’s (USGS) Community Internet Intensity Map, known more fondly as the *Did You Feel It?* map (Atkinson and Wald, 2007; Wald, Quitariano, and Dewey, 2006). *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.

SeeClickFix and *Did You Feel It?* are instances of type one crowdsourcing set up for citizens to conveniently provide simple reports to government in the course of day-to-day activities. The U.S. Patent and Trademark Office's (USPTO) Peer to Patent initiative illustrates how citizens are willing and skilled enough to undertake serious, time-consuming work in the service of government. Faced with a backlog of patent applications and a staff that did not have the resources or time necessary to properly determine whether patent applications presented truly novel inventions, the USPTO partnered with the New York Law School and several major patent-holding companies to launch the Peer to Patent Community Patent Review pilot project in 2007. For the project, the USPTO posted a small sample of patent applications on the Internet and invited an online community of volunteers to search for evidence of "prior art," which is

Distinguishing Big Data from Crowdsourcing

With the surge of interest in so-called big data applications for government, it is important to parse big data analytic techniques from crowdsourcing approaches to problem-solving. The term "big data" can mean a number of things, either that the "sheer volume" of data means "traditional databases and analytical techniques are not capable of effectively analyzing it" or that high-performance computing makes it possible to analyze entire corpuses of data rather than relying on random samples (Stowers, 2013, p. 9). In popular discourse, big data approaches hold much promise for business, government, health, and other applications, even if the shift toward big data decision-making comes with its own caveats regarding privacy and reliable insights (Data, 2010).

Big data processes involve harvesting massive amounts of information from social media, search engines, mobile data, and other sources. Often, these data are deliberately user-generated, such as individuals' tweets on Twitter or search queries on Google. However, the fact that these data are deliberately user-generated does not mean a big data process necessarily counts as crowdsourcing. Passive collection of user data for analytical purposes is very different from even the most trivial micro-work tasks performed by users at type two crowdsourcing site Amazon Mechanical Turk.

Let us consider the case of Google Flu Trends. Typically, the CDC "relies on outpatient reporting and virological test results supplied by laboratories nationwide" to detect flu outbreaks and this "system confirms outbreaks within about two weeks after they begin" (Schmidt, 2012, para. 4). With Google Flu Trends, the data trails users leave behind in their day-to-day queries on Google are collected and used to model outbreaks. Monitoring thousands of searches from a specific geographic location at a given time for "how to treat a cold," for instance, is a good way to identify when and where a major flu outbreak might occur. Users are unaware that their online search behaviors are contributing to Google Flu Trends' insights. They are not actively contributing their intellect, creativity, or time to Google Flu Trends. While Google Flu Trends is certainly useful for public health practitioners, it is an example of data-driven surveillance accelerated by increasingly sophisticated and ubiquitous data-mining tools and clever analytical algorithms. Because of its lack of active user participation in response to an organizational call for solutions, Google Flu Trends would not count as crowdsourcing (Brabham et al., 2013).

In contrast, crowdsourcing is a two-party effort, requiring an organization and an online community to work in concert to solve a given problem actively and deliberately. Big data analysis, however, may involve an active crowd working in a crowdsourcing activity, but in many instances big data refers to large-scale data analysis removed from the hands-on efforts of a crowdsourcing online community.

any evidence that shows an invention has already been done before and is thus not subject to patent protection (Noveck, 2006). This online community of more than 2,600 volunteers reviewed more than 200 applications during the pilot period, reporting their findings back to the USPTO, which used the reports to determine whether to issue patents. According to the project's second anniversary report (Allen et al., 2009), the USPTO used the online community's prior art reports to reject one or more claims in 18 different patent applications, preventing possible lawsuits that might arise from having effectively issued two patents for a single technology to two different patent-holders. The success of Peer to Patent led to a second pilot round in 2010–2011 and subsequent tests of the approach in Australia, Japan, South Korea, and the U.K.'s patent offices. The approach is likely to remain a part of the regular operations of the USPTO long-term. The challenge for the USPTO was to locate and organize information in a single resource, and mobilize an online community through type one crowdsourcing to accomplish these tasks, improving the functioning of the agency with public participation.

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.

Amazon's Mechanical Turk platform is a flexible tool for facilitating these large-scale “decomposition and distribution” data analysis problems to an online community of workers. Dubbed “artificial artificial intelligence,” Mechanical Turk allows organizations to offer large batches of all kinds of “micro-tasks” for which computers are not as effective as simple human intelligence, such as meta-tagging images, transcribing distorted text within images, or finding contact information for a small business online (Barr and Cabrera, 2006, para. 3). Mechanical Turk has been proposed as a convenient third-party platform for governments and scholars to transcribe other historical document scans (Lang and Rio-Ross, 2011) and for crowdsourced language translation (Callison-Burch, 2009). Public health departments could use this latter approach for translating health campaign materials into foreign languages, even relatively rare ones, allowing government to reach more constituents who may not speak the dominant languages in a region. Or language translation, often cost-prohibitive for many government agencies, especially for minority languages, can be crowdsourced for tax documents, school enrollment and immunization brochures, and other materials.

Figure 4: Amazon Mechanical Turk Platform

amazonmechanicalturk
Artificial Intelligence

Your Account | HITS | Qualifications

Introduction | Dashboard | Status | Account Settings

Mechanical Turk is a marketplace for work.
We give businesses and developers access to an on-demand, scalable workforce.
Workers select from thousands of tasks and work whenever it's convenient.
210,847 HITS available. [View them now.](#)

Make Money
by working on HITS

HITS - *Human Intelligence Tasks* - are individual tasks that you work on. [Find HITS now.](#)

As a Mechanical Turk Worker you:

- Can work from home
- Choose your own work hours
- Get paid for doing good work

Find an interesting task → Work → Earn money

[Find HITS Now](#)

or [learn more about being a Worker](#)

Get Results
from Mechanical Turk Workers

Ask workers to complete HITS - *Human Intelligence Tasks* - and get results using Mechanical Turk. [Register Now](#)

As a Mechanical Turk Requester you:

- Have access to a global, on-demand, 24 x 7 workforce
- Get thousands of HITS completed in minutes
- Pay only when you're satisfied with the results

Fund your account → Load your tasks → Get results

[Get Started](#)

FAQ | Contact Us | Careers at Amazon | Developers | Press | Policies | Blog
©2005-2013 Amazon.com, Inc. or its Affiliates

An **amazon.com** company

Source: Amazon Mechanical Turk platform (<https://www.mturk.com/mturk/>) shows the two entry points for the site as either a worker seeking work (left) or an organization needing work performed (right).

The second type of crowdsourcing may also be useful for governments needing to predict citizens' behaviors, such as for predicting their use of public transit or other services or for predicting behaviors that could inform public health practitioners and environmental policy makers. Bongard, Hines, Conger, Hurd, and Lu (2013) proposed and tested a system where users could pose and answer questions about their body weight and electricity usage in two separate trials. As users proposed new questions to the system, answered existing questions about their various behaviors, and entered their own body mass index (BMI) numbers and data from their electrical bills, the system began to develop refined models that could draw connections between these data points. Essentially, their system crowdsourced the generation of variables that could be plugged into the behavioral models to help refine the models and uncover new patterns and connections. The system could have tremendous impact in a public health context for uncovering subtle patterns and predicting health outcomes in areas where energy practices, such as "fracking," are underway and facing public scrutiny about long-term health and environmental effects.

Crowdsourcing Police Investigations?

In the wake of the Boston Marathon bombings, which took place on April 15, 2013, the FBI called upon citizens to submit any and all photos and videos from the scene of the finish line, where the bombs went off, in addition to the usual call for any information leading to possible suspects. Masses of data streamed in, and news reports emphasized the sheer volume of evidence the FBI was wading through to find clues as to the identities of the attackers.



Marathon bombing images (Source: <http://imgur.com/a/sUrnA>).

Meanwhile, the online communities at Reddit, a content aggregator site which bills itself the “front page of the Internet,” and at 4chan, a site referred to by FoxNews.com (4Chan, 2009) as the “rude, raunchy underbelly of the Internet,” where crude jokes and memes are the norm, were hard at work on their own kind of investigation. Reddit and 4chan members pored over photos and video clips circulating through the news and social media, annotating figures in the crowd who seemed suspicious, often those carrying large backpacks that might have been capable of carrying a bomb. An annotated image (left) from the 4chan Think Tank shows the way users in the 4chan community investigated the Boston

In the end, it was the department store Lord and Taylor’s security video footage that opened up a lead for investigators, and other user-submitted photos provided even clearer images of the two suspects, Dzhokhar Tsarnaev and his brother, Tamerlan Tsarnaev. The efforts of Reddit and 4chan members only led to false accusations and rumors, activities which generated considerable controversy (e.g., Leonard, 2013).

