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COMMUNITY INTELLIGENCE PLATFORMS: THE CASE OF OPEN GOVERNMENT

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ABSTRACT

The focus on collaborative and participatory governance has led to interest in studying how ‘intelligence’ in citizen communities can be leveraged towards creating robust solutions for complex social and policy problems. In this paper, we present four models that uncover the process of leveraging community intelligence. We analyze multiple case studies that capture the varying roles of citizens and public agencies in the problem-solving process. Employing Arnstein’s (1969) ladder of citizen participation as an analytical tool, we outline the strengths and weaknesses of each model, and suggest design recommendations for the development of participatory platforms for open government.

Keywords: government 2.0; collective intelligence; community intelligence; citizen participation, governance infrastructures; collaborative platforms

INTRODUCTION

The nature of *governance* and the role of *government* are undergoing fundamental changes, thanks in part to emerging technologies. Governance is moving from being top-down and tightly controlled towards being more bottom-up driven and participatory (Bischoff, 2011). Public agencies are also being transformed through efforts such as open data initiatives and incentivizing solution development through prize-based competitions. Agencies are doing more to become transparent and allow citizens an opportunity to participate in the policy design, implementation, and evaluation (Johnston, 2010; Desouza and Bhagwatwar, 2012). Open government initiatives aim to engage citizens in the policy process and to solicit their participation in matters of civic importance. Critical to achieving this mission is the development of participatory platforms where citizens can come together to share information, evaluate options, and even implement solutions (Bischoff, 2011; Desouza 2012). According to the IT dashboard (www.itdashboard.gov), the US government spending on IT in 2011 was about \$78 billion, at least 10% of which was spent on open government initiatives.

The success of open government initiatives depends on the ability of collaborative platforms to motivate and sustain the harnessing of *community intelligence*. Community intelligence, a form of collective intelligence, is the integration of diverse citizen information and knowledge towards the tackling of governance challenges (Atlee, 2004). With the availability of collaborative platforms, mobile technologies, and open-data initiatives, the time is ripe for governments to engage communities into the policy setting apparatus to tackle social problems. Public agencies do not have to solve problems using *limited* intelligence (i.e. reliance solely on their staff and formal networks); they can engage citizens, their primary stakeholders, into the problem resolution process.

In this paper, we present four models that outline how community intelligence is harnessed for solving social challenges. These models have emerged from a grounded-theoretic inspired approach of analyzing current participatory platforms for citizen engagement. Arnstein’s (1969) ladder of citizen participation is employed as an analytical tool to study the strengths and weaknesses of each model, and arrive at design recommendations.

BACKGROUND

Open Government and Participatory Governance

Citizens access government websites to get information about local issues, access services, see how their taxpayer money is being used, and stay updated on various public projects being undertaken. Of the 78% of American adults

who used the Internet in 2010-2011, 67% used it to access services and information provided by local, state, or federal government (Pew Internet Research, 2011). Today, in the public sphere, we have seen a number of open-data initiatives (Orszag, 2009). Citizens have access to more information than ever before about agency operations, service levels, and resource usage. In addition, public agencies have started embracing technology-facilitated citizen-centric approaches for delivering services (Wang, Bretschneider, and Gant, 2005; Morris and Moon, 2005). This not only involves increased citizen engagement in policy design but calls for leveraging citizen ideas and knowledge to reduce operational costs, increase service delivery efficiencies, and devise innovative solutions to public problems (Orszag, 2009, Morison, 2010). Harnessing knowledge and intelligence of individuals within local communities to develop innovative solutions for complex social issues has been commonly referred to as community intelligence (Atlee, 2004).

Collective Intelligence and Communities

Google, Wikipedia, and other platforms leverage collective intelligence to achieve their goals (O'Reilly & Battelle, 2009; Malone, Laubacher, & Dellarocas, 2009). Mechanisms for harnessing the intelligence of people from variety of backgrounds and across the world has been conceptualized using terms such as *crowdsourcing*, *radical decentralization*, *community intelligence*, and *collective intelligence* (Malone et al., 2009). Platforms to leverage community intelligence in the public sphere are emerging (Desouza, 2012). In late 2010, US government launched the challenge.gov website with the goal of harnessing community intelligence to solve social problems. Since its launch, the platform has been used by many federal agencies including the Department of Energy, Department of Treasury and NASA to launch prize based competitions that invite communities to work on a social problem. The goal is to increase citizen participation in governance issues and solicit multiple innovative approaches for realizing opportunities or solving problems. The range of challenges presented through the platform varies from social issues related to health and education to complex technological problems from NASA.

