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CROWDSOURCING THE PUBLIC PARTICIPATION PROCESS FOR PLANNING PROJECTS

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Abstract   Public involvement is a central concern for urban planners, but the challenge for planners is how best to implement such programs, given many difficulties inherent in the typical public involvement process. The medium of the Web enables us to harness collective intellect among a population in ways face-to-face planning meetings cannot. This article argues that the crowdsourcing model, a successful, Web-based, distributed problem solving and production model for business, is an appropriate model for enabling the citizen participation process in public planning projects. This article begins with an exploration of the challenges of public participation in urban planning projects, particularly in the harnessing of creative solutions. An explanation of the theories of collective intelligence and crowd wisdom follows, arguing for the medium of the Web as an appropriate technology for harnessing far-flung genius. An exploration of crowdsourcing in a hypothetical neighborhood planning example, along with a consideration of the challenges of implementing crowdsourcing, concludes the article.

Keywords   collective intelligence, crowdsourcing, public participation, urban planning, Web

Now that we can do anything, what will we do? (Mau, 2004: 15)

Like Bruce Mau, and like Buckminster Fuller before him, I believe we live in a world capable of designing the solutions to the world's many problems, to implement our imagined paths to peace, sustainability, and abundance.

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Historian Arnold J. Toynbee also hoped in this new century we would 'dare to think of the welfare of the whole human race as a practical objective' (cited in Pearson, 1957, para. 17). To that end, '[i]nterdisciplinary and participatory design collaborations seem to be the best option for problem solving in a democratic society of the digital, postindustrial age' (Brabham, 2006: 29). The design disciplines, including urban planning, have come to accept this notion of participation and collaboration, particularly as an exercise in participatory democracy. Yet, urban planners continually struggle to enlarge the participation process, to maximize and diversify stakeholder input in the designing of solutions for urban problems. In practice, too, the very facilitation of a public planning meeting has its challenges for spurring participation and for drawing out creative solutions from the future users of public spaces (Campbell and Marshall, 2000; Carp, 2004; Hibbard and Lurie, 2000; Hou and Kinoshita, 2007; Innes et al., 2007).

An embrace of technological solutions is needed. The medium of the Web enables us to harness collective intellect among a population in ways face-to-face planning meetings cannot. As open source production on the Web has proven itself as a collaborative method for designing superior software products,[1] the crowdsourcing model may prove itself as a superior method for designing real spaces, planning the built environment. I argue that the crowdsourcing model, a successful, Web-based, distributed problem solving and production model for business, is an appropriate model for enabling the citizen participation process in public planning projects. I begin this argument with an exploration of the challenges of public participation in urban planning projects, particularly in the harnessing of creative solutions. Next, I outline the theories of collective intelligence and crowd wisdom, arguing for the medium of the Web as an appropriate technology for harnessing such far-flung genius. Finally, I call for the crowdsourcing model as a practical means for facilitating public participation processes online, speculating its application for the planning of a hypothetical neighborhood as an example.

Public participation, creative solutions and democracy

A robust body of planning literature has acknowledged the benefits of public participation in planning processes (see, for example, Creighton, 2005). At most, public participation can be seen as a logical extension of the democratic process in more local, direct, deliberative ways (Pimbert and Wakeford, 2001). And at the very least, involving citizens in the planning process helps ensure a plan that will be more widely accepted by its future users (Burby, 2003; Brody et al., 2003; Miraftab, 2003). As Crewe (2001) found in an analysis of citizen participation in the Boston Southwest Corridor project in the 1970s and 1980s, '[t]he more designers value the input of citizens, the more appropriate their designs will be for the users concerned' (p. 439). Extending this notion, Fiskaa (2005) posits that '[t]he purpose of public participation is of course to obtain better plans, meaning that they are well accepted by most, and therefore easier to carry out' (pp. 160–1).

Non-expert knowledge

Other benefits for public participation involve the valuing of non-expert or non-mainstream knowledge brought into the creative problem solving process of planning. Participation is the act of creating new knowledge, contributing new perspectives to the planning process, and diffusing knowledge to others in the process (Hanna, 2000). Van Herzele (2004) found that inclusion of non-expert knowledge was beneficial to the planning process in general, since the perspectives of individuals outside of the professional bubble of urban planning can (re)discover creative solutions that could work in a specific local context. To enlarge the discussion to the realm of innovation research, as well, several studies (Lakhani and Jeppesen, 2007; Lakhani and Panetta, 2007; Lakhani et al., 2007; von Hippel, 1988, 2005) have found tremendous success when non-experts engage in scientific problem solving and product design, often with solutions superior and more cost-effective than traditional research and development programs. Corburn (2003) urges that 'local knowledge should never be ignored by planners seeking to improve the lives of communities experiencing the greatest risks' (p. 420). Corburn (2003) goes on to define local knowledge and its purpose in the public planning process. Adapted from Corburn (2003: 421), local knowledge is:

- Knowledge of specific characteristics, circumstances, events, and relationships, as well as important understandings of their meaning, in local contexts or settings;
- Often acquired through life experience and is mediated through cultural tradition;
- Rarely a hunch or spontaneous intuition but rather evidence of one's eyes tested through years if not generations of experiences; and
- Legitimated through public narratives, community stories, street theater, and other public forums, as opposed to professional knowledge which is generally tested through peer review, in the courts, or through the media.