Two crowdsourcing approaches were in play during the Boston Marathon bombing investigation. Law enforcement launched a type one crowdsourcing activity, issuing an open call for specific content (photos, videos, other tips) from the public to be submitted to a certain place (a phone and e-mail tip line) concerning a specific event (the Boston Marathon, specifically near the finish line where the explosions occurred). The Reddit and 4chan communities, on the other hand, deployed their own data analysis process similar to a type two crowdsourcing activity, posting visual data to be analyzed and inviting members to analyze images for clues.

While these two processes occurred separately and under the auspices of different organizations, their motives were the same: to figure out a suspect. The Reddit and 4chan activities seemed like irresponsible vigilantism to some, who may have a point. However, there is arguably a way to bring the activities of police organizations and the motives of concerned citizens together in a single crowdsourcing platform that could host both the type one activities of the FBI and the type two activities of Reddit and 4chan in a single, reputable venue. This platform could be owned by the FBI or some other law enforcement entity and exist as a “dark site” ready to launch in the immediate aftermath of a terror attack. The platform could serve as a place for citizens to upload their photos and videos, as well as a place for volunteer citizens to comb through these data looking for clues. Police could direct some of the data analysis activity, charging the online community with duties (e.g., “tag all photos containing black backpacks”) and officially shutting down bogus leads, dispelling rumors, and clearing innocent people identified as possible suspects.

When disaster strikes, especially terrorist attacks, most citizens want nothing more than to help in some way. Traditional police tip lines work, but they could work better with the help of many eager citizens. An official crowdsourcing worksite combining type one and type two methods could be just the solution for putting these citizens to work, helping police solve crimes quickly and efficiently and amplifying investigators’ resources online during messy information management crises.

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 (About Challenge.gov, para. 2). 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.

Figure 5: The Challenge.gov Platform

The screenshot displays the Challenge.gov website interface. At the top, the logo reads "Challenge.gov Government Challenges, Your Solutions". Navigation tabs include "Home", "Find Challenges", and "About". A search bar contains the text "e.g.: 'Apps' or 'Health'" and a "SEARCH" button. A central banner states "On Challenge.gov, the public and government can solve problems together." with a "SIGN UP AND PARTICIPATE" button and a link to "Learn More".

The main content area is divided into sections:

- Featured Challenges:** Shows a challenge titled "United States Mint: Kids' Baseball Coin Design Challenge" by the United States Mint. It includes a "24 days to vote" timer and a "LEARN MORE" link.
- Recent Challenges:** Shows a challenge titled "Developing Strategies to Measure SORNA Implementation Costs and Public Safety Benefits" by the U.S. Department of Justice. It includes a "About 4 months to submit" timer, "\$50,000 in prizes", and a "LEARN MORE" link.
- Browse Challenges:** A sidebar with "CATEGORIES" and "ORGANIZATIONS". Categories listed include Defense (29), Economy (33), Education (63), Energy & Environment (55), Health (100), International Affairs (11), Jobs (19), Personal and Public Safety (31), Science & Technology (133), Software (50), and Technology (4).

Source: Challenge.gov shows a list of current challenges available on the site.

Reducing Administrative Distractions at the Navy

In summer 2013, the Department of the Navy launched a broadcast search crowdsourcing initiative called Reducing Administrative Distractions (RAD), gathering input from military and civilian employees on how best to streamline operations. According to the program's website, RAD solicits ideas from employees for "which programs can be eliminated, reduced, converted to electronic media, automated, or otherwise made more efficient." The program will unfold over about four months, and then the process will be repeated.

For RAD, the Navy used the IdeaScale platform, at IdeaScale.com, the same platform which handled the White House *SAVE Award*. The program lists recognition from the Chief of Naval Operations and possible cash rewards through the Navy's Beneficial Suggestions (MILCAP) Program as motivators for participation from Navy employees. If successful, the RAD program could save the Navy time and money by fixing operational inefficiencies and improving wartime readiness.

In 2009, President Obama, in conjunction with the U.S. Office of Management and Budget, awarded the first annual White House Securing Americans Value and Efficiency (SAVE) Award. The award is given to a federal employee who submits the best cost-cutting idea for government operations, focusing on the dollars saved by streamlining specific functions. The best idea is awarded a prize and the top ideas are profiled on the White House's SAVE web page. In the past few years, more than 56,000 ideas have been submitted, and the winning ideas are projected to save the government millions of dollars in the long term (About the Government Reform for Competitiveness and Innovation Initiative; About the *SAVE award*; Chopra and Metzenbaum, 2010; Long, 2009). The 2012 *SAVE Award* proposed that government employees who receive mass transit passes switch to the senior discount rate as soon as eligible, saving government agencies as much as half the cost of this assistance without affecting the employee's received benefits. Similar initiatives, where employees suggest cost-saving ideas, often small incremental changes that add up across large organizations, have taken root in large companies like Walmart (Fenwick, 2010).

While type one and type two approaches address information management problems, the broadcast search approach to crowdsourcing solves ideation problems that have empirically "right" answers, such as cost-saving formulas or scientific solutions. With the broadcast search approach, government agencies can ask citizens for practical ideas to solve specific problems. Broadcast search works in part because by casting a wide net online, an organization can reach those on the margins of a problem domain, who may have unique heuristics, tool kits, or perspectives that could aid in solving a given problem. Research into marginality in problem-solving with broadcast search has shown that any number of factors may help "outsiders" perform well in a problem-solving situation. Technical marginality is when someone on the edges of a discipline brings a unique perspective to a problem, such as a traffic engineer who solves a difficult geophysical algorithm related to earthquake prediction (Jeppesen and Lakhani, 2010). Rank marginality means that lower positions in an organizational chart, such as receptionists and program coordinators, may solve problems that managers and other experts may not have the skill to solve (Villarroel and Reis, 2010).

Government agencies have also used third-party platforms for broadcast search crowdsourcing, most notably InnoCentive, a crowdsourced scientific research and development platform (Lakhani, 2008). In 2009–2010, NASA offered a \$30,000 prize on the InnoCentive platform for an algorithm for predicting solar flares, and the winner was a retired radio engineer who solved the problem (N. B. Johnson, 2010).

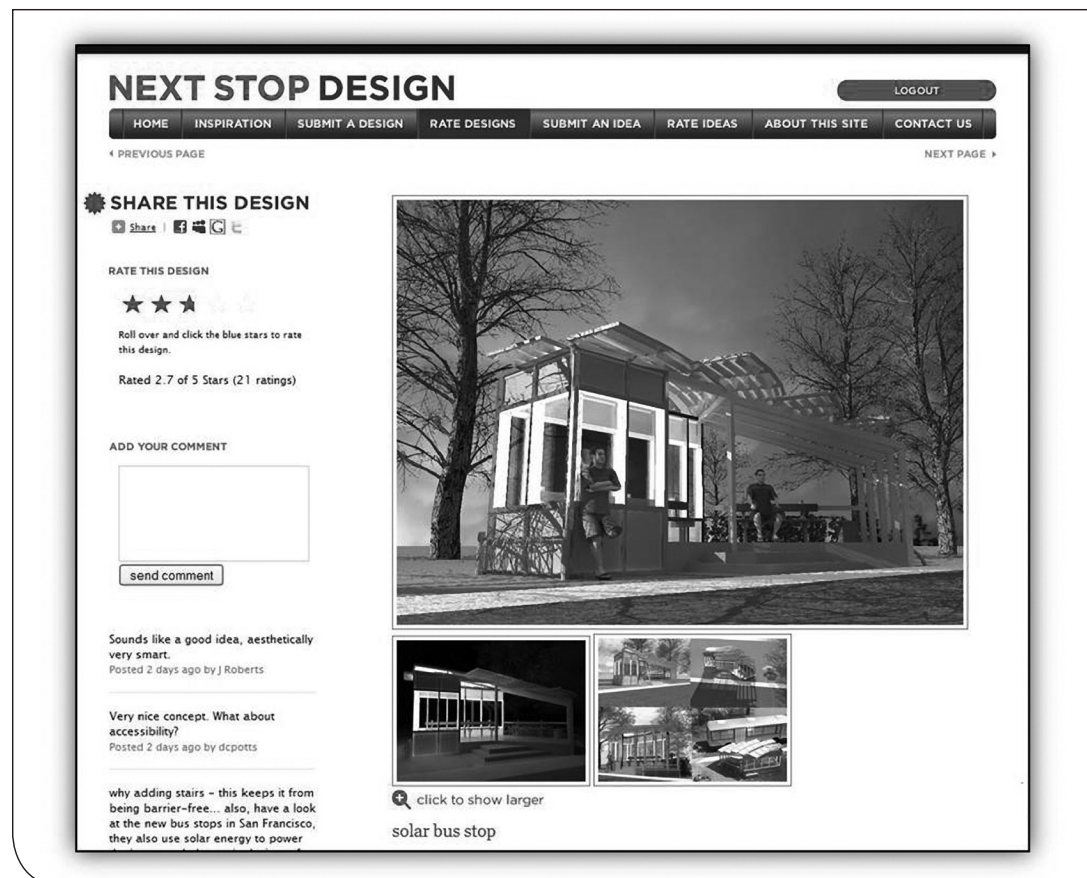
Type Four: Peer-Vetted Creative Production

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 (Fletcher, 2006; Lakhani and Kanji, 2008).