The effectiveness of community intelligence depends on how actively citizens engage in matters of social interest. Citizen engagement involves collective actions taken to resolve social problems (Ehrlich, 2000). Bassler et al. (2008) pointed out several outcomes of effective citizen engagement: 1) development of effective solutions that resolve social problems; 2) higher likelihood that solutions ideated by citizens will be implemented; 3) greater citizen knowledge and awareness about social issues; 4) empowerment of traditionally disfranchised and disadvantaged groups; 5) greater trust between the communities and government; and 6) better resolution of problems before they get out of hand as citizens can serve as signals of emerging problems.

Active civic engagement geared towards designing solutions for local issues is the crux of the community intelligence concept. Atlee (2004) defined community intelligence as the capacity of a local community to understand the conditions in the society and to respond to these conditions in a creative, coherent, and appropriate way. Atlee (2004) proposed six functions required to keep the community alive, united, and thoughtful so as to maximize the potential of community intelligence: *community information* – keeping the community informed about social problems, *community conversation* – the formal, informal, and virtual conversation between community members to discuss social problems, *community engagement* – engaging community members in social issues using meaningful and coherent ways, *community healing* – forming consensus over various issues on which the community members have diverse opinions, *community judgment* – involving community members to shape the governance structure and policies, and *community reflection* – the insight, oversight and wisdom required to guide the community's well-being.

Arnstein (1969) proposed three levels of public participation – non-participation, tokenism, and citizen power. The levels represent increasing level of public participation ranging from no participation to high level of participation to citizen ownership of decision-making on social issues. Non-participation can be a result of poor planning, lack of communication, poor collaborative platforms, lack of trust among participants, and inadequate (or incorrect) incentives. Tokenism can be broken down into three sub-levels – informing, consultation, and placation. *Informing* refers to government authorities keeping people informed on social problems. *Consultation* refers to government authorities consulting citizens while making decisions regarding social issues. While there is a degree of communication in the informing and consultation sub-dimensions, there is no certainty that the authorities would consider the opinions of people while making decisions. *Placation* refers to placing people at positions in the decision-making chain such that they will have influence over the decision made about social issues. The third level, citizen power, indicates the highest level of citizen participation, and has three sub-levels – partnership, delegated power, and citizen control. *Partnership* refers to the alliance between citizens and public agencies for making

decisions. *Delegated power* refers to an increased level of citizen authority since people are given certain decision-making powers by the government authorities. *Citizen control* over the decision-making process and ownership of outcomes represents the final level. Arnstein's (1969) model is a valuable analytical tool for understanding the community intelligence process. Ideally, platforms that support community intelligence should evolve through the three major levels from non-participation to tokenism and finally citizen power.

LEVERAGING COLLECTIVE INTELLIGENCE FOR OPEN GOVERNMENT

Drawing on multiple case studies of citizen participatory platforms, we deduced four approaches to leveraging community intelligence for solving social problems. Due to space limitations, we will only briefly introduce each model and share one example of a participatory platform for each.

Model 1: Citizen Centric and Citizen Sourced Data

In 2009, Conor White-Sullivan and Aaron Soules, two students at the University of Massachusetts at Amherst, initiated a project called Localocracy to harness citizen intelligence for creating solutions for social problems. Localocracy enables people from a particular locality to discuss local issues, generate ideas to solve those issues, and select ideas based on the opinion of others. Localocracy initially available only in Amherst, was later accessible across Massachusetts including Arlington, Cambridge, Granby, Milford, and South Hadley. During the initial phase of the project, only people who registered on the website using their voter identification and real names were allowed to contribute and discuss issues and ideas. However, on realizing the possibilities of innovative solutions that could be generated if people posted anonymously, the developers decided to allow anonymous postings. Citizens can discuss and modify tentative solutions. Once citizens are confident about the effectiveness and feasibility of their solutions, they can propose the solutions to the appropriate public agency. Localocracy invites public agency representatives to actively monitor citizen suggestions on issues. As such, the platform gives an opportunity to citizens to propose their solution to a problem directly to the public agency. The acceptance and implementation of the solution remains at the discretion of the public agency.