It is immodest to think that only professional planners can develop planning solutions, and perhaps more so to think that experts can identify precisely which and how many non-experts would be of value to a project. Local, non-expert knowledge adds the perspective of the future user of a designed space and the insights about environment and place that the planning discipline might never have approached or might have already forgotten (Burby, 2003; Laurian, 2003). It is this hope for the value of the everyday citizen that fuels crowdsourcing projects, which I explore later in this article.

Cautioning against participation

A counter body of literature, however, has also emerged which challenges these broad, rosy promises of public involvement, citing local exceptions and small-scale public participation failures based on specific cases and long-range studies. For example, Abram and Cowell (2004) argue that success in public participation may be culture-specific, noting that Norwegians are more apt to be involved in public planning due to a general expectation of transparency in

government and due to Norwegians' generally high rates of activity in political parties. Likewise, some cultures have differing levels of transparency in government and various barriers of public participation in government processes (Alfasi, 2003). Lane (2003) challenges the inherent democratic potential of local knowledge, particularly when processes fail to incorporate local knowledge meaningfully. Nance and Ortolano (2007) argue that success in public participation may be project-specific, noting that public participation in a Brazilian urban sanitation plan had mixed results relating to performance of the plan. Furthermore, while public participation can be a conscious way to incorporate the ideas and feelings of minority groups typically underrepresented in policy-making, Beebeejaun (2006) warns of inclusion of ethnic groups in particularist ways which separate those minority groups from the mainstream. Further still, tokenism and the reinforcement of essentialist categories of difference in conspicuous inclusion of minority representation may be counterproductive to the greater project of interrogating power inequities in a community (Beebeejaun, 2006). Brody (2003) highlights the relative absence of empirical evidence of success in public participation as well, pointing out that '[h]igh levels of participation may *increase* conflict by having disputing parties at the negotiating table' and 'frustrate planners by slowing down the decision-making process' (pp. 409–10, emphasis added).

Adding to this general qualifying of the potential of public participation in planning, Burby (2003) reminds us that 'planners themselves can stifle participation by the choices they make about public involvement' (p. 34). Specifically, the ways planners conduct meetings and inject their own wit and personal facilitation style may work to either limit or enhance planning subjects' impact on material outcomes (Carp, 2004). The very presence of special interest groups in the planning process, who show up to planning meetings representing the interests of some facet of the public, may intimidate the average citizen with elaborate charts, maps, empirical evidence, and expert advice, thus deterring future involvement by non-experts in the community (Hibbard and Lurie, 2000). Non-verbal communicative actions and unrelated small talk by various citizens in the actual spaces of public meetings also work to 'script' the power grabs that occur during the actual public participation segments of planning meetings (Campbell and Marshall, 2000). Furthermore, recent studies from Hou and Kinoshita (2007) and Innes et al. (2007) found that the degree of informality employed during the public participation process affected the ways in which citizens were able to contribute to the development of the plan and see themselves as effective actors in the solving of problems.

Forester (2006) reminds us that '[e]asy to preach but difficult to practice, effective public participation in planning and public management calls for sensitivity and technique, imagination and guts' (p. 447). These many articles which caution against the optimistic view of public participation could be collectively seen as a series of exceptions to the rule, studies hinging on narrow case studies where a public involvement program was soured by specific interpersonal dynamics or exceptional local circumstances. Traditional public participation methods should not be devalued, for these methods have generally served us

well in the past, and no method is perfect. But when we consider the medium of the Web, for instance, where anonymity for users is available and where body language, identity politics, and interpersonal power dynamics are absent or changed, we can begin to ameliorate the several pitfalls of public participation that this body of counter literature on public involvement identifies. Simply put, with so much difficulty in executing the face-to-face public participation component of a planning project, we should begin to think beyond the bounds of what might constitute public involvement in the first place.

Network democracy

The purpose of this article is not so much to explore the contours of democratic theory and how it relates to public involvement; rather my project is to put forth a practical, technology-driven alternative to the traditional public involvement process. Yet, it is worth discussing briefly why something like crowdsourcing might better fit the shape of democracy in the realities of an increasingly networked information society. In light of moves to involve the public in urban planning, by law or voluntarily, in theory and in practice, the planning discipline has embraced the notion of a more deliberative form of democracy. In this model, public consensus is desired to achieve a public good (a plan), and this consensus is reached through the meaningful discussion and negotiation of the diverse viewpoints of stakeholders (Pimbert and Wakeford, 2001). In deliberative democracy, 'equality, identity between governing and governed and popular sovereignty' are the key principles, where the government and competing interested parties are all seen as in productive conflict with each other (Mouffe, 2000). Planning committees and public involvement meetings following the mantra of multi-stakeholderism and multiculturalism employ the many tools of deliberative democratic process, including juries, polls, and forums (Carson and Hartz-Karp, 2005). The deliberative democratic model even promises to be a 'new [model] of collaboration between citizens, experts and decision-makers based on [a] new paradigm and assumptions' which may bring 'greater wisdom to governance' and, by extension, greater wisdom to public plans (Hartz-Karp, 2007: 2).

However, this agonistic, deliberative democratic model assumes the successful functioning of representative democracy, which, as it is predicated on the vertical, hierarchical form of the nation-state, may be ineffective for the horizontal, distributive capacities of networks. The prominent current in the critical study of globalization tells us of the obsolescence of the nation-state, favoring instead a social order which acknowledges movement, flows (Appadurai, 1996), and an existence within organized networks that have co-emerged with digital technologies and information economies (Castells, 1996; Rossiter, 2006). The future focus ought