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 (Brabham, 2012b). The *Next Stop Design* project was replicated in part for the inTeractive Somerville project in Somerville, Massachusetts, where the outcomes were also quite successful (Messina, 2012).

Figure 6: The *Next Stop Design* Website



Source: *Next Stop Design* website showing a user-submitted bus stop shelter design, ratings, and comments.

Another type four crowdsourcing process concluded in 2009. This was a joint project between the Intelligent Transportation Society of America (ITS), IBM, Spencer Trask Collaborative Innovations, and other partners, with the goal of coming up with a technological solution to alleviate traffic congestion, a problem that wastes countless environmental resources and costs millions of dollars annually. The winning idea, chosen from a finalist pool voted on by users, was iCarpool.com, a collection of tools and dashboards to help citizens make behavioral changes away from solo commuting (IBM, ITS America, 2009).

Type four crowdsourcing applications can help a government agency solicit solutions to ideation problems that require broad-based public support or that do not truly have empirically “right” answers. By allowing citizens to both submit ideas online and vote on the ideas they want from their peers, the type four process can mirror the deliberative democratic process inherent in traditional face-to-face public participation programs.

Best Practices and Considerations for Executing Crowdsourcing Applications

As crowdsourcing cases have proliferated in business and the public sector and as empirical research on these cases comes to light, scholars and practitioners of crowdsourcing have identified a number of common principles or best practices. The following list of 10 best practices serves as a practical guide for any government organization hoping to extend their problem-solving abilities by crowdsourcing the public participation process of governance. While some of these best practices apply directly to one or a few specific crowdsourcing types, the practices presented are generally applicable for any crowdsourcing venture.

The best practices discussed below are presented within the phase in which they occur:

- The Planning Phase
- The Implementation Phase
- The Post-Implementation Phase

The Planning Phase

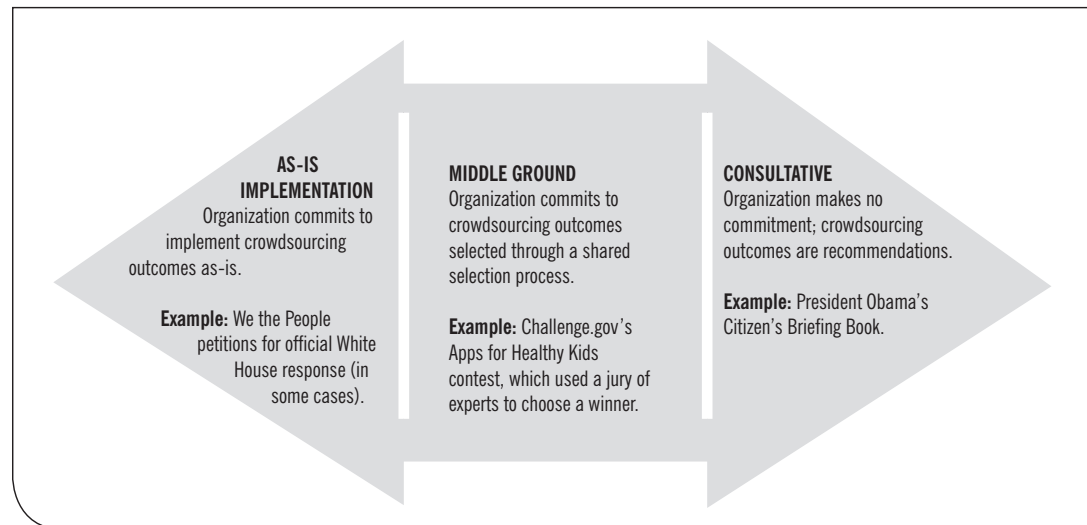
Best practices in this phase are applicable to all four types of crowdsourcing activities.

Best Practice One: Clearly define the problem and solution parameters. In any crowdsourcing venture, the online community needs a clear directive. The problem needs to be well-framed and specific, and the online community needs to be given clear parameters for how they can contribute to the project. Asking an overly broad question of an online community, such as “What is your vision for the city in 10 years?” will generate thoughtful responses and may turn out to be quite a valuable exercise in public participation and long-term visioning for the city. But it is almost certain that the broad question will also elicit from citizens a wide range of responses, many vague, few feasible, which present city planners with the problem of selecting the best ideas from a mixed bag of apples and oranges. Posing a more specific question, such as “What kinds of sports facilities would you like to see in the new downtown public park?” will draw more specific responses that will better serve city planners. Both types of questions can be useful for public participation programs, but only a specific question will effectively engage citizens in the co-creation of a useful information resource or new actionable idea.

Clarity of the problem goes hand-in-hand with the need for parameters for how users can provide solutions. At the crowdsourced clothing company Threadless, users may submit silk-screened graphic T-shirt designs, but they must do so using a predefined Adobe Illustrator template. They are also made aware of the range of T-shirt colors available to them as they create their design. Without the template, a design brief, and terms of service on the site, all of which effectively constrain the kind of submission users can make at Threadless, users might submit all kinds of graphic design ideas that would not be producible as actual, salable T-shirts. Government crowdsourcing ventures must make it just as clear to citizens how they are expected to contribute their ideas in terms of technical formatting and content or topical requirements.

Best Practice Two: Determine the level of commitment to the outcomes. Any crowdsourcing application requires the organization to communicate to the online community exactly how much impact user-submitted ideas and labor will have on the organization. Government agencies should commit upfront to the degree to which the online community's ideas will be put to use. Figure 7 proposes a spectrum for thinking about the level of commitment to crowdsourcing outcomes, ranging from as-is implementation on one end to viewing crowdsourcing activities as merely consultative.

Figure 7: Degree of Upfront Government Commitment to Crowdsourcing Outcomes



On the as-is implementation end of the spectrum, the government agency is committed to using the online community's ideas or labor completely. This means that in a contest format, the winning idea or design or project selected by the online community will be implemented. The benefit of this extreme is that by embracing this stance, the government is communicating to the online community that they are trusted to come up with good ideas, and the level of public participation may be higher because citizens believe their input will matter. The obvious downside, though, is that the government may not be pleased with the outcome, either because it undoes effective long-standing policy, is not financially feasible, or is not a usable idea. The Obama administration faced this problem with the Citizen's Briefing Book, an online initiative to solicit policy proposals from the public after Obama's election in 2008 and before his taking office in 2009. More than 1.4 million votes on 44,000 proposals led to winning ideas such as legalizing marijuana, legalizing online poker, and revoking the Church of Scientology's tax-exempt status, all out of alignment with the Obama administration's policy hopes (Giridharadas, 2009). The Obama administration downplayed the results and was no doubt thankful it had not committed to an as-is implementation stance on this activity.

Comedian Stephen Colbert has "hijacked" naming contests for a Hungarian bridge (Burwell and Boler, 2008) and a NASA contest to name a new module on the International Space Station (Coyle, 2009). The Hungarian government reneged when Colbert won its contest, choosing instead a name that was not even a finalist, and NASA also reneged, but they showed a sense of humor by naming a treadmill onboard the Space Station after the comedian (Siceloff, 2009). It is difficult to identify cases where government has truly committed to an online community's ideas in an as-is way, though the closest example might be We the People, the Obama administration's public petition system (<https://petitions.whitehouse.gov/>). At We the People, anyone can create an online petition, and any petition gaining a certain number of signatures within a given time frame is guaranteed an official White House response, though critics have noted that

the signature threshold shifts over time (Zimmerman, 2013). While a guaranteed response from the White House for a qualifying petition does not constitute a commitment to pursue the policies proposed in that petition—and it rarely does—the mechanism of guaranteeing an official government response is in the spirit of an as-is implementation.

At the consultative end of the spectrum, government does not make any promise that it will make use of any of the ideas that come from a crowdsourcing venture. Instead, the government agrees to use crowdsourcing outcomes only if it decides they make sense. There is no guarantee any of the online community's work will be used in the end. The advantage favors the government, which does not have to risk anything by running the crowdsourcing venture, but the disadvantage is that the online community may not be as motivated to participate if they do not sense that their work will matter. In the *Next Stop Design* case, there was no compensation promised to the winners, nor any commitment that the winning bus stop shelter would eventually be built. Despite this, the project enjoyed a relatively high level of participation, though some participants inquired after the conclusion of the contest when the winning design would be built and were disappointed to find out it may not ever be built, suggesting they may not have participated as robustly had they known that fact in advance (Brabham, 2012b).