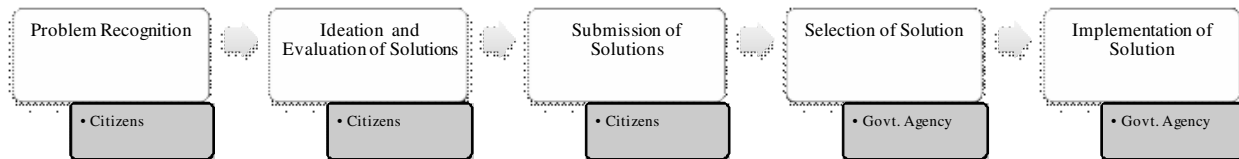


Figure 1: Citizen Centric and Citizen Data Model

Figure 1 depicts the process of leveraging collective intelligence under a *citizen centric and citizen sourced data* model. The first step is the realization of the need to solve a local issue by citizens. The second step is to harness community intelligence to design solutions for the local issue. Contributed solutions are then refined and evaluated. It is in the ideation and refining of solutions to public problems where community intelligence emerges. However, even after solution generation, the choice and implementation of the solution is at the discretion of the public agencies. Agencies can choose to leverage solutions generated through collective intelligence or rely on other solutions (e.g. those that emerge internally within the department).

Model 2: Citizen Centric and Government Open Data

In 2007, Mike Migurski, the technology director at Stamen Design, realized the need to increase awareness about criminal activity in Oakland, California (Gilmer, 2007). The team at Stamen Design was dissatisfied with the existing crime tracking applications available to citizens. To make crime information accessible to everyone, Stamen Design developed the Oakland Crimespotting application. The application provides the most updated information about criminal incidents that take place within Oakland. Instant information access about any crime incident allows citizens to take required precautionary steps to keep themselves safe. In addition, it becomes easy for public agencies to increase awareness of criminal activity within the community. The application uses open data from law enforcement agencies and displays that information on an interactive map. Citizens are able to track the crime by different localities and have the provision of tracking crimes based on type.

Even after the initial success of the application, the city government decided to cut off the data stream for the application saying that the frequent data demands of the application were disrupting the city's crime website (Miller,

2009). However, owing to the popularity of the application, the city government not only had to revert back its decision but also decided to support the application. Government also decided to use the application as a platform to receive additional information feeds from citizens about criminal activity to help the law enforcement agencies to better track down the criminals. The immense success of the application for Oakland region motivated Stamen Design to design a similar application for the San Francisco region (Oakland Crimespotting, 2009a). The website, which was launched in August 2009, was well received by the citizens of San Francisco and also received support from Mayor Newsom and local law enforcement agencies (Miller, 2009). In addition, Mayor Newsom decided to take steps that would make more government data available to people.

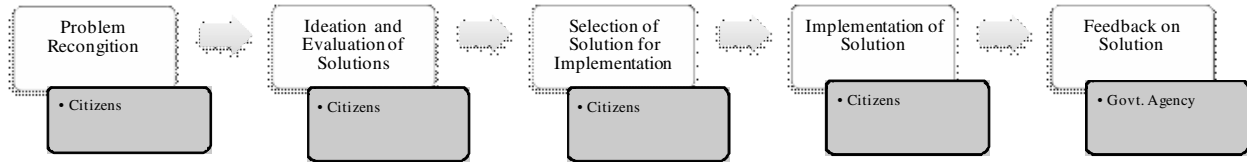


Figure 2: Citizen Centric and Government Data Model

The examples of the Oakland and San Francisco Crimespotting point to the second model - *citizen centric and government open data* model (see Figure 2). As seen in the model, the instigator for the development of a community intelligence platform is the drive to solve a social challenge either by an individual or by a group of citizens. In the case of the Crimespotting example, this problem was the ineffectiveness of the existing applications in the Oakland region in providing crime data to the citizens. The next step is the coming together of community members to brainstorm possible solutions. After understanding the feasibility, applicability, and effectiveness of the various solutions, the community then decides to implement one solution. In the Crimespotting example, this step refers to the brainstorming, designing, and development of the Oakland Crimespotting application by the development team at Stamen Design. Once implemented, the next step is the feedback or reaction of government. In this case, it was the initial criticism and lack of support from the city government for the Crimespotting application before eventually adopting it as a solution. The difference between this model and the *citizen centric and citizen sourced data* model is the way solution implementation is executed. In this model, the Crimespotting application had already been deployed before any government intervention. The community had to start the process of solution diffusion and implementation before the solution was formally approved and adopted by the government. Another notable difference between the two models is that while the *citizen centric and citizen sourced data* model relied on citizen-sourced data this model relies on the government open data, which is then leveraged by community.

