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The Deliberative Politics of the Consultative Layer: Participation Hopes and Communication as Design Values of Civic Tech Founders

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Drawing from communication as design and the spirit of technology, this study investigated the political values embedded in consultative layer companies, with particular attention to the influence of normative deliberative democratic ideals in tech design. Interviews with the founders of consultative layer tech startups explored (a) founders' visions for their technologies and how they were incorporated, (b) the imagined user groups for these technologies, and (c) expected broader outcomes as a result of using their platforms. Six interrelated themes emerged in the analysis that illuminate ideologies, ideals, and pragmatic considerations embedded in the consultative layer, raising new theoretical and practical questions about the role of communication in understanding this emerging industry and its reimagining of government in the online space.

Keywords: Communication Design, Spirit, Civic Technology, E-government, Democracy.

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During the past 20 years, the emergence of what has been called the "civic tech" sector has transformed how government agencies function as well as citizens' perceptions of public engagement. Civic tech is a "convergence of fields" that includes community organizing, social networking, new standards and tools for using government data, collaborative consumption and peer-to-peer sharing, and crowdfunding (Patel, Sotsky, Gourley, & Houghton, 2013, p. 6). Some civic tech firms provide online platforms for neighbors to communicate with one another to share goods and services, and some exist to advocate for specific open data standards, transparency in government, and the use of government data to improve services. Many civic tech firms, however, seek

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to provide a bridge or infrastructure for communication between citizens and government, in part or entirely via technologies such as the Internet and mobile apps, typically for the sake of public consultation on government decisions, such as policies or urban plans. We introduce this particular grouping of civic tech firms designed to facilitate government-citizen communication as the "consultative layer."

As an industry that is redefining the democratic connectivity between citizens and government through digital communication platforms, the consultative layer and its technologies require scrutiny. Technologies have politics (Winner, 1980) and politics have technologies (Joerges, 1999). Buchanan (1992) argues that any plan for a new technology is "an argument, reflecting the deliberations of designers and their efforts to integrate knowledge in new ways, suited to specific circumstances and needs" (p. 19). A technology artifact results from intensive communication, persuasion, and deliberation between its makers because it embodies certain values. Furthermore, the affordances of a technology shape the assumptions and perceptions of its users (Gillespie, 2010). Through a series of interviews with founders and executives of consultative layer firms, clear ideologies, preferences, and assumptions are uncovered about the technologies now central to public life.

Government purchasing offices select vendors for public engagement efforts according to practical factors—a reduction in transaction costs, the benefits of economies of scale, reputation, and past work of a vendor—but not necessarily because these companies further democratic ideals (Brown & Potoski, 2003; Brown, Potoski, & Van Slyke, 2006). Contracting with the consultative layer without critical reflection may normalize particular visions of democratic communication embedded in the technology platforms it produces. This paper questions a now taken-for-granted civic tech sector and contributes both to the theoretical exploration of the politics of platforms in e-government, as well as to the practical management of consultative layer vendors. The technological platforms in the consultative layer are not neutral channels for connecting parties in the process of communication. Essentially this paper investigates civic tech founders' hopes and intentions: what designers want, for whom they want it, and how they want it to happen. In what ways, then, are consultative layer firms injecting a political perspective into the sacred citizen–government relationship so central to democracy? How does the consultative layer support or undermine the normative ideals of deliberative democracy? This paper views these questions through the lens of communication scholarship, interrogating the emergence of the consultative layer and its role in shaping the landscape of democratic engagement today.

Consultative layer framework

The consultative layer for civic tech has quickly matured as an industry in its own right, with dozens of major players in North America alone, and with some firms merging with or being acquired by large, established urban planning and architecture firms. The consultative layer is a band of technologies, consultancies, service

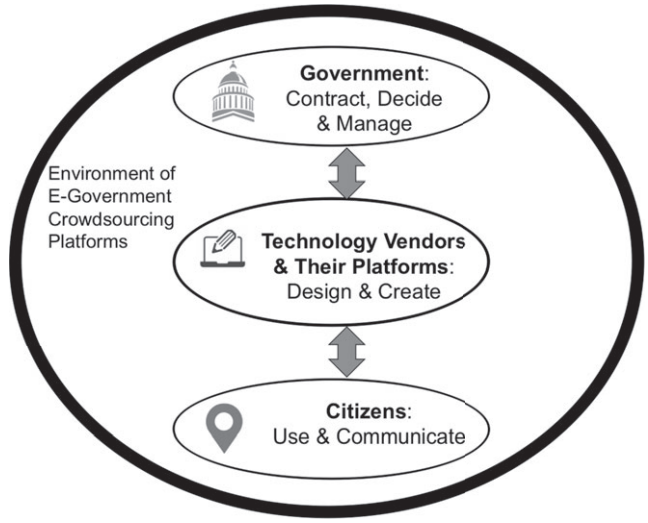

Figure 1 The consultative layer between government and citizens.

providers, and engagement professionals who help facilitate or mediate government interaction with citizens (see Figure 1). Variously called *public participation* or *citizen engagement* programs, *public consultations*, where a formal solicitation is made for citizen input, are considered a best practice and often legal requirement in major planning and policymaking processes in North America. The consultative layer label invokes a connection to the robust tradition of public engagement efforts whereby government formally seeks public feedback on proposals for land use, policies, and other projects. In other words, this communication mechanism is vital for democratic participation in building communities. Government contracts broadly with vendors, a subset of those vendors work in civic tech, and a subset of the civic tech vendors work in the consultative layer. The consultative layer comprises civic tech companies that focus on engagement, but not all civic tech companies are in the consultative layer, such as companies that provide data and performance analytic software for government. The consultative layer is becoming increasingly professionalized and acts as a mediator that augments and changes the current rules of engagement, necessitating an understanding of its design intentions. Consultative layer civic tech firms mostly replicate or extend more traditional, face-to-face public engagement methods, such as town hall meetings, hearings, and design charrettes (Brabham, 2015), and increasingly government calls that include these traditional engagement methods are encouraging—or requiring—online efforts as well. Thus, as the consultative layer becomes mainstreamed into the practice of government and as citizens begin to appreciate or even expect online engagement with government on a range of public matters (Brabham, 2015), it is important to critically examine how these firms shape the contours of democratic life.

Communication as design

Design incorporates an indeterminate breadth of ideas and methods that range across professionalized practices and disciplines to address wicked social problems in contemporary life (Buchanan, 1992). Two decades ago, the boundaries around what were once distinct areas of design problems, such as graphic design and urban planning, collapsed "due to the influence of new technology, new management strategies, new social forces, and new intellectual currents" (Margolin, 1996, p. 23). With the backdrop of this complexity, at its most basic in practice, design proposes additions and changes to the human-made world of artifacts based on knowledge gained from using or manufacturing those artifacts (Cross, 2001). According to theories of social control in sociotechnical systems literature, artifacts themselves prescribe certain actions through their design, conveying a specific, perhaps political, interpretation of appropriate actions to be taken (Latour, 1992; Winner, 1980). Contingency theories support the capacity for multiple affordances in artifacts, and propose that ruling politics may decide which artifacts or preferred prescriptions become dominant (Joerges, 1999; Woolgar, 1991). The increasing complexity of design for social problems paired with the capacity to support or limit actions necessitates a focus on platforms that design communication.