The middle ground between these as-is and consultative extremes is perhaps a more reasonable place for government crowdsourcing ventures to reside. In this middle ground, a shared selection process ensures that the online community has a substantial say in the outcome, but the government still maintains a level of control over the process that offers a way out if the venture goes awry. For example, if a government agency were to take on a type four design competition, the government may allow the online community to vote for the top 10 designs, but then the agency retains final choice among those finalist designs. Or the opposite could be true: the government agency selects the top 10 user-submitted designs but then turns the voting over to the online community and commits to the outcome. Another middle-ground option might involve a mix of citizens, design experts, and government agency staff jurying the user-submitted designs in combination with weighted votes from the online community. No matter the level of commitment on this spectrum, what matters is that the government agency sponsoring the venture truly commits to the selection mechanism and keeps the process transparent, or else citizens may grow suspicious of the project and be discouraged from participating in governance later.

Best Practice Three: Know the online community and their motivations. It is important to know whether a given crowdsourcing application will appeal to participants. An online community only exists when people show up and are eager to contribute. Understanding the various motivations for participation among online community members, especially regarding their willingness to contribute user-generated content and ideas, is paramount. The emerging empirical research on motivations for participation in crowdsourcing (e.g., Acar and van den Ende, 2011; Brabham, 2010; Lakhani, Jeppesen, Lohse, and Panetta, 2007; Lietsala and Joutsen, 2007) more or less confirms common theories about why people blog (Liu, Liao, and Zeng, 2007), why YouTube members post videos (Huberman, Romero, and Wu, 2009), why Wikipedians contribute to the online encyclopedia project (Nov, 2007), and why people tag content on the photo-sharing site Flickr (Nov, Naaman, and Ye, 2008). There is a range of reasons:

- To earn money or build a portfolio to get future work
- To socialize, make friends, pass the time when bored, or have fun
- To contribute to a large project of common interest and challenge oneself with solving a tough problem

Media scholar Henry Jenkins (2006) reminds us that members of participatory cultures “believe their contributions matter, and feel some degree of social connection with one another” (p. 3). Motivations are a mixed bag of altruistic and extrinsic factors in these cases.

Still, we know relatively little about which motivators are in play in a given crowdsourcing application or why participants are drawn to specific projects. It is no doubt a combination of factors, each individual contributor participating for his or her own reasons, though additional research may help tailor a crowdsourcing venture to those who are motivated by certain things. Public administrators should be mindful of this mosaic of motivators and design government crowdsourcing ventures that are attuned to the type of citizen they hope to attract and elicit the kind of response they need. Ongoing research and good online community management, discussed below, are key to this.

The Implementation Phase

In this phase, the user must tailor each of the best practices conducted below to the type of crowdsourcing approach to be used.

Best Practice Four: Invest in usable, stimulating, well-designed tools. One of the most surprising findings to emerge in a series of interviews with participants from the *Next Stop Design* case was that users were drawn to the project because the site was so well designed, intuitive, and easy to use (Brabham, 2012c). The need for good usability in government websites is nothing new (The Case), and U.S. government sites are required to be maximally accessible to people of all physical abilities (Standards), but the fact that good design motivates participation in crowdsourcing and the fact that participants would take note of good design is notable. Easy-to-use websites and submission systems should be in place for any government crowdsourcing venture, and that likely means hiring professional, third-party usability and web design experts if one does not reside on an agency's staff already. Crowdsourcing may be efficient, but good crowdsourcing is not usually entirely free to implement.

Incidentally, as a government-funded project, the source code for the *Next Stop Design* website is freely available online for other government agencies hoping to develop new type four crowdsourcing activities on that platform (<https://github.com/nextstopdesign/nextstopdesign-1.0>).

Best Practice Five: Craft policies that consider the legal needs of the organization and the online community. Crowdsourcing brings with it a slew of potential legal problems, both for participants and for the organizations sponsoring the ventures. These problems, however, are manageable with some foresight. These legal questions tend to cluster around issues of preserving free speech and navigating copyright and intellectual property issues.

Free speech is not only a core tenet of democratic governance (Noveck, 2003), it is also essential for fostering innovation and problem-solving (Amabile, 1998; Von Hippel, 2005). With any government-sponsored project, public dissent is inevitable, and the question is how to preserve the integrity of a crowdsourcing venture while upholding the rights of citizens to speak out against something with which they disagree. When online communities lash out on crowdsourcing platforms, which Jeff Howe cleverly calls "crowdslapping" (Howe, 2006b), government agencies must choose how to respond.

Broadly, there are four kinds of crowd resistance:

- **Disruptive "crowdslapping"** is peaceful protest and rational arguments posted to a crowdsourcing site by a citizen, which is the ideal kind of dissent for an agency to encounter since it is the kind of rational dissent that might normally appear in any face-to-face traditional public participation activity, such as a town hall meeting or hearing.
- **Destructive "crowdslapping"** is more aggressive and takes the form of "flaming" or "flooding" (Dutton, 1996; Lange, 2006) an online forum with repetitive or offensive content that discourages others from engaging in a productive dialogue.

- **Cracking**, which is the term for malicious hacking, outright prevents other citizens from participating, involving breaking a site's functionality through the manipulation of code or other tactics. Cracking, of course, would be akin to destroying a public forum by calling in a bomb threat, which is not something a government crowdsourcing application should tolerate.
- **Ignoring**, the most powerful form of protest in crowdsourcing, is when participants simply choose to ignore the project. If no one shows up to the online community, the project fails, and this is something that has been explored by e-government experts (Brabham, 2013a; Noveck, 2003).

It is important to preserve free speech in government crowdsourcing applications. Crowdsourcing applications are akin to a limited public forum in legal terms, which means government can control the time, place, and manner of speech in content-neutral ways for the sake of public discourse (Bluestein, 2009). Crowdsourcing ventures should be viewed in the same way as town hall meetings and other traditional public participation forums. Ideally, too, there would be architectural features of a crowdsourcing application that would allow citizens to govern themselves, allowing community standards and easy tools, such as reputational icons attached to users, to govern who is heard and how they are heard (Lessig, 1999; Post, 1995).

Because crowdsourcing applications, especially the ideation approaches of broadcast search and peer-vetted creative production, involve an online community submitting original ideas, it is important to have in place a policy of handling intellectual property and possible copyright violations. Crowdfunding site Kickstarter was recently subject to a lawsuit involving a 3D printer project from technology company Formlabs that was funded through the site, which another company, 3D Systems, claimed infringed on its intellectual property ("Kickstarter Sued," 2012). The Digital Millennium Copyright Act (DMCA), terms of use for websites, and other policies can help protect the government agency sponsoring the crowdsourcing venture. Crowdsourcing companies such as InnoCentive and Threadless have clear policies in place to protect the organization from copyright problems stemming from user-submitted ideas.

Best Practice Six: Launch a promotional plan and a plan to grow and sustain the community. If an online community gets off to a slow start and there are only a few participants in a crowdsourced public participation venture, it will appear to newcomers as if the place is a ghost town, and these newcomers may be less likely to get involved at all. Likewise, if a community is already quite large, robust, and has developed its own internal culture and governance structure, newcomers to the community may not feel welcome or may be unsure how to become initiated into the group or taken seriously.

Balancing the dynamics of an online community between the above two extremes is an art, and a strategic plan for online community growth should be in place before a crowdsourcing venture gets going. Some of the most well-known crowdsourcing businesses, such as Threadless, managed to grow quickly for many years without having to do any formal advertising, relying on word-of-mouth from bloggers and fans to drive new participants and customers to the site. The *Next Stop Design* case attempted a rather traditional public relations campaign to get the online community started, including press releases to news organizations and e-mail blasts to personal lists, but the largest spikes in growth happened when architecture blogs, including foreign sites, found the contest and promoted it to their communities (Brabham, 2012d).

By and large, participants in crowdsourcing communities self-select into the projects based on their interests and expertise; they are also drawn to handsome rewards in some instances. Building an online community, then, has much to do with market research, audience segmentation,

and targeted promotional campaigns; it is a process of tailoring to specific groups rather than mass appeal. It may also make sense to ethically seed an online community to get it off the ground (Powazek, 2012). Government agencies hoping to crowdsource should consider seriously a strategic plan for growing the online community and for sustaining it once it reaches a critical mass and begins to be truly productive.

Best Practice Seven: Be honest, transparent, and responsive. As a concept, online community management has been discussed at some length by practitioners, primarily because managing venues such as discussion boards and attracting members to an online community in the first place are core requirements for any successful venture based on the labor and energies of volunteers (O’Keefe, 2008; Powazek, 2002). The basic principles of public relations and relationship management apply here. Relationships between an organization and its stakeholders are usually “strongest when they are mutually beneficial and characterized by “win-win’ outcomes” (Heath and Coombs, 2006, p. 5), when they are symmetrical and two-way in the flow of communication (J. E. Grunig, Grunig, and Dozier, 1992; L. A. Grunig, Grunig, and Dozier, 1992), and when they are at the core of strategic communication practice (Ledingham, 2003). Public relations activities in this light are best seen through the lens of strategic management, following a typical series of steps consisting of research, objectives, strategies, tactics, and evaluation (Parkinson and Ekachai, 2006).

It is important that the online community in a crowdsourcing venture trusts the government agency sponsoring the project, and they should feel as though their voices will be heard and their ideas handled with care. It may help for the managers of these crowdsourcing ventures to think of themselves less as managers and more as curators, cultivating ideas and contributions from the online community and elevating them into practical use (Phillips and Brabham, 2012). Curators should view their roles as being both secretaries and shepherds, taking note of the community’s needs and wants while moving the group toward a common goal.

Best Practice Eight: Be involved, but share control. Any profession that is constantly worried about what will be part of an official public record (Bluestein, 2010) is right to be nervous about turning over the reins to citizens, especially when there are so many public sector and for-profit cases of social media and other online activities gone wrong. But it is important to let citizens take an active role in the crowdsourcing process, all within the as-is implementation or consultative spectrum that the government agency has committed to upfront.

Food manufacturer Heinz tried to run a crowdsourced advertising contest in 2007, inviting users to submit advertisements promoting its ketchup. As with many type four examples, unusable content rolls in, but if the online community is empowered to vet the submissions of peers, they will surely “find the best stuff” (Howe, 2006a). Heinz’s problem was that it hired an expensive Madison Avenue advertising firm to wade through the flood of bad submissions, ultimately costing the company money and time without turning up a winning advertisement (Story, 2007). Had the process been left to the online community, there surely would have been a different outcome for Heinz.

The case of Greenpeace and Reddit also shows the benefits of sharing control. Greenpeace held an online naming contest for a whale it was tracking in the Pacific Ocean as part of its anti-whaling campaign. It hoped to name the whale something distinguished, but instead Mr. Splashy Pants was suggested and soon was a landslide winner of the contest thanks to promotion from content aggregating site Reddit. Ultimately, Greenpeace embraced the Mr. Splashy Pants moniker and launched a successful marketing campaign, complete with merchandise sales, around the figure (Ohanian, 2009). This demonstrates that sharing control can often lead to positive, if unintended, outcomes for the crowdsourcing organization. The government agency should always remain involved and present in the crowdsourcing platform,

ideally through an online community management team, but they must be comfortable letting the online community run free to some degree or else good ideas might be stifled.

The Post-Implementation Phase

As in the planning phase, the following two best practices are applicable to all types of crowdsourcing.

Best Practice Nine: Acknowledge users and follow through on obligations. As important as knowing what motivates an online community to participate in crowdsourcing is making sure those participants' needs are met, which often takes the form of acknowledgment. If the crowdsourcing application is a contest of some sort, which is more common in an ideation challenge, it makes sense to publicly acknowledge the winners in some fashion. And for information management problems, where the end goal may be to build or organize a collective resource rather than design a new plan or policy, acknowledgment may come in the form of a mass "thank you" to all participants.

The White House maintains an entire page on its website to acknowledge the efforts of recent and past *SAVE Award* winners (<http://www.whitehouse.gov/save-award>), as well as official press releases on other parts of the White House website. This kind of acknowledgement goes a long way to encourage people to participate in future endeavors and to feel connected to government after the project is over. Simple acknowledgment for work performed in a crowdsourcing venture, which may serve as a badge of honor for individuals to carry among their peer groups and professional colleagues, is sometimes a more important motivator than even large cash rewards.

Figure 8: The 2010 *SAVE Award* Winners Page

The screenshot shows the White House website's page for the 2010 SAVE Award winners. At the top, there is a search bar and navigation links. The main heading is 'The President's SAVE Award'. Below this, there are links for previous years' awards. The central focus is the '2010 SAVE Award' section, which features a video of President Obama presenting the award to Trudy Givens. The video player shows a duration of 1:11 / 2:29. Below the video, the text identifies the winner as Trudy Givens from the Wisconsin Bureau of Prisons. To the right, there is a 'STAY CONNECTED with EMAIL ALERTS' sign-up box with a 'Sign Up' button.

Source: <http://www.whitehouse.gov/save-award/save-award-2010>. The page acknowledges the winner of the competition, Trudy Givens from the Bureau of Prisons, with a brief write-up and video of Givens meeting President Obama and explaining her idea.

Best Practice Ten: Assess the project from many angles. Crowdsourcing projects generate enormous amounts of data, all of which can be used to refine the process in an ongoing way or to inform future endeavors. With simple, free tools, such as Google Analytics, government agencies can track traffic patterns on the crowdsourcing website and determine exactly how people engage the project and how they arrive and depart from the website. This includes discovering inbound links to the website, which can tip off an online community manager about new affiliated sites that have begun to direct traffic to the project, as well as common keywords people use to find the project website. Advanced uses of these tools can allow administrators to track with precision any number of outreach efforts to grow the online community, too, using custom links and campaigns associated with different stakeholder groups.

A crowdsourcing project may also require citizens to register free accounts on the website before being able to fully participate or contribute new ideas. This registration process can capture a wealth of demographic and other information about participants that can help organizers track success. For instance, with the *Next Stop Design* project, users were required to complete a registration process to use all of the site's functions. The registration form asked users key demographic questions, frequency of transit use, and past attendance at traditional public participation meetings. These data helped the project team discover that participants were mostly young, used mass transit frequently, and had mostly never attended traditional public participation meetings, all indicators that the project succeeded in bringing new voices into the process (Brabham, 2012b).

Government agencies should also embark on original empirical research, issuing regular surveys on the site and initiating interviews and focus groups with participants. These studies could yield qualitative and quantitative insights that could improve the process in an ongoing way, a kind of "monitoring the pulse" practice for the agencies involved. Textual analysis techniques can also be helpful, as a systematic approach to understanding the content trends in a crowdsourcing process could reveal a zeitgeist that could steer an agency in new directions. For instance, environmentally friendly materials, notification systems to alert passengers to arriving buses, and good lighting to create a sense of safety were common themes across the majority of design submissions in the *Next Stop Design* bus stop shelter competition, even though the top winners did not particularly play up these features. This suggests a public desire for these features in future transit shelters, no matter the contest outcome.

Not all assessment procedures related to a crowdsourcing project need to take place on the project website itself, either. So much of a public participation program is about educating and informing citizens about the complexities of the policy making or planning process or about the complex issues at hand (Beierle, 1998). Even if participants do not fully engage a government-sponsored crowdsourcing application, their having participated at all indicates they may have learned at least a small amount about the problem the government agency was attempting to solve.

A White House *SAVE Award* entry may teach a citizen about government spending and operations, a bus stop shelter design competition may serve as a teaching tool for the citizens about the complexities of urban planning and transportation, and a crowdsourced transcription of old Census records may encourage an appreciation for our collective history. Each of these learning opportunities may make future policy making—whether cutting government waste, passing a bond to enhance public transit, or initiating public history and art projects—just a bit smoother and bring citizens a bit closer into the decision-making process. Good government crowdsourcing ventures must make sure to assess learning outcomes, even tangential ones, that may result from citizens having participated in the process at hand.

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.

This report hopes to inspire future crowdsourcing ventures in government, offering a tidy typology for four approaches to crowdsourcing based on problem type. This report provides an overview of crowdsourcing, its history and definitions, and how it works in a government context, along with a list of best practices to consider at all phases of a crowdsourcing venture. These best practices also imply a need for future research and case studies related to crowdsourcing in governance. Few have intimate knowledge of how to run a crowdsourcing project from start to finish even though its use is relatively widespread, and empirical research on crowdsourcing is in its infancy. It will be the role of government, namely the White House's Office of the Chief Technology Officer, to ensure collaboration and knowledge sharing related to crowdsourcing in government. Regular summits on crowdsourcing in government are needed for elected officials, administrators, and proprietors of crowdsourcing platforms (e.g., IdeaScale, InnoCentive, Mechanical Turk) to share this information with one another to improve the business of government. Connections between government and academic institutions are certainly needed as well.

While many of the examples in this report focus on the federal level, there is clearly room for crowdsourcing at the state and local levels, too. The challenge for these smaller government entities, however, will be in finding the resources necessary to support a successful crowdsourcing endeavor. These resources include the money to build and support the websites and other technologies needed for a crowdsourcing application and the staff to act as online community managers. But the most substantial hurdle for smaller government entities will be, frankly, having the guts to give crowdsourcing a try. Planners, engineers, and architects at a regional transit agency, for example, may feel threatened by a crowdsourced transit planning competition, worried that the efforts of volunteer citizens may make their jobs obsolete. An elected official may worry that inviting too much public involvement may expose hidden cracks in the foundation of an administration, highlighting operational inefficiencies or a lackluster

record of accomplishments. Or an elected official may simply worry that crowdsourcing policy proposals will drift him or her too far off message politically. These worries are not entirely unfounded, but they reveal a hesitant attitude about innovation that is far more worrisome than the specific outcomes of any one crowdsourcing venture. The Obama administration's push for transparency and innovation in government has helped to spread crowdsourcing and other technology-based projects throughout the federal government quickly, but the majority of local government agencies have not felt this push. Local government agencies, however, have the benefit of small size working in their favor; there are fewer resources at the local level, but there is more agility and smaller constituencies to win over with new experiments. Hopefully, as government crowdsourcing matures, we will see more of these activities taking place in states and cities.

References

- 4Chan: The rude, raunchy underbelly of the Internet. (2009, April 8). *FoxNews.com*. Retrieved from <http://www.foxnews.com/story/2009/04/08/4chan-rude-raunchy-underbelly-internet/>
- About Challenge.gov. (n.d.). Challenge.gov. Retrieved from <http://challenge.gov/about>
- About the government reform for competitiveness and innovation initiative. (n.d.). U.S. White House. Retrieved from <http://www.whitehouse.gov/federalvoices/about>
- About the SAVE award. (n.d.). U.S. White House. Retrieved from <http://www.whitehouse.gov/save-award/about>
- Acar, O. A., and van den Ende, J. (2011). Motivation, reward size and contribution in idea crowdsourcing. Presented at the DIME-DRUID Academy Winter Conference 2011, Aalborg, Denmark. Retrieved from <http://www2.druid.dk/conferences/viewpaper.php?id=502498andcf=47>
- Albors, J., Ramos, J. C., and Hervas, J. L. (2008). New learning network paradigms: Communities of objectives, crowdsourcing, wikis and open source. *International Journal of Information Management*, 28(3), 194–202.
- Allen, N., Caillas, A., Deveau-Rosen, J., Kreps, J., Lemmo, T., Merante, J., ... Webbink, M. (2009, June). Peer to Patent second anniversary report. The Center for Patent Innovations at New York Law School. Retrieved from http://dotank.nyls.edu/communitypatent/CPI_P2P_YearTwo_hi.pdf
- Amabile, T. M. (1998). How to kill creativity. *Harvard Business Review*, 77–87.
- Atkinson, G. M., and Wald, D. J. (2007). “Did You Feel It?” intensity data: A surprisingly good measure of earthquake ground motion. *Seismological Research Letters*, 78(3), 362–368.
- Barr, J., and Cabrera, L. F. (2006). AI gets a brain: New technology allows software to tap real human intelligence. *ACM Queue*, 4(4), 24–29.
- Beierle, T. C. (1998). *Public participation in environmental decisions: An evaluation framework using social goals* (Discussion paper No. 99-06). Washington, D.C.: Resources for the Future. Retrieved from <http://ageconsearch.umn.edu/bitstream/10497/1/dp990006.pdf>
- Bluestein, F. (2009, August 5). Limited public forum analysis revisited. *Coates’ canons: NC local government law blog*. Weblog. Retrieved from <http://canons.sog.unc.edu/?p=139>
- Bluestein, F. (2010, April 14). Citizen participation information as public record. *Coates’ canons: NC local government law blog*. Weblog. Retrieved from <http://canons.sog.unc.edu/?p=2238>

- Bongard, J. C., Hines, P. D. H., Conger, D., Hurd, P., and Lu, Z. (2013). Crowdsourcing predictors of behavioral outcomes. *IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans*, 43(1), 176–185.
- Brabham, D. C. (2008). Crowdsourcing as a model for problem solving: An introduction and cases. *Convergence: The International Journal of Research into New Media Technologies*, 14(1), 75–90.
- Brabham, D. C. (2009). Crowdsourcing the public participation process for planning projects. *Planning Theory*, 8(3), 242–262.
- Brabham, D. C. (2010). Moving the crowd at Threadless: Motivations for participation in a crowdsourcing application. *Information, Communication and Society*, 13(8), 1122–1145.
- Brabham, D. C. (2012a). Crowdsourcing: A model for leveraging online communities. In A. Delwiche and J. J. Henderson (Eds.), *The participatory cultures handbook* (pp. 120–129). New York: Routledge.
- Brabham, D. C. (2012b). The effectiveness of crowdsourcing public participation in a planning context. *First Monday*, 17(12). Retrieved from <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/4225/3377>
- Brabham, D. C. (2012c). Motivations for participation in a crowdsourcing application to improve public engagement in transit planning. *Journal of Applied Communication Research*, 40(3), 307–328.
- Brabham, D. C. (2012d). Managing unexpected publics online: The challenge of targeting specific groups with the wide-reaching tool of the Internet. *International Journal of Communication*, 6, 1139–1158.
- Brabham, D. C. (2013a). *Crowdsourcing*. Cambridge, MA: MIT Press.
- Brabham, D. C. (2013b). The four urban governance problem types suitable for crowdsourcing citizen participation. In C. N. Silva (Ed.), *Citizen e-participation in urban governance: Crowdsourcing and collaborative creativity*. Hershey, PA: IGI-Global.
- Brabham, D. C., Ribisl, K. M., Kirchner, T. R., and Bernhardt, J. M. (2013, March). Crowdsourcing applications for public health. Unpublished paper.
- Brito, J. (2008). Hack, mash, and peer: Crowdsourcing government transparency. *The Columbia Science and Technology Law Review*, 9, 119–157.
- Brody, S. D. (2003). Measuring the effects of stakeholder participation on the quality of local plans based on the principles of collaborative ecosystem management. *Journal of Planning Education and Research*, 22(4), 407–419.
- Brody, S. D., Godschalk, D. R., and Burby, R. J. (2003). Mandating citizen participation in plan making: Six strategic planning choices. *Journal of the American Planning Association*, 69(3), 245–264.
- Burby, R. J. (2003). Making plans that matter: Citizen involvement and government action. *Journal of the American Planning Association*, 69(1), 33–49.
- Burwell, C., and Boler, M. (2008). Calling on the Colbert Nation: Fandom, politics and parody in an age of media convergence. *Electronic Journal of Communication*, 18(2-4). Retrieved from <http://www.cios.org/www/ejc/EJCPUBLIC/018/2/01845.html>

- Callison-Burch, C. (2009). Fast, cheap, and creative: Evaluating translation quality using Amazon's Mechanical Turk. In *Proceedings of the 2009 conference on empirical methods in natural language processing* (pp. 286–295). Stroudsburg, PA: Association for Computational Linguistics.
- Campbell, H., and Marshall, R. (2000). Public involvement and planning: Looking beyond the one to the many. *International Planning Studies*, 5(3), 321–344.
- Carp, J. (2004). Wit, style, and substance: How planners shape public participation. *Journal of Planning Education and Research*, 23(3), 242–254.
- Carr, N. (2010, March 4). A typology of crowds. *Rough Type*. Weblog. Retrieved from <http://www.roughtype.com/?p=1346>
- Chesbrough, H. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Boston, MA: Harvard Business Press.
- Chopra, A., and Metzenbaum, S. (2010, December 8). Designing for democracy. U.S. White House Open Government Initiative. Weblog. Retrieved from <http://www.whitehouse.gov/blog/2010/12/08/designing-democracy-0>
- Coyle, J. (2009, April 14). NASA: Colbert name on treadmill, not room. *NBCNews.com*. Retrieved from http://www.nbcnews.com/id/30217550/ns/technology_and_science-space/t/nasa-colbert-name-treadmill-not-room/#.UW3qvsrIFWI
- Creighton, J. L. (2005). *The public participation handbook: Making better decisions through citizen involvement*. San Francisco: Jossey-Bass.
- Data, data everywhere. (2010, February 25). *The Economist*. Retrieved from <http://www.economist.com/node/15557443>
- Davey, N. (2010, January 7). Ross Dawson: Six tools to kickstart your crowdsourcing strategy. MyCustomer.com. Retrieved from <http://www.mycustomer.com/topic/customer-intelligence/ross-dawson-six-tools-start-your-crowdsourcing-strategy/109914>
- Dutton, W. H. (1996). Network rules of order: Regulating speech in public electronic fora. *Media, Culture and Society*, 18(2), 269–290.
- Estellés-Arolas, E., and González-Ladrón-de-Guevara, F. (2012). Towards an integrated crowdsourcing definition. *Journal of Information Science*, 38(2), 189–200.
- Executive Office of the President of the United States. (2012). *Implementation of federal prize authority: Progress report*. Washington, D.C. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/competes_report_on_prizes_final.pdf
- Fenwick, N. (2010, August 2). Unscrew your light bulb! *Forrester: Nigel Fenwick's blog for chief information officers*. Weblog. Retrieved from http://blogs.forrester.com/nigel_fenwick/10-08-02-unscrew_your_light_bulb
- Fletcher, A. (2006). *Do consumers want to design unique products on the Internet?: A study of the online virtual community of Threadless.com and their attitudes to mass customisation, mass production and collaborative design* (Unpublished bachelor's thesis). Nottingham Trent University.
- Friedland, N., and Brabham, D. C. (2009). *Leveraging communities of experts to improve the effectiveness of large-scale research efforts* (White paper). Renton, WA: The Friedland Group.