Model 3: Government Centric and Citizen Information

SpeakUpAustin (www.austintexas.icanmakeitbetter.com), developed and implemented by the City of Austin, is an application that engages citizens in social issues. Local problems identified by public agencies are posted on the application. Problems are organized into categories (e.g. public transportation, utilities, waste, etc). Citizens can read any of the posted problems and propose ideas to resolve them. People can also vote for the posted ideas. The ideas with highest votes get highlighted in the application. By generating awareness about local problems, public agencies aim to foster citizen engagement for effective government decision-making. The application aims to solicit citizen participation primarily during the idea generation and voting stages. The decision whether to implement the solution or not, timeframe and budget constraints for implementation are made by the public agency. Even during the implementation phase, the public agency can solicit citizen feedback and use the application to keep citizens updated about the progress. SpeakUpAustin was launched in summer of 2011 and has already accumulated more than 1,300 registered users, more than 450 new ideas, around 1000 comments, and more than 4,500 votes on various issues.

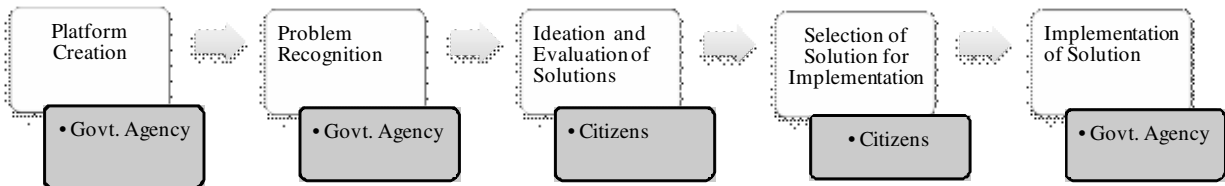


Figure 3: Government Centric and Citizen Information Model

This model is an example of how public agencies can take the lead to leverage community intelligence through design and implementation of participatory platforms - *government-centric and citizen information* model. In the

case of SpeakUpAustin, the City of Austin initiated the platform with the goal of leveraging the knowledge of citizens to generate ideas for resolution of local issues. The model highlights how a public agency can solicit citizen attention by bringing into focus local issues that are of concern. By bringing civic and policy issues to the public, the government can engage citizens in constructive dialogue and seek resolutions. A key highlight of the model is the power granted to citizens in the form of freedom to post their ideas as well as vote for the ideas of their choice. Citizens are able to vote and share their opinions on posted ideas. The public agency takes care of solution implementation. Similar to the *citizen centric and citizen sourced data* model, implementation of the solution is at the discretion of public agency.

Model 4: Government Centric and Citizen App Model

In September 2008, Vivek Kundra, the former Chief Technology Officer for Washington DC area asked iStrategyLabs to suggest way to design an open data catalog useful for citizens, developers, and public agencies (Corbett, 2008). Instead of investing many years and millions of dollars in contracts with private organizations to develop technological solutions to address local issues based on open data, iStrategyLabs employed a community intelligence approach. The company launched Apps for Development. With cash prizes of more than \$30,000 and public recognition as the incentive for application developers, the competition made available a huge amount of city data to citizens (Nagesh, 2010). The response from citizens was overwhelming. Within 30 days of the launch of competition, iStrategyLabs received 47 web-based or smart phone based applications, an estimated net value of close to \$2.3 million (Corbett, 2008). With the opportunity of utilizing open data at hand, communities of developers and citizens came forward to create innovative solutions to solve city's problems. After the applications were submitted, a joint panel of citizens and government officials was asked to select applications for the different prize categories. Based on panel's decision and votes of citizens, prizes were given to the best applications in various categories like social application award and community grant award. Many solutions presented through this competition received support from city governments and were implemented as websites or mobile applications. Some applications include solutions to increase crime awareness, make DC bike friendly, and provide easy access to city's historic information through an interactive map (Corbett, 2008).