Communication design, as a professionalized practice, intervenes on the structure of discourse by redesigning interactivity and shaping communication possibilities through new platforms or devices (Aakhus, 2007). Aakhus (2007) outlines that design is a natural, creative process in communication that people use to pair words for a message or coconstruct conversation with others. Communication design offers hypotheses about the influence expected on communication practices with the alteration of interactivity through new formats and procedures, allowing affordances or presenting constraints. Designs for communication inculcate theories about communication with implications for practice (Craig, 1999). Communication designers are advised: "We should ask not just 'How do people behave?' but 'If people understand this theory, how will they then behave?'" (Aakhus & Jackson, 2005, p. 431). Software is a material of design (Blevis, Lim, & Stolterman, 2006), and software designed to support sociability designs the material of communication. Gangadharan (2009) explains,

> online deliberation entails choices about the goals of deliberation, the software used to achieve those goals, the platforms that host the online deliberation experience, the modality of the user experience, the way in which participants are recruited, the types of participants being targeted, the context and scale of the user experience, … and the economics and managerial style of the deliberative endeavor (pp. 340–341).

Communication-design-work creates communication tools and design methodology, but ultimately disciplines communication in society (Aakhus, 2007). This study explored questions about founders' values built into civic technologies, designers' thoughts about users, and intended outcomes.

Values and technology spirit

Decentralized civic technologies create a need for common standards and flexibility, but large-scale information and communication technologies resist universal norms because one person's norm is another's anarchy (Star & Ruhleder, 1996). These norms rely on values, which are themselves contested (Cheng & Fleischmann, 2010) and evolve over the course of the design process (Holloran, Hornecker, Stringer, Harris, & Fitzpatrick, 2009). Values are interrelated but distinct elements that may define a situation of action and designate desirable and undesirable modes, means, and ends of action persistently through time and direction (Kluckhohn, 1951). Focal values are comprised of directives, both prescriptions and prohibitions, as well as character, both virtues and vices (Albert, 1956). Creating superior value for users can provide competitive advantage for civic tech firms, but multiple notions of value exist, and the manifestation of value through design often elides conversation (Boztepe, 2007). Instead, civic tech designers may strategically market these platforms to serve multiple constituencies and values through particular vocabulary, while duly neglecting to acknowledge tensions in fulfilling these conflicting needs (Gillespie, 2010).

Civic technologies are aimed at a swath of users to redefine the infrastructural relationship between the citizenry and government, generally to provide communicative access for average citizens to their governments in new ways. While the use of technologies is understood in sociomaterial practice, infrastructure is a relational concept that is embedded in the structure of the civic tech design (Jewett & Kling, 1991). An infrastructure is a working relationship that resolves tension between the local and the global (Star & Ruhleder, 1996, p. 6). In the case of civic tech, technologies redesign and enable a relationship between the citizenry and the government body through communication. Rather than information-seeking behavior, communication is a meaningful engagement process in these civic technologies (Mokros & Aakhus, 2002). Civic tech designers often embed their own intentions and values about communication and engagement into technologies, always with an aim for profit that may work at odds to the mission of government in serving the common good.

Civic tech designer values about democracy divulge themselves in the usability and sociability of the technologies. Adaptive Structuration Theory (AST) theorizes about a coherent and incoherent "spirit" and the features of a technology to account for the process of shaping relevant groups' social structures (DeSanctis & Poole, 1994; Markus & Silver, 2008; Silver & Markus, 2013). Spirit refers to the general intent associated with the values and goals of a set of structural features that are presented to users in a technology (DeSanctis & Poole, 1994). While sociomateriality focuses design analysis on technology use by highlighting the inseparability of social dynamics and material artifacts (Leonardi & Rodriguez-Lluesma, 2012; Orlikowski & Scott, 2008), the spirit in adaptive structuration allows a consideration of the vision of the technology as intended by the designer. For civic tech products, the spirit ties directly to the designer's visions of the democracy to be enacted.

The values designed into civic tech solutions and provided by vendors for government–citizen interactions have not been explored extensively, but should

be contrasted with values of online deliberative democracy. Noveck (2003) argues that effective online deliberative democratic processes should be informed by 11 normative values, including accessibility, freedom from censorship, accountability, transparency, and pluralism. It is likely that many civic tech founders embark on their business ventures with some general idea of improving society or aiding the democratic process, given the public sector niche they target. It is unlikely, however, that civic tech founders adhere so closely to all of the specific values outlined by scholars like Noveck. As Feinleib (2012) has noted, broader visions can sometimes become clouded by the pace and the day-to-day hustle of startup culture or a casualty of lost focus or feature creep over time. Thus, the first research question relating to designer values and technology spirit in civic tech is:

> **RQ1:** How will technological products designed for citizen-government interaction both inculcate and promote multiple interpretations of deliberative ideals?

Imagined users

The current study also builds on sociotechnical systems research to understand the images of users employed by designers and engineers to construct technologies that serve government clients. Designers use various methods to incorporate users and understand their needs, from treating users as imagined people as a part of building requirements during the engineering process to full partners on the team in participatory design (Gregory, 2003; Kuutti, 2009). Whoever the intended user groups are, the relationship between users and their context assists designers in understanding the knowledge needed and created in design (Kuutti, 2009). The depictions of intended users can include (a) people who will use the system, and their relationships, as well as (b) users that will ultimately benefit from the direct users' contributions (Wyatt, 2008, p. 171). Implicated users, or (c) members of the broader community served by but who may not have any physical contact with the system, may also be distinguished in this study (Clarke, 1998). For example, people who communicate about traffic congestion issues on a municipal discussion platform fall into group *a*, and people who merely read about the congestion on the platform and plan alternate routes fall into group *b*. People who, without communicating on the platform, benefit from the actions eventually taken to ease traffic congestion as a result of platform activity fall into group *c*. Many empirical studies of online communities support Nielsen's (2006) hypothesis that 1% of users contribute the most, 9% engage sometimes, and 90% "lurk," or observe without acting. Arnstein's (1969) classic urban planning metaphor illustrated a "ladder of participation" with the most active and concerned users at the top and a majority of disaffected, passive users at the bottom rungs. Maier (2001) conceived of concentric circles with the target users at the center and the apathetic majority at the periphery. Technology designers consider similar communication patterns, with a variety of user types and levels of engagement, and develop tools and entry points into the technology to appeal to a range of users. The way tech designers imagine future users and their communication influences the design of the product.

With regards to the imagined citizens involved in online deliberative democratic engagement, Noveck (2003) advocates for systems that are accessible to a wide range of users, designed to hold users accountable to one another, and that ensure equality and a broad spectrum of viewpoints are available. "[E]quality, identity between governing and governed and popular sovereignty" are hallmarks of deliberative democracy, and conflicts between the diverse viewpoints of citizens and the state are seen as productive and a pathway to reasonable compromise and action (Mouffe, 2000, p. 3). Citizens in deliberative democracy are furthermore seen as capable and intelligent, and the interplay between citizen and state is a new kind of "collaboration" that may bring "greater wisdom to governance" (Hartz-Karp, 2007, p. 2). Thus, the second research question focuses on users and is:

> **RQ2:** What are the imagined or intended user groups for civic tech tools that seek to serve democratic purposes?