- Fritz, S., McCallum, I., Schill, C., Perher, C., Grillmayer, R., Achard, F., Obersteineer, M. (2009). Geo-Wiki.org: The use of crowdsourcing to improve global land cover. *Remote Sensing*, 1(3), 345–354.
- Geiger, D., Seedorf, S., Schulze, T., Nickerson, R. C., and Schader, M. (2011). Managing the crowd: Towards a taxonomy of crowdsourcing processes. In *Proceedings of the Seventeenth Americas Conference on Information Systems* (p. Paper 430). Detroit, MI.
- Giridharadas, A. (2009, September 12). “Athens” on the net. *New York Times*. Retrieved from http://www.nytimes.com/2009/09/13/weekinreview/13giridharadas.html?_r=3
- Grunig, J. E., Grunig, L. A., and Dozier, D. M. (1992). The excellence theory. In C. H. Botan and V. Hazelton (Eds.), *Public relations theory II* (pp. 21–62). Mahwah, NJ: Lawrence Erlbaum Associates.
- Grunig, L. A., Grunig, J. E., and Dozier, D. M. (1992). *Excellent public relations and effective organization: A study of communication management in three countries*. Mahwah, NJ: Lawrence Erlbaum.
- Haklay, M. (Muki), and Weber, P. (2008). OpenStreetMap: User-generated street maps. *IEEE Pervasive Computing*, 7(4), 12–18.
- Heath, R. L., and Coombs, W. T. (2006). Strategic relationship building: An ethical organization communicating effectively. In *Today's public relations: An introduction* (pp. 1–40). Thousand Oaks, CA: Sage.
- Hou, J., and Kinoshita, I. (2007). Bridging community differences through informal processes: Reexamining participatory planning in Seattle and Matsudo. *Journal of Planning Education and Research*, 26(3), 301–314.
- Howe, J. (2006a, June). The rise of crowdsourcing. *Wired*, 14(6). Retrieved from <http://www.wired.com/wired/archive/14.06/crowds.html>
- Howe, J. (2006b, June 16). Neo neologisms. *Crowdsourcing: Tracking the rise of the amateur*. Weblog. Retrieved from http://www.crowdsourcing.com/cs/2006/06/neo_neologisms.html
- Howe, J. (2008). *Crowdsourcing: Why the power of the crowd is driving the future of business*. New York: Crown.
- Huberman, B. A., Romero, D. M., and Wu, F. (2009). Crowdsourcing, attention and productivity. *Journal of Information Science*, 35(6), 758–765.
- IBM, ITS America. (2009, September 23). Spencer Trask and partners announce the winner in challenge for traffic congestion solutions: iCarpool.com recognized as best traffic solution in the global competition. IBM. Retrieved from <http://www-03.ibm.com/press/us/en/pressrelease/28467.wss>
- Innes, J. E., Connick, S., and Booher, D. (2007). Informality as a planning strategy: Collaborative water management in the CALFED Bay-Delta Program. *Journal of the American Planning Association*, 73(2), 195–210.
- Jenkins, H. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century* (White paper). Chicago: MacArthur Foundation. Retrieved from <http://newmedialiteracies.org/files/working/NMLWhitePaper.pdf>
- Jeppesen, L. B., and Lakhani, K. R. (2010). Marginality and problem-solving effectiveness in broadcast search. *Organization Science*, 21(5), 1016–1033.

- Johnson, A. (2011, February 17). City: SeeClickFix has good first month. *WRAL.com*. Retrieved from http://www.wral.com/news/news_briefs/story/9128944
- Johnson, N. B. (2010, August 30). How agencies are crowd-sourcing their way out of problems. *Federal Times*. Retrieved from <http://www.federaltimes.com/article/20100830/AGENCY03/8300301/1001>
- Kazai, G., Kamps, J., and Milic-Frayling, N. (2011). Worker types and personality traits in crowdsourcing relevance labels. In *Proceedings of the 20th ACM international conference on information and knowledge management* (pp. 1941–1944). New York: Association for Computing Machinery.
- Kickstarter sued over 3D Systems' printer patent. (2012, November 21). *BBC*. Retrieved from <http://www.bbc.co.uk/news/technology-20434031>
- Kittur, A., Chi, E. H., and Suh, B. (2008). Crowdsourcing user studies with Mechanical Turk. In M. Burnett, M. F. Costabile, T. Catarci, B. de Ruyter, D. Tan, M. Czerwinski, and A. Lund (Eds.), *26th Annual CHI Conference on Human Factors in Computing Systems* (pp. 453–456). New York: Association for Computing Machinery.
- Lakhani, K. R. (2008). *InnoCentive.com (A)* (Harvard Business School Case No. 608-170). Cambridge, MA: Harvard Business School.
- Lakhani, K. R., Jeppesen, L. B., Lohse, P. A., and Panetta, J. A. (2007). *The value of openness in scientific problem solving* (Working paper No. 07-050). Retrieved from <http://www.hbs.edu/research/pdf/07-050.pdf>
- Lakhani, K. R., and Kanji, Z. (2008). *Threadless: The business of community* (Harvard Business School Multimedia/Video Case No. 608-707). Cambridge, MA: Harvard Business School.
- Lang, A. S. I. D., and Rio-Ross, J. (2011). Using Amazon Mechanical Turk to transcribe historical handwritten documents. *Code4Lib Journal*, (15). Retrieved from <http://journal.code4lib.org/articles/6004>
- Lange, P. G. (2006). What is your claim to fame? *First Monday*, 11(9). Retrieved from <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1393/1311>
- Ledingham, J. A. (2003). Explicating relationship management as a general theory of public relations. *Journal of Public Relations Research*, 15(2), 181–198.
- Leonard, A. (2013, April 17). Our crowd-mobbed vigilante future. *Salon.com*. Retrieved from www.salon.com/2013/04/17/our_crowdmobbed_vigilante_future
- Lessig, L. (1999). *Code: And other laws of cyberspace*. New York: Basic Books.
- Lietsala, K., and Joutsen, A. (2007). Hang-a-rounds and true believers: A case analysis of the roles and motivational factors of the Star Wreck fans. In A. Lugmayr, K. Lietsala, and J. Kallenbach (Eds.), *MindTrek 2007 Conference Proceedings* (pp. 25–30). Tampere, Finland: Tampere University of Technology.
- Liu, S.-H., Liao, H.-L., and Zeng, Y.-T. (2007). Why people blog: An expectancy theory analysis. *Issues in Information Systems*, 8(2), 232–237.
- Long, E. (2009, December 7). Administration announces finalists in cost-cutting contest. *GovernmentExecutive.com*. Retrieved from www.govexec.com/story_page.cfm?filepath=/dailyfed/1209/12070911.htm

- Martineau, E. (2012, April). *A typology of crowdsourcing participation styles* (M.S. Thesis). Concordia University, Montréal, QC. Retrieved from http://spectrum.library.concordia.ca/973811/1/Martineau_MSc_Winter_2012.pdf
- McHenry, K., Marini, L., Kejriwal, M., Kooper, R., and Bajcsy, P. (2011, September 22). Toward free and searchable historical census images. SPIE Newsroom. Retrieved from <http://spie.org/x57241.xml>
- Messina, M. J. (2012). *Crowdsourcing for transit-oriented planning projects: A case study of "inTeractive Somerville"* (M.A. Thesis). Tufts University, Medford, MA.
- Nov, O. (2007). What motivates Wikipedians? *Communications of the ACM*, 50(11), 60–64.
- Nov, O., Naaman, M., and Ye, C. (2008). What drives content tagging: The case of photos on Flickr. In M. Burnett, M. F. Costabile, T. Catarci, B. de Ruyter, D. Tan, M. Czerwinski, and A. Lund (Eds.), *Proceedings of the 26th annual SIGCHI Conference on Human Factors in Computing Systems* (pp. 1097–1100). New York: Association for Computing Machinery.
- Noveck, B. S. (2003). Designing deliberative democracy in cyberspace: The role of the cyber-lawyer. *Boston University Journal of Science and Technology Law*, 9(1), 1–91.
- Noveck, B. S. (2006). "Peer to Patent:" Collective intelligence, open review, and patent reform. *Harvard Journal of Law and Technology*, 20(1), 123–262.
- O’Keefe, P. (2008). *Managing online forums: Everything you need to know to create and run successful community discussion boards*. New York: AMACOM.
- Obama, B. (n.d.). *Transparency and open government* (Presidential memorandum). Retrieved from http://www.whitehouse.gov/the_press_office/Transparency_and_Open_Government
- Ohanian, A. (2009). How to make a splash in social media. Presented at the TEDIndia 2009, Mysore, India. Retrieved from http://www.ted.com/talks/alexis_ohanian_how_to_make_a_splash_in_social_media.html
- Parkinson, M. G., and Ekachai, D. (2006). *International and intercultural public relations: A campaign case approach*. Boston, MA: Pearson.
- Phillips, L. M., and Brabham, D. C. (2012). How today’s digital landscape redefines the notion of power in public relations. *PRism*, 9(2). Retrieved from http://www.prismjournal.org/fileadmin/9_2/Phillips_Brabham.pdf
- Pimbert, M., and Wakeford, T. (2001). Overview: Deliberative democracy and citizen empowerment. *PLA Notes*, 40, 23–28.
- Post, R. C. (1995). *Constitutional domains: Democracy, community, management*. Cambridge, MA: Harvard University Press.
- Powazek, D. M. (2002). *Design for community: The art of connecting real people in virtual places*. Indianapolis, IN: New Riders.
- Powazek, D. M. (2012, August 2). On seeding communities. *Powazek.com*. Weblog. Retrieved from <http://powazek.com/posts/3046>
- Schenk, E., and Guittard, C. (2011). Towards a characterization of crowdsourcing practices. *Journal of Innovation Economics*, 7(1), 93–107.
- Schmidt, C. W. (2012). Trending now: Using social media to predict and track disease outbreaks. *Environmental Health Perspectives*, 120(1), a30–a33.

- Siceloff, S. (2009, May 5). COLBERT ready for serious exercise. NASA. Retrieved from http://www.nasa.gov/mission_pages/station/behindscenes/colberttreadmill.html
- Sieber, R. (2008). The participatory geoweb: A research agenda. Presented at the Association of American Geographers Annual Meeting, Boston, MA.
- Smith, A. (2010, August 7). SeeClickFix celebrates 50G issues reported. *New Haven Register*. Retrieved from http://www.nhregister.com/articles/2010/08/07/news/aa3_neseeclick-fix080710.txt
- Standards. (n.d.). Section508.gov. Retrieved from <https://www.section508.gov/index.cfm?fuseAction=stds>
- Story, L. (2007, May 26). The high price of creating free ads. *New York Times*. Retrieved from <http://www.nytimes.com/2007/05/26/business/26content.html?pagewanted=all>
- Stowers, G. (2013). *The use of data visualization in government*. Washington, DC: IBM Center for The Business of Government. Retrieved from <http://www.businessofgovernment.org/sites/default/files/The%20Use%20of%20Visualization%20in%20Government.pdf>
- Takemoto, N. (2010). Crowdsourced placemaking. Presented at the TEDxPotomac, Washington, DC. Retrieved from <http://tedxtalks.ted.com/video/TEDxPotomac-Neil-Takemoto-Crowd>
- The case for usability in government. (n.d.). Usability.gov. Retrieved from http://www.usability.gov/government/case_for/
- Villarroel, J. A., and Reis, F. (2010). Intra-corporate crowdsourcing (ICC): Leveraging upon rank and site marginality for innovation. Presented at the CrowdConf2010, San Francisco. Retrieved from <http://www.crowdconf2010.com/images/finalpapers/villarroel.pdf>
- Von Ahn, L., Maurer, B., McMillen, C., Abraham, D., and Blum, M. (2008). reCAPTCHA: Human-based character recognition via Web security measures. *Science*, 321(5895), 1465–1468.
- Von Hippel, E. (2005). *Democratizing innovation*. Cambridge, MA: MIT Press.
- Wald, D. J., Quitoriano, V., and Dewey, J. W. (2006). USGS “Did You Feel It?” community Internet intensity maps: Macroseismic data collection via the Internet. Presented at the First European conference on earthquake engineering and seismology, Geneva, Switzerland. Retrieved from <http://ehp2-earthquake.wr.usgs.gov/earthquakes/pager/prodandref/WaldEtAIECEESDYFI.pdf>
- Wiggins, A., and Crowston, K. (2011). From conservation to crowdsourcing: A typology of citizen science. In R. H. Sprague Jr. (Ed.), *Proceedings of the 44th Hawaii international conference on systems science (CD-ROM)*. Los Alamitos, CA: IEEE Computer Society.
- Zimmerman, N. (2013, January 16). White House raises “We the People” signature threshold to 100,000, leaving only a single response-eliciting petition on the site. *Gawker.com*. Retrieved from <http://gawker.com/5976366/white-house-raises-we-the-people-signature-threshold-to-100000-leaving-only-a-single-response+eliciting-petition-on-the-site>
- Zmuda, N. (2009, November 2). New Pepsi “Dewmocracy” push threatens to crowd out shops. *AdAge.com*. Retrieved from <http://adage.com/article/agency-news/pepsi-dewmocracy-push-threatens-crowd-shops/140120/>

About the Author

Daren C. Brabham is an assistant professor in the Annenberg School for Communication & Journalism at the University of Southern California, as well as the founding editor of *Case Studies in Strategic Communication*. He was the first to publish scholarly research using the term crowdsourcing in 2008 in an article in *Convergence*.

Dr. Brabham is the author of the book *Crowdsourcing* (MIT Press, 2013). He has published more than a dozen other academic articles on crowdsourcing in journals such as *Information, Communication & Society*; *Planning Theory*; *First Monday*; *International Journal of Communication*, and *Journal of Applied Communication Research*. Brabham teaches courses in public relations and new media, consults on crowdsourcing, and has presented to numerous scholarly and professional associations.

He holds an M.S. and Ph.D. in communication from the University of Utah and a B.A. in communication and religion from Trinity University (Texas).



Key Contact Information

To contact the author:

Daren C. Brabham

Assistant Professor

Annenberg School for Communication & Journalism

University of Southern California

3502 Watt Way

Los Angeles, CA 90089

(801) 633-4796 (mobile)

e-mail: brabham@usc.edu

www.darenbrabham.com



Reports from **IBM Center for The Business of Government**

For a full listing of IBM Center publications, visit the Center's website at www.businessofgovernment.org.

Recent reports available on the website include:

Acquisition

Controlling Federal Spending by Managing the Long Tail of Procurement by David C. Wylde

Assessing the Recovery Act

Recovery Act Transparency: Learning from States' Experience by Francisca M. Rojas

Key Actions That Contribute to Successful Program Implementation: Lessons from the Recovery Act by Richard Callahan, Sandra O. Archibald, Kay A. Sterner, and H. Brinton Milward

Managing Recovery: An Insider's View by G. Edward DeSeve

Virginia's Implementation of the American Recovery and Reinvestment Act: Forging a New Intergovernmental Partnership by Anne Khademian and Sang Choi

Collaborating Across Boundaries

Developing Senior Executive Capabilities to Address National Priorities by Bruce T. Barkley, Sr.

Beyond Citizen Engagement: Involving the Public in Co-Delivering Government Services by P. K. Kannan and Ai-Mei Chang

Implementing Cross-Agency Collaboration: A Guide for Federal Managers by Jane Fountain

A County Manager's Guide to Shared Services in Local Government by Eric Zeemering and Daryl Delabbio

Fostering Transparency and Democracy

Assessing Public Participation in an Open Government Era: A Review of Federal Agency Plans by Carolyn J. Lukensmeyer, Joe Goldman, and David Stern

Improving Performance

Predictive Policing: Preventing Crime with Data and Analytics by Jennifer Bachner

The New Federal Performance System: Implementing the GPRA Modernization Act by Donald Moynihan

The Costs of Budget Uncertainty: Analyzing the Impact of Late Appropriations by Philip G. Joyce

Transforming the Workforce

Engaging a Multi-Generational Workforce: Practical Advice for Government Managers by Susan Hannam and Bonni Yordi

Implementing Telework: Lessons Learned from Four Federal Agencies by Scott P. Overmyer

Using Technology

Rulemaking 2.0: Understanding and Getting Better Public Participation by Cynthia R. Farina and Mary J. Newhart

Cloudy with a Chance of Success: Contracting for the Cloud in Government by Shannon Howle Tufts and Meredith Leigh Weiss

The Use of Data Visualization in Government by Genie Stowers

Mitigating Risks in the Application of Cloud Computing in Law Enforcement by Paul Wormeli

Challenge.gov: Using Competitions and Awards to Spur Innovation by Kevin C. Desouza

Working the Network: A Manager's Guide for Using Twitter in Government by Ines Mergel



IBM Center for
The Business of Government

About the IBM Center for The Business of Government

Through research stipends and events, the IBM Center for The Business of Government stimulates research and facilitates discussion of new approaches to improving the effectiveness of government at the federal, state, local, and international levels.

About IBM Global Business Services

With consultants and professional staff in more than 160 countries globally, IBM Global Business Services is the world's largest consulting services organization. IBM Global Business Services provides clients with business process and industry expertise, a deep understanding of technology solutions that address specific industry issues, and the ability to design, build, and run those solutions in a way that delivers bottom-line value. To learn more visit: ibm.com

For more information:

Daniel J. Chenok

Executive Director

IBM Center for The Business of Government

600 14th Street NW

Second Floor

Washington, DC 20005

202-551-9342

website: www.businessofgovernment.org

e-mail: businessofgovernment@us.ibm.com

Stay connected with the
IBM Center on:



or, send us your name and
e-mail to receive our newsletters.