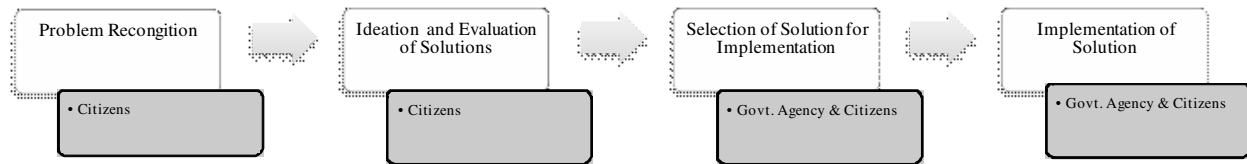


Figure 4: Government Centric and Citizen App Model

The example of Apps for Development competition shows how public agencies and citizens can work together to create innovative solutions in a short period of time - *government-centric and citizen app* model (see Figure 4). This model requires mutual participation from both the public agencies and the community. Instead of relying on traditional mechanisms (for e.g. contracts with industry), public agencies can harness the intelligence of citizens towards designing solutions to problems. As depicted in Figure 4, the first step is the realization of the need to solve local issues and to solicit community intelligence for it by a public agency. The second step is leveraging community intelligence to design innovative solutions for the problem. Once the competition was announced by iStrategyLabs, communities of developers and citizens came forward to develop applications that address various local issues. As the applications were ready, they were submitted to the competition for judging and voting by the community. Again, the top solutions from the submitted solution pool are selected through leveraging community intelligence. In the above example, this was achieved through a voting process. Once the top solutions were selected, the solutions were given prizes and public recognition. In addition, the implementation of the applications occurred through cooperation between citizens and public agencies. A key different between this model and the *government-centric and citizen information* model is that the output of the community intelligence process in this model is visible in the form of actual solutions (e.g. mobile applications) developed by the community rather than ideas or information, which are output of model 3.

ANALYSIS OF THE MODELS

We present an analysis of the four models using Arnstein's ladder as the conceptual lens. We only consider the 'tokenism' and 'citizen power' levels from Arnstein (1969). We do not consider the 'non-participation' level since it is not applicable in the context of community intelligence.

Table 1 provides an analysis of the proposed four models based on six levels of Arnstein’s ladder. We will highlight areas where community intelligence is leveraged for tackling social problems. The *citizen-centric and citizen data model* is at the consultation level. The role of community intelligence is limited to just the solution ideation stage. Community intelligence is employed to generate innovative ideas for resolving the social problem. However, the public agency might decide to ignore the ideas presented by the community and implement a completely different solution. They can even decide to modify a submitted solution and then implement it.

Model/ Parameters	Tokenism			Citizen Power							
	Informing	Consultation	Placation	Partnership	Delegated Power	Citizen Control					
Citizen Centric and Citizen Data Model											
Citizen Centric and Government Open Data Model											
Government Centric and Citizen Information Model											
Government Centric and Citizen App Model											
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Table 1: Analysis of the models based on Arnstein (1969)

For the *citizen centric and government open data model*, the role of community members goes beyond solution ideation. Once a set of possible solutions has been generated, the community again uses the intelligence of its members to determine which solution to implement. The solution might be implemented by the citizens themselves or submitted to the public agency for implementation. This model operates at the placation level. It is important to note that placation occurs in a limited manner and is restricted to interactions between citizens, and not between citizens and public agencies. In this model, there is a reasonable chance for partnerships to emerge with the government, as was the case with the Crimespotting application.

In the *government centric and citizen information model*, government initiates the process by creating citizen engagement platform. Here, the public agency initiates the creation of a partnership with citizens and wants to involve them in decision-making and ideation of solutions. This model goes beyond simply placation and seeks to put citizens in the driver's seat to contribute their ideas and energy towards resolving problems. Citizens drive the entire process of leveraging collective intelligence for idea generation and selection of top ideas through deliberation and voting. There is no, or minimal, intervention from the public agency. Through the voting process, citizens form a consensus on the best ideas for effective problem resolution. Once a given solution is implemented, citizens are engaged in the evaluation of the solution and even receive updates on its progress. This model has elements of delegated power as citizens are involved in the choice of solutions and can participate in the implementation process.