Intended outcomes

Finally, embedded within the e-government philosophies of technology arises a management belief that computerization will automatically enhance effectiveness and efficiency, and enable social transformation, otherwise known as justificatory technological determinism (Edwards, 1995). Another intended aim of government is to increase and support democratic values through more accessible, diffused mechanisms. Answering a call from Wyatt (2008), this study seeks to understand how designers interpret technologically deterministic rhetoric from government clients, who compel both the request for and design of civic tech products by decision makers to serve specific goals and create particular outcomes for multiple stakeholders. Engagement is a necessity to transform a civic technology into a tool for democratic participation (De Moor & Aakhus, 2006). Despite these top-down intended outcomes for civic tech, Mansbridge et al. (2010) assert that the deliberation in civic tech platforms may never fully reach the Habermasian ideal of consensus among citizens because of user self-interest. However imperfect, such deliberation can ensure that outcomes are more widely accepted by future stakeholders, "accepted by most, and therefore easier to carry out" (Fiskaa, 2005, pp. 160–161). Plausible agreements may be the best outcome for citizens as they make sense of municipal events amidst ongoing interaction (Weick, 1995). Civic technologies may aim for multiple outcomes, only some of which are aligned with actionable democratic processes. Finally, the third research question is:

> **RQ3:** What are the types of supposed goals or intended outcomes of these tools imagined by designers or stated by government clients?

Method

Participant interviews

Participants in this study were civic tech founders or developers who were imperative to the creation of the civic technologies their company produced. This study focuses

specifically on the creation thought process of these technologies, which are the result of civic tech leaders' visions. Consultative-layer civic tech founders are a boundary spanning population of practitioners across startups, corporations, and government who help facilitate or mediate government interaction. Civic tech work focuses specifically on public engagement, mapping, or related services that connect citizens to government entities using new media technologies or a combination of technological and face-to-face methods. Taken together, the companies that undertake this type of work comprise what has been called the "civic tech" or "e-government" industry (Patel et al., 2013). The civic tech vendors that contract with North American government entities provide a particular context in which democratic freedoms are valued. Participants foundational in the development of civic techs were interviewed because they can provide insight into the design and vision of their products.

There were two phases to the selection of the participants that helped maximize the variety of participants and the technologies represented (Miles & Huberman, 1994). The first phase focused specifically on crowdsourcing tools in civic tech, and the second phase expanded to include other types of civic technologies (e.g., neighborhood social networks) to increase the size of the sampling frame and broaden the scope. The researchers conducted Internet search engine queries to find relevant companies in the civic tech industry as well as lists of company names in the civic tech industry from a number of publicly accessible websites. Examples of source lists include exhibitors and sponsors for professional conferences focused on public participation or government IT issues, community foundation programs, and academic community development case studies. The search resulted in civic tech companies that ranged from well-known to unknown. The researchers evaluated companies based on external validity criteria and included if they operated a civic tech business or product. The researchers identified names and contact information for company founders and officers from company websites and public professional profiles (e.g., LinkedIn). They then e-mailed participants with a request for an interview.

The selection process resulted in 30 relevant contacts in the civic tech industry. Most participants were founders or cofounders of a civic tech company and, if acquired by another company, also held current executive positions in their respective companies. Because entrepreneurs view their time as especially precious, startup founders were difficult to contact and schedule, presenting a challenge to collecting a diversified corpus of interviews. A few founders were unavailable entirely to interview for this study, though publicly available interviews about their civic tech companies were published online by news organizations. The researchers incorporated these previously published online texts into this study as they aligned with similar questions asked in the present research. The researchers conducted formal interviews with 19 participants and used secondary sources for three participant interviews ($n = 22$). In terms of the sample size, theme saturation in interviews typically occurs by the 12th interview, with metathemes appearing as early as the sixth interview (Guest, Bunce, & Johnson, 2006), and this held true in the present study. All participants agreed to

be named in the study, which was approved by a university institutional review board (see Appendix A for participants).

The primary data gathering tool for this study is the interview, both those conducted by the authors and those available from published online texts. The researchers interviewed participants in three waves: one set between May and September 2014, another one in October 2015, and the final set between April and May 2016. Interviews were semistructured, with an interview guide consisting of central questions and follow-up probes used by the researchers during the interviews (see Appendix B). Interviews progressed through three areas of a participant's influences: work background, company product or service, and company strategy. For work background, participants were asked questions such as "how did you get into this line of work?" For company products or services, participants were asked questions such as, "why did you decide on the specific capabilities of your product?" For company strategy, participants were asked questions such as, "can you tell me about your company's mission or vision?" and "in 20 years, what do you hope your company/your tool are able to do for public engagement?"

Data analysis

Interviews occurred via telephone or video conferencing and were audio-recorded. Interviews ranged from 27 to 72 minutes ($M = 52.53$, $SD = 11.53$). The researchers analyzed a total of 16 hours and 38 minutes of recorded interviews. They analyzed interview transcripts according to the constant-comparative technique of grounded qualitative data analysis, and theoretical categories and insights emerged inductively from the data (Charmaz, 2014; Corbin & Strauss, 2008). The process followed a general inductive approach to qualitative interview analysis by condensing the raw data into meaningful summary bits, finding linkages, and developing broader frameworks (Thomas, 2006). The researchers used close, critical discursive analysis to analyze the broader social context within which participants' narratives rested (Wodak & Meyer, 2009). The researchers read through the complete transcripts several times in waves, manually tagging responses, noting participants' language choices, and grouping the responses into emergent thematic categories. They refined several coded categories in an iterative process and then grouped and translated them into six broader themes that addressed the research questions. In this process, the six major themes coalesced into three metatheme categories about intentional design, intended users, and expected outcomes that aligned well with the RQs.

Findings

The interviews produced a rich yield of stories, accounts, and descriptions representing how civic tech vendors understand the role of their technologies in participatory democracy. Six themes emerged from the data that, collectively and in overlapping ways, work to thoroughly answer the three research questions explored in the study. The interrelatedness of the six themes and their fit with the RQs is best illustrated

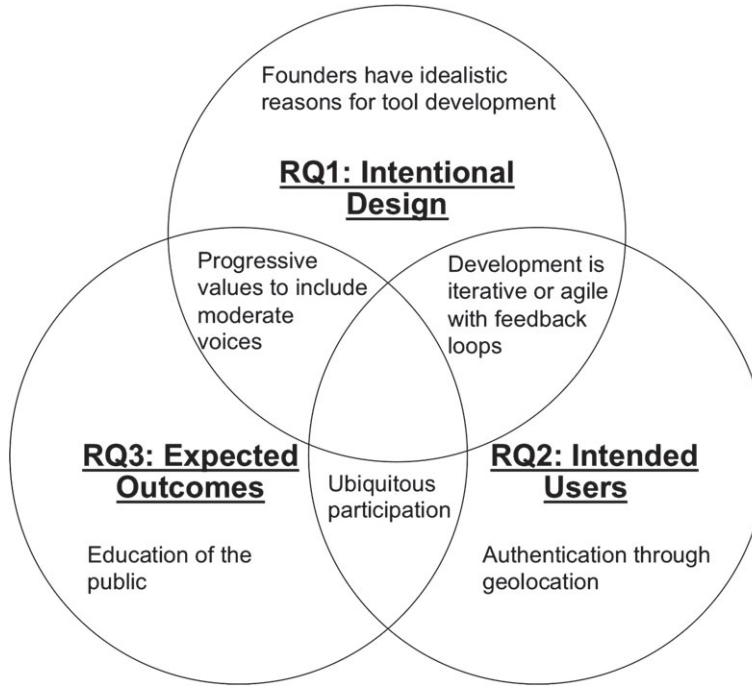

Figure 2 Themes from interviews.

through a Venn diagram (see Figure 2), which organized the emergent themes according to the research question(s) to which each theme corresponds.

Idealistic reasons for tool development

RQ1 asked about intentionality in design, specifically on the interpretations of deliberative ideals promoted in technological products. A theme about designers' idealistic reasons for tool development emerged in answer to RQ1. Several participants spoke about higher ideals that influenced the development of their companies and their hopes for serving government clients and citizens. Comments formed two categories about ideals: an ideal of engagement that can lead to community empowerment and an ideal of improved problem-solving and decision-making in government. As an example of the engagement category, Dan Parham, cofounder of Neighborland, saw his work as "contribut[ing] to the civic health of our country":

> I believe in broad-based civic engagement, so I have an egalitarian perspective on what makes a healthy democracy. … I do believe that web-based communication platforms can increase the number of people engaged in the process. And I think that we have certainly built a technology that has a perspective in that way—it is built for advocacy planning.

Ben Berkowitz, founder of SeeClickFix, felt that his company taps into a sense of individual empowerment brought about by new technologies, facilitating a path to democracy:

> Because of the new feeling of empowerment that definitely comes from the Internet and social media, there is a new expectation from government to be responsive. … We're selling a more informed and more engaged citizen population that ultimately will lead to better communities.

Nextdoor cofounder Sarah Leary expressed a sense of togetherness and strong community:

> You spend so much time in your local community [but] … most people don't know their neighbors. … It's really about using technology from social media but applying it to the concept of really bringing back that sense of community to the neighborhood.

The second category on improved problem-solving and decision-making in government included designers such as Intellitics founder Tim Bonnemann, who remarked that companies like his help government organizations secure buy-in on decisions in order to prevent costly missteps:

> Making wrong decisions, making bad decisions, making decisions you can't sell after the fact because there's no buy-in is a very expensive way to manage your organization or community.

MindMixer cofounder Nick Bowden echoed Bonnemann:

> We're not asking cities to change their behavior. We're asking them to change the medium by which they deliver or enact that behavior. … We're going to make [their] current behavior more efficient and effective. … They want to have a meaningful conversation and ask meaningful questions that citizens can provide meaningful answers to that can help them improve their decision-making and ultimately have a positive impact on citizens.

Jon Fredrickson, vice president of InnoCentive, saw his company's role as helping government use engagement with the public to help home in on the most pressing issues in the first place:

> Our task is really to help determine where and what the problem is, then how best to articulate the problem, and typically take it out of its normal context so that you can get people who look at those kinds of issues to look at it differently. … We [aim] to present the best question to the widest number of people to create the potential for best results for what the real issue is.

These founders illustrate that ideals for an engaged citizenry and municipal problem-solving dominate the reasons for the civic technologies they develop.

Agile development with feedback loops

RQ1 asked about designer's intentions and RQ2 asked about the intended user groups for civic technologies. The second theme that emerged in the data, agile development with feedback loops, addresses both RQ1 and RQ2. At the core of many businesses examined, founders embrace an agile development perspective, meaning development within the company constantly adjusts and repositions as new challenges arise or as demands from clients shift. One category that emerged in this theme was project-based internal learning for the organization. James Miner,

managing director of CrowdGauge, explained about the iterative process of crafting new features in client tools:

> We're always tweaking. The only way we've been able to develop these tools is on the back of projects. Every project, in fact, influences the development. Each iteration is an improvement on the last, which is really fascinating for me to see, because no two versions look alike.

Chris Kuryak, chief operating officer of Recovers.org, added insight about the company venturing into unexplored territory and learning based on responses to client needs:

> [In the beginning] we didn't get it right on the first try, and from those experiences we'd say "oh you know what they really need?" … and we just kind of built those features as we went. So we pulled needs from the community as they were using it.

A second category emerged about meeting community needs with shared innovation and improvement. Participants outlined various processes for taking suggestions from clients for product features. A recurring storyline was that when a new feature was requested by and added to a product on behalf of a particular client, the product often absorbed it as a core feature for future clients. In this way, the feedback loop from clients grew the core business, presumably enticing future business. Chris Haller, founder of Engaging Plans, described the threshold for adding new features:

> If it's a client requesting it or we hear a feature requested a fifth time … that's when it's time to build it. [The] open source model is nice because it allows us to turn those things around and ultimately build something that is, you know, shared innovation … that is demand-driven.

Jean-Noé Landry, executive director of Citizen Budget, described a similar feedback process:

> We have structures and debrief procedures with our clients to be able to hear back from them … if there are things they [could] see improved. ... It depends on if it's a one-off feature that we'll develop for a specific client, but … in terms of the return on investment, whether or not that added feature has potential to scale and become part of our core offering.

A third category that emerged in the feedback loop theme was the creation of policy based on experiences shared by users. Front Porch Forum Co-Founder Michael Wood-Lewis described the innovation of site policies and terms of use in response to honor code workarounds. As users find vulnerabilities in the community policy, the company addresses policy in an ongoing way:

> We do have our terms of use on our website which … lays out some of the … guidelines. ...We found whatever the rules were … [users] say 'ok, so here's the loophole' and they charge right through it. … [S]o if there's a loophole, we'll close it. So we've been learning all the way.

The agile development with feedback loops that designers highlighted spanned across internal organizational learning, meeting needs with shared innovation, and

policy development in response to user behavior, merging both designer intentions and user groups in the civic tech vision.

Authentication through geolocation

RQ2 asked about the intended user groups for civic technologies and was addressed directly with the third theme, authentication through geolocation. Participants hold different values about authenticating the geographical location of users. At one end of the spectrum in one category, firms emphasize verification to make sure only those citizens in a certain locality engage with a location-specific project. At the opposite end in another category, firms believe that user location should not preclude contributions in a civic tech platform.

The first category in the authentication theme placed an emphasis on location authentication as a means to ensuring relevant contributions. Wood-Lewis described competitor Nextdoor's policy as involving "different steps to verify [one's] address with credit cards and with postcards that get mailed to [a] physical address with a code," but noted that "they still have people slipping in to do mischief or to try and get business advantage." Colleen Hardwick, founder of PlaceSpeak, offers a number of ways to authenticate users based on geolocation in her platform:

> over time, we are going to add further and different ways to authenticate people. … We believe proponents [city clients] are going to require greater rigor over more controversial topics. … We also believe people will become more influential the more authenticated they are.

Wood-Lewis cares about users' locations, but described a system based on technical rather than geolocal rigor:

> we depend on the honor system and we do have an ever growing list of tech tricks, technical features, to try and catch people sneaking in. … [O]ur system usually flags them and reminds them of the rules they agreed to when they signed up and shows them the door.

Striking a midpoint category on the spectrum, some designers expressed equivocation about geolocation generally, elucidating that it sometimes enhances the credibility of the information or helps them understand users better. Brian Herbert, developer at Ushahidi, noted that verifying user geolocation is a case-by-case matter, and that it can sometimes be very important:

> Depending on the situation, it might be incredibly important that everything is 100 percent verified and accurate, and there are different ways of doing that. ... But in a lot of cases, it's really important to just get information out there …

Miner's firm captures basic information, using it on the back end to make sense of user activity:

> we record some geographic demographic information … so we were asking people for their ZIP codes … [to] geocode the responses and see how the responses varied across the region.

Finally, at the opposite end of the spectrum in the third category, designers revealed a philosophy that prefers authenticity of ideas rather than location. Bowden

viewed the contributions of individuals as taking precedent over where those individuals are from:

> We authenticate that you're a real person, but we don't verify your identity to a location. … I don't even know why a city cares where a great idea comes from. … We've taken more of an agnostic approach to that. … Why would you care if a good idea came from Nashville instead of Kansas City, so long as it was a good idea?

Participants presented a range of opinions about intended user groups of their technologies by centering participation on geolocation, and whether or not individuals must "be one to know one."

Ubiquitous participation

RQ2 focused on the intended user groups while RQ3 asked about the outcomes imagined by designers or requested by government clients. The fourth theme, ubiquitous participation, addresses both of these research questions. Participants valued multiple channels and formats for capturing user ideas that could come in from anywhere and at any time. Dave Biggs, cofounder of MetroQuest, saw the need for ubiquitous participation because it aligns with younger generations' expectations for technologies more generally:

> My efforts have been around trying to demystify online engagement to make it seem more appropriate for different types of communities and less scary. … What I hear from millennials is that they expect to be able to participate in the planning process without getting out of their seat, on their smartphones. … So when you're talking 20 years out, … I think it's going to be a world where the planning process becomes open to people in a much more fluid way—it's much more than voting once every 3 or 4 years. It's something people could potentially do daily or weekly from the comfort of sitting on the bus on the way to work and answering a few very quick questions or registering your input or learning about what's going on and voting up or voting down very, very quickly. So it becomes a much more a part of our daily routine.

Haller elaborated on this point:

> [The clients] had visioned … being able to collect ideas from multiple streams—so it was not just submitting it on the website or via their mobile phone but also to text in their ideas for that workshop or to use an aggregated Twitter hashtag—and so at that point we felt that this goes beyond the feature that everybody has and … we felt like that was something we should pursue.

Designers appear to have considered the increasingly on-the-go use of many applications with an aim to increase the potential for participation. The desire for inclusivity was substantiated by developing universal access to civic tech platforms across formats and separate technologies.

Education of the public

RQ3 asked about the goals for civic tech tools, according to either the designers or their government clients. The fifth theme that emerged to address this question concerned the education of the public. One category that emerged was an expected outcome of a better informed citizenry as a result of the civic tech platforms. Several

participants explicitly valued an informed citizenry, and their firms provide a way to educate the public about key issues facing the government. Eddie Tejada, cofounder of Civic Insight, articulated this value well:

> But ultimately, engagement itself is not … necessarily a better thing [but] … it's having better informed people who are engaged with issues. … And that's where I think we come in. … [I]f people have information, and people know what's going on in their city, and the city has the same information, and they're on the same page … it is a lot easier for them to come to an understanding about what needs [to be done] or what is a rational or reasonable next step. Engagement, and then in parentheses, informed citizens as well.

Darin Dinsmore, founder of Crowdbrite, aims to provide detailed information on public decisions:

> Designed for city leaders and residents alike, the site provides details on [policy], summarizing what types of projects communities can finance with these new authorities and providing short videos with frequently asked questions about the new powers.

A second category that emerged was a goal in which government clients and citizens will be able to effectively communicate their facts and viewpoints during the decision-making process as a result of the civic tech platforms. A few participants asserted that citizens possess important knowledge already, but it is the government's habit not to seek it out, and their tools enable governments to tap into this intelligence. The public sometimes needs assistance translating its knowledge for public administrators. For instance, Neil Takemoto, cofounder of CSPM Group, said:

> [Public sector employees] don't see the value in the crowd's knowledge. … They don't think people have value to add to anything. [They think everyday citizens are] uneducated and they're just going to make things harder if you get them involved … so that they're not dismissed, is that we actually work with the community when they submit an idea … so that they won't sound uneducated. … We'll actually help them present the idea so that it looks professional. … We help them come up with a feasible idea.

Richard Kingston, founder of TellUs Toolkit, remarked that the failure of government to keep citizens fully informed ultimately puts up barriers to successful projects:

> We're pretty bad at not fully justifying why we make a decision because the decision makers can't be bothered to explain … if you make that information freely and openly available people can better understand why you may have come to that decision. And I see our role as partly facilitating access to that information. … Through providing access to that spatial information in the form of online interactive maps, they can better inform people why that decision was taken.

Similarly, Biggs noted that access to information about the options in a decision will enable better communication between stakeholders:

> [We] discovered that with good information and a keen understanding about the tradeoffs associated with the different choices, what we'd hear from the public was pretty well thought out advice on what direction to take. So our attention turned to developing educational opportunities for the public to learn about different choices and to weigh in to bolster the community support for making the changes that ought to be made.

A third category within educating the public focused on the potential long-term outcomes about understanding the effects of policy presented through civic technologies that support interactive participation between government and citizens. Civic tools may lead to buy-in for later funding of government projects as the founder of SciStarter, Darlene Cavalier, stated:

> What about the kid that knows or feels from an early age that they're not going to be scientists, or teachers, or policymakers? How do we do a better job of communicating to them all the other ways that they can tap into the significance of research and science and let them know that there are important ways that they can be contributing? Because when they're older, as we know, they'll be funding research and they'll be expected to vote on issues or vote for people that have something to do with science and technology and affect them.

Designers' imagined goals for civic technologies centered around educating the public, with goals for a better informed citizenry, effective communication, and understanding of the future effects of policy.

Progressive values to include moderate voices

RQ1 asked about the designer values embedded in civic tech tools and RQ3 asked about the expected outcomes of these tools. The sixth theme describes firms' embedded progressive values and orientation, addressing both research questions. One category emerged and supports the idea that involving more citizens can transform decisions to be bolder. Biggs explicitly noted this:

> The vast majority of times, a decision is arrived at in the end with the public's support, [that] is perhaps more progressive or more, I guess, adventurous than … if it was just up to the planners predicting what the public might think. I think that more change is happening … because of the public involvement process. Our vision is to increase the democratization of the planning process [to enable] more … progress and positive changes to communities.

For designers at firms that deal significantly with urban planning activities, a second category within progressive values emerged about privileging a new urbanism philosophy over other types of development. New urbanism is an urban planning design movement that promotes environmentally friendly living with walkable neighborhoods and a variety of housing and employment opportunities. For example, Miner critiqued the "big box" store and post-WWII suburban communities:

> The second part of it [our stated mission], 'Planning and design for a better world,' … you're not going to find us or any of our work developing a regional retail power center where you're going to see Home Depot and Cheesecake Factory and some crappy highway development motel. We all know that's not good for anybody, so you're not going to find us doing it.

Mark Walerysiak, community liaison for Bristol Rising!, echoed that sentiment:

> We came up with something known as the crowdsourcing agreement … people proposing building a Wal-Mart downtown wasn't appropriate for the downtown zone, because it's a single-use building, a massive footprint, and requires a sea of parking all around it. … So we

> wanted to be clear about what was appropriate downtown so people weren't wasting their time.

Several participants also saw the value of their firm as being inclusive and far-reaching, incorporating a moderate majority not typically involved in public engagement programs. A third category emerged where participants believed that their civic tools could aid in the democratic ideal for each citizen to be involved, and not just those involved in the extremes of debate. Biggs hoped the silent moderate segment of society emerges through online engagement:

> the best motivators for people to get off their couch and attend a public meeting is anger or fear. … [But] the easier you make it to participate the more likely you are to hear from people who are not angry at you or are moderate. … If you're trying to do something and the vast majority of people are supportive, make it easy as possible to have them to tell you that and give them input on how it plays out and you're on the right track.

Walerysiak remarked that online engagement brings in new demographics, particularly around age:

> … the demos are way more balanced than a town hall meeting. We're pretty representative of what this public is—a microcosm of it, really. Initially our membership was a little bit older—I would say 40s, maybe 50s … because those are the folks who read the local newspaper … over time, that started really leveling out a bit with younger people getting involved from the online standpoint especially. Our [in-person] meet-ups are mostly more like [people in their] 30s and 40s, with a smattering of a couple of younger people. I would say the younger folks are more comfortable behind the computer and the older folks like to get out and in front of people.

Shay Har-Noy, cofounder of Tomnod, noted that government agencies have long been concerned with inclusivity, access, and diversity of opinion, too. He claimed the extension of public engagement activities to online platforms continues that mission, making analogy to the U.S. Census:

> … if you isolate people to just their view and allow them to independently arrive at a conclusion, you could aggregate that and make sense of it. … You're not asking for the final answer, you're asking for a step toward the final answer. … Observing and documenting the population [in the US Census] was a fundamental statute of democracy, because we need to know where they are, we need to know they're represented in government … and every 10 years since then people take clipboards door to door. The guy with the clipboard goes to the poor communities just as readily as he goes to Bel Air.

Within the progressive values to include moderate voices theme, participants believed that involving more citizens can make ideas bolder, new urbanism was a preferred development architecture, and inclusivity was the key to bring moderate voices to democratic conversations.

Discussion

Founders of civic tech firms bring particular viewpoints to bear on their tools, from the designs, to the intended user groups, and expected outcomes. The themes that

emerged from the data represent a variety of approaches among civic tech practitioners in thinking about designing communicative aspects of democracy, epitomizing the communication as design approach in practical terms. That there exist ideological peculiarities at all in the privately developed civic technologies is problematic to the ideal of deliberative democracy pursued by government bodies. These findings are also indicative of the power that the consultative layer embodies by structuring citizen–government communication.

Still, commonalities emerge that represent the dominant perspective in the civic tech sector on the theoretical perspective of communication as design as redesigning interactivity (Aakhus & Jackson, 2005). Much of what participants espoused in this study aligned with normative ideals for online deliberative democracy. Specifically, participants hoped their companies would engage the public on behalf of government entities in ways that are inclusive, accessible, equal, and responsive, all norms that Noveck (2003) identifies as ideals for such technologies. Participants largely considered their work as enabling healthy democratic participation to build strong communities and uplift individual voices. Participants, however, viewed the concept of a strong community in particular ways, such as an embrace of new urbanist philosophy in neighborhood planning or an appeal to a moderate, centrist stance perceived as frequently absent from many public engagement programs. They regarded their firms as widening the circle of public participation through new media technologies, held education of the public in high esteem, and refined their products in ongoing ways as they received feedback from users or clients. Participants' viewpoints directly link to the expectations of influence on communication practices that the communication design framework elucidates (Aakhus, 2007). Through their civic technologies, designers of the consultative layer discipline communication in support of some democratic ideals more than others in and on behalf of society.

RQ1 explored the intentions each participant brought to designing his or her platform. Participants had specific ideals in mind when they developed their tools. Participants believed that their tools provide the means to strengthen democracy, but with various interpretations of the meaning of democratic participation. They assume that engaged communities become empowered communities, and that government can draw from communities to solve problems and make decisions. Participants embraced an iterative approach to product development, choosing instead to refine and add features to their tools as clients requested them or as users exploited new vulnerabilities. The agile approach falls short in intensity and frequency of true participatory design (Gregory, 2003; Kuutti, 2009), but it does illustrate in these firms a clear feedback loop and a user-centered design perspective that drives innovation. DeSanctis and Poole (1994) remind us that the "spirit" of a technology is neither "the designers' intentions" nor "the user's perceptions or interpretations of it," but rather a "property of the technology as it is presented to users" (p. 126). Participants designed their products with clear intentions—to facilitate progress, to enrich democracy through citizen engagement, and to adapt to client needs in an ongoing way—and the properties of these products communicate their core values. These findings support

the infrastructure-building perspective of communication design (Star & Ruhleder, 1996) with a "spirit" that sometimes aligned with specific online deliberative democracy values (Noveck, 2003). Aakhus (2007) suggests that "communication problems, from a design stance, are found in the gap between normative commitments about what communication ought to be and the presumptive empirical state of affairs about what communication is" (p. 117). The study explored "the practical and theoretical opportunities" in this "normative-empirical gap" (Aakhus, 2007, p. 117) by examining normative democratic design ideals in tension with tech founders' intentions for how their products should function. In charting this terrain, we provide a more nuanced theoretical understanding of "advancing … communication practices for engaging the social world" via a communication design perspective (Aakhus, 2007, p. 117).

RQ2 concerned the intended users that participants had in mind when they designed their products. Participants wanted their tools to reach users where they are, providing easy, frequent access for everyday citizens and multiple media channels for engagement opportunities. Participants hoped that the act of public engagement becomes ubiquitous as well as enmeshed with daily, routine acts. Hoping to shrink the figurative gap between government and citizen via technological platforms, designers should also turn to users and to government clients for insight into product improvements based on client needs and user experience. Users hold important knowledge and should be sought out not only for input on the public matter at hand, but also for their on-the-ground insight about the online participatory process itself. These findings revealed that imagined users tended to be motivated and engaged, or willing to participate to deliberate and resolve conflict. Users were imagined as capable and intelligent (Hartz-Karp, 2007) with goals of contributing to and improving society.

Findings revealed differing perspectives among participants about the importance of place in public engagement, however. Some participants occupy what might be termed a "constituency-focused" end of a spectrum, where it is paramount — especially in land use planning or local policy-making scenarios — to verify that citizens are situated in a particular location, and consequently authorized to have a voice on matters that affect them and their local communities. On the other end of the spectrum exist "ideas-focused" participants, who privilege the merits of contributions more than the identities or allegiances of citizens. In the middle of this spectrum, some participants adopt more pragmatic approaches in resolving the geolocation tension, opting for platform honor codes or post hoc analysis of basic self-reported geolocation data. The tension illustrates clearly a difference between the values of self-determination of local communities and the need to verify location, and the values of open innovation and the meritocratic approach to participation. Thus, the depictions of intended users tended to center on people who will use the system (group *a* in Wyatt, 2008), rather than on entities that might benefit from direct contributions or implicated users. These findings reveal that the visions of users tend to reflect the highest ideal of activity, rather than the 90% of lurking that occurs regularly (Nielsen, 2006). Without designers considering low engagement levels, civic tech tools may overpromise participation and underestimate the need for efficient designs that allow quick access

at irregular intervals. The normative-empirical gap between idealized, imagined user groups and the actual patterns of use in these online systems provides an opportunity to enrich the theoretical perspective of communication as design and offers deeper "communicative explanations of the social world" (Aakhus, 2007, p. 117).

As a result of these findings, a bigger question about the civic tech sector more broadly arises: Are civic tech firms pressed from the mold of the tech startup world where innovation and meritocracies reign, borne out of a higher intellectual reasoning concerning democratic participation, or simply a pragmatic solution to the inefficiencies of public administration? Bigger still: How closely are governments scrutinizing these fine-grained distinctions between firms in the consultative layer during contracting decisions? These questions should be explored in future studies about the civic tech sector and the larger consultative layer.

RQ3 dealt with the outcomes envisioned by participants as a result of governments and citizens using their products. A broad concern for educating the public was central among responses. Participants believed that an informed public can make better decisions, both for the immediate issue at the center of a public engagement activity and in the long-term, teaching the public about the complexity of public decisions and making the prospects of future funding decisions more relatable. Several participants believed that an informed public would also make more progressive decisions, attracting a moderate majority of citizens into the engagement process to neutralize polarized, volatile parties holding more extreme views. Ultimately, the expectation of participants is an improved communication between citizens and government, a dialogue that is sustained, meaningful, rational, informed, and multimodal. Participants see their products as providing such a conduit and preparing both citizens and government to cocreate, in a sense, some version of a better world. These findings highlight that many participants shared a long-held view about outcomes: Their technologies would enable social transformation and enhance productivity (Edwards, 1995). Participants spoke in deterministic terms about goals of increased democratic user engagement with their technologies, without an acknowledgment that decisions resulting from these technologies may exclude a segment of the citizenry.

That participants hoped for the seamlessness and ubiquity of their engagement tools in everyday life also reveals a belief among participants in the necessity of their services to facilitate democratic participation. Indeed, it reveals an implicit desire for the continued professionalization and longevity—or permanence—of the consultative layer itself in government–citizen interactions going forward. Leveraging a communication as design perspective in understanding the emergence and values of the consultative layer provides a useful theoretical lens through which to view the communicative construction of technology and/in society and the establishment of new organizational structures in democratic life.

The consultative layer framework represents an important, initial theoretical contribution in understanding the professionalized communication-as-design practices that induce infrastructural and organizational shifts associated with new technologies. Significant and separate bodies of research critically examine the

issues surrounding contracting to third-party vendors for public administration needs (Brown & Potoski, 2003; Brown, Potoski, & Van Slyke, 2006), the stakes and techniques of traditional, face-to-face public participation programs (Burby, 2003; Carp, 2004; Creighton, 2005), and communication as design (Aakhus, 2007; Aakhus & Jackson, 2005). The rise of the civic tech sector and a rapidly professionalizing consultative layer that provides tech-mediated methods for connecting citizens and governments necessitates weaving these discourses together to shine light on inconsistencies, embedded ideologies, and philosophical differences between competing firms. Consultative layer firms embrace components of startup culture—agile development, user-centered innovation, ubiquitous participation, growth—and yet aspire to affect societal change through certain democratic ideals. As the consultative layer matures and becomes mainstreamed in regular operations of public administrators, certain value-based affordances will become embedded into the citizen–government relationship and established as normative, communicating to citizens a democratic engagement process borne not of public deliberation but of a privately held startup. If the communicative ideal in deliberative democracy is a citizen engaging directly with government to shape policies and plans, then technologies consigned to facilitate that interaction play an important role in supporting that ideal process. The founders of these consultative layer companies breathe a spirit into the technologies they develop and communicate their democratic values through the affordances and constraints of these artifacts. This study finds that often the spirit, the values, and the hopes embedded in these tools by the founders aim to further the ideals and norms of particular aspects of deliberative democracy. As these technologies are shaped by the political investments of their founders, driven by the product development cycles of startup culture, and responsive to the practical demands of public administration, they necessarily alter the larger ideal of deliberative democracy in certain ways.

The consultative layer presents a new way of conceiving of organizational changes connecting the public sector, private contractors, and citizens through new media technology. The framework positions civic technologies and their designers at the center of a relational, communicative viewpoint between citizens and government, actively during both design and implementation. Practically, critical consideration should be paid to deliberative democratic ideals during the design of civic tech tools by designers, as well as inquired about during the contracting of these tools by government clients.

Limitations to the research include that data encompassed self-reported accounts by founders of their civic tech platform functionality. Future research could investigate the communication and behavior encouraged or admonished in the use of civic tech tools as a way to confirm or contradict founders' self-reports. Other studies should examine the means by which the consultative layer reconstitutes relationships through civic tech platforms from the perspective of multiple stakeholders. The research design in this study did not incorporate input from public managers or users about civic tech. The understudied role of tech vendors in e-government focused the research on the

creative freedom allowed to tech vendors and the important role they play in envisioning democracy in the online space. An important extension to this study would be to investigate whether those government project managers in charge of making contracting decisions with consultative layer firms consider bigger questions of democratic ideals amidst pressures of meeting fiduciary expectations. Such research could take the form of additional interviews or content analysis of public requests for proposals and contract language.

Conclusion

The consultative layer is a permeable membrane that enables, rather than acts as a barrier to, communication, at least in the hopes of company founders. The lens of communication as design focuses a spotlight on civic tech structures that enable citizens and governments to communicate. The consultative layer framework (Figure 1) contributed in this article highlights its place and function in modern democracy, and the themes that emerged about democratic ideals in the technologies (Figure 2) reveal the structures that are envisioned and supported.

Designers want their firms to act as facilitators of multimodal communication between citizens and governments, not just as a transactional middle step on the way to making the business of governance more efficient and effective. E-government tools have the ability to transform government–citizen interaction, but an explication of the design values laden in these technologies with an interrogation of democratic values had previously not been undertaken. The consultative layer is becoming increasingly professionalized as a niche within the civic tech sector, but individual tools are still the outcome of distinct design shops.

Findings of this study show that designers inject values into e-government technology that place emphasis on some normative democratic ideals more than others and offer particular interpretations about how online deliberative democracy should function. The present study pairs together the frameworks of communication as design and AST in an examination of how technologies shape, and are shaped by, society. The role of the consultative layer in government–citizen interaction is just one context worthy of continued study by communication scholars. The consultative layer of civic tech is cementing itself as a routine, permanent, professionalized fixture in the democratic process, and more questions will inevitably emerge about its role.

Translating communication theory generally, and communication as design and AST specifically, to other disciplinary domains remains an important endeavor for interdisciplinary collaboration and advancement. Communication scholarship unites conversations across broad practice areas, such as those that occur in public administration, because of the focus on process and discourse. In this article, the focus on the process of civic technology creation revealed taken-for-granted sociotechnical and ideological apparatuses about modern democracy and how the producers of civic tech tools think it should function in the age of access. In theory and practice, we recommend better frameworks for evaluating consultative layer contractors that include

higher-level criteria about the foundations of democracy alongside budget considerations and contractor portfolios.

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Appendix A: Participants

Table A1. Participant and Company Information.

Participant Name	Title	Company Name	Purpose	Founding	Headquarters
Ben Berkowitz	Founder, Chief Executive Officer	SeeClickFix	A communications platform for citizens to report non-emergency issues, and governments to track, manage, and reply.	2008	New Haven, Connecticut, United States
Dave Biggs	Co-Founder, Chief Engagement Officer	MetroQuest	Public engagement software for sustainable planning used by cities, planning agencies, planning and engineering firms.	1990	Vancouver, British Columbia, Canada
Tim Bonnemann	Founder, President, Chief Executive Officer	Zilino, Intellitics, Inc.	Dialogic-centric participatory processes using technology.	2008	San Jose, California, United States
Nick Bowden	Co-Founder, Chief Executive Officer	MindMixer (mySidewalk as of 2015)	Digitizing town hall to facilitate discussions and debates for urban planning projects.	2011	Kansas City, Kansas, United States
Darlene Cavalier	Founder	SciStarter	Database of citizen science projects where people can find, join, and contribute to formal and informal science research projects.	2010	Philadelphia, Pennsylvania, United States
Robert Cheetham	President, Chief Executive Officer	Open Tree Map, Azavea	A collaborative platform for crowdsourced tree inventory, ecosystem services calculations, urban forestry analysis, and community engagement.	2011	Philadelphia, Pennsylvania, United States

Table A1. Continued

Participant Name	Title	Company Name	Purpose	Founding	Headquarters
Darin Dinsmore[a]	Founder, Chief Executive Officer	Crowdbrite	A way to participate in online brainstorming sessions, meetings, and workshops for teams, outside professionals, and the community to collaborate.	2010	San Francisco, California, United States
Jon Fredrickson	Vice President, Chief Government Innovation Officer	InnoCentive	Web-based community matching scientists to research and development challenges presented by companies worldwide.	1998	Waltham, Massachusetts, United States
Chris Haller	Founder, Chief Executive Officer	Engaging Plans, Urban Interactive Studio	Involves citizens and stakeholders in public projects and decision making, keeping documents, events, news and FAQs clear and up-to-date in one accessible location and allows feedback via discussions, surveys, or an idea wall.	2008	Denver, Colorado, United States
Colleen Hardwick	Founder	PlaceSpeak	A location-based consultation platform that engages people online within specific geographical boundaries for organizations of all types.	2010	Vancouver, British Columbia, Canada

Table A1. Continued

Participant Name	Title	Company Name	Purpose	Founding	Headquarters
Shay Har-Noy	Platform Lead	Tomnod (acquired by DigitalGlobe in 2013)	Tomnod, which means big eye in Mongolian, uses sophisticated machine learning algorithms to analyze images tagged by human users and determine which ones are the most likely to include useful information.	2010	Westminster, Colorado, United States
Brian Herbert [a]	Developer	Ushahidi	Maps with crowd-sourced information to pinpoint safe havens during crises.	2008	Nairobi, Kenya
Richard Kingston	Founder, Online participatory GIS expert	TellUs Toolkit	Offers map-based software tools to support business decisions and stakeholder engagement and in the areas of infrastructure planning and stakeholder engagement, as well as technical expertise in IT system design.	2015	Manchester, United Kingdom
Chris Kuryak	Chief Operating Officer	Recovers	A recovery software framework that can be deployed before a disaster to prepare communities.	2011	San Francisco, California, United States
Jean-Noé Landry	Executive Director	Citizen Budget, OpenNorth	Interactive platform that shows the financial impacts of participants' choices in real time, educating them about the trade-offs and constraints faced by their municipality.	2011	Montreal, Quebec, Canada

Table A1. Continued

Participant Name	Title	Company Name	Purpose	Founding	Headquarters
Sarah Leary [a]	Co-Founder	Nextdoor	A private social network for neighbors to talk online.	2010	San Francisco, California, United States
James Miner	Managing Director	CrowdGauge, Sasaki Associates	Open-source framework for creating educational online games. It first asks users to rank a set of priorities, then demonstrates how a series of actions and policies might impact those priorities. The third part of the sequence gives users a limited number of coins, asking them to put that money towards the actions they support most.	2012	Watertown, Massachusetts, United States
Dan Parham	Co-founder & Design	Neighborland	A communications platform that helps civic organizations collaborate effectively with the public using software and design tools that support broad-based stakeholder engagement and advocacy planning, based on the fundamentals of human-centered design.	2011	San Francisco, California, United States

Table A1. Continued

Participant Name	Title	Company Name	Purpose	Founding	Headquarters
Neil Takemoto	Co-Founder	CSPM Group	Manages a partnership between three primary groups: the local community, the municipality and the private sector to co-create beautiful downtowns and public destinations utilizing a crowdsourced placemaking.	2011	New York City, New York, United States
Eddie Tejeda	Principal Product Manager	Civic Insight (acquired by Accela in 2015)	Civic Insight measures and tracks permitting, code enforcement, and planning data in an interface that features interactive maps and visualizations that allow citizens and agency staff keep up to date on homes and neighborhoods.	2012	San Francisco, California, United States
Mark Walerysiak	Community Liaison	Bristol Rising!	A web-based forum for people to submit ideas for development, vote on them, and lobby for support in downtown Bristol.	2011	Bristol, Connecticut, United States
Michael Wood-Lewis	Co-Founder	Front Porch Forum	A free community-building service in Vermont that hosts neighborhood forums open only to the people who live there.	2006	Burlington, Vermont, United States

[a]Participants whose data were collected from public, secondary sources.

Appendix B: Interview guide.

What is your official title?
How did you get into this line of work?
    Follow-up: What are the organizations you have worked for?
What trade or professional associations are you a member of or affiliated with?
What conferences do you attend regularly?
What newsletters or trade press do you read?
What does your product do?
    Follow-up: Why did you decide on those capabilities?
    Follow-up: How did its features come about?
    Follow-up: Why did you choose these features and not others?
    Follow-up: Whose idea was it or was it a request from a particular client?
Tell me more about the design of your product.
What does your product offer that's better than competitors?
What are the next improvements you plan to make to the product and why?
How many clients currently employ your product?
What is the size of the user base for your product?
How many years in total have you worked for the company?
    Follow-up: How long have you worked for the company in your current position?
Can you tell me when the company started and with how many employees?
    Follow-up: How many employees does it have now?
Can you tell me about your company's mission or vision?
What is your company's competitive advantage?
Who do you consider your peer or competing companies?
In 20 years, what do you hope your company and your tool are able to do for public engagement?