The *government centric and citizen app model*, public agencies take the lead in identifying social problems and informing the community about them. In addition to spreading awareness about the problem, the agency also solicits solutions from the community. Next, the community develops ideas to resolve the problem using the information provided by the government and by leveraging community knowledge. Solutions are submitted for consideration to the public agency, which selects a set of solutions from the pool. It is again the task of the community to select one solution from the shortlist. Thus, throughout the process, there is a continuous interaction and partnership between government and citizens. By delegating the task of deciding the best solution for implementation, community is empowered to resolve the problem.

DISCUSSION AND IMPLICATIONS

The four models offer insights on variations in the community intelligence process and the implementation approach for the ideated solutions. In none of the models do we find collaboration between citizens and public agencies in the identification of problems. Problems are identified either by citizens or public agencies. Citizens identify problems that they care about, and public agencies focus on problems they are mandated to address. We posit that development of viable community intelligence platforms can be improved if the two parties collaborate in the upfront stage of problem definition. Channels need to be developed to promote efficient two-way communication of

problems between citizens and public agencies. We also find that none of the models evolve to the *delegated power* level of the citizen engagement ladder. In the citizen-only model we witness citizen control, but this is not an outcome of evolution from the lower-levels (i.e. from non-participation to tokenism, etc). This finding calls for greater efforts on the part of public agencies to delegate decision-making to citizens, i.e. give up control and allow citizens to shape decisions that impact them. This does not mean that the public agencies should not disengage themselves, but work collaboratively with citizens to setup a forum where citizens can take charge of their own future.

It is crucial to understand what triggers the community intelligence process, the role of public agencies and citizens in the process, and the stages at which government participates. Three factors influence the applicability of the model to a particular context or situation: (a) the planning of the community intelligence process, (b) government involvement and, (c) solution implementation. In order to harness community intelligence in the best possible way, it is important that the community intelligence process is planned for adequately. Initiators of the process should consider the factors that influence the process as the initiative progresses. Planning involves considering factors such as the platform to be used for the process, creation of channels for community members to interact, and creating communication mechanisms to keep the community members informed about the progress of the process. Planners can use the models as a guide to understand what model would be best suitable for their context. This can also help the planners make key decisions like at what stage should a public agency (or citizens) be involved, who should have the authority over the implementation process, and whether a public agency (or citizens) should be consulted for key decision-making.

Community intelligence platforms thrive when they operate freely and without direct, and strict, controls. The emergence of solutions, ideas, and even problems need to be promoted. This requires public agencies to make a mindset shift. Agencies are familiar with operating within rules, structures, and formal instruments (e.g. contracts). They now need to learn to operate in more chaotic spaces. Chaotic spaces cannot be completely planned or evaluated a priori. One point bears mentioning, chaotic spaces can still operate within constraints. Constraints are valuable as they can limit the types of problems, solutions, and even approaches that a given platform might host.

Citizens and public agencies need to negotiate their roles on the participatory platforms. Communities might decide to take a government independent approach, in which case, they need to ensure that the solution and its implementation process comply with laws and regulations. Disregarding these issues could hinder the implementation process. If the community members decide to involve the government at any stage, they should also clarify and negotiate their role in the solution implementation early on. This will help ensure that the solutions are not completely disregarded by the government.

Future research could focus on the decision-making process on community intelligence platforms. Researchers could further analyze the dynamics of various critical events within each stage. Research is also needed to study the impacts of the four models of organizing community intelligence platforms. Researchers can undertake a case study based approach to analyze which model is best suitable for a particular context. Researchers can also evaluate the success of models based on various parameters like the extent of citizen engagement, government involvement in the process, cost of solution ideation and implementation, and the time required for the completion of all stages of a model. Information contained on the platforms (e.g. number of visits, idea contributions, and voting statistics) could also be mined to study the impact of various platform design choices on participation outcomes.

CONCLUSION

As the emerging technologies empower people to access information and better interact with each other, we can expect participatory platforms that leverage community intelligence to play a bigger role in solution creation and implementation for social problems. As noted by former US President, Woodrow Wilson, "I not only use all the brains that I have, but all that I can borrow." It is now time that public agencies do not just rely on the brains that they employ, but draw on the brains of their citizens to solve the most pressing societal challenges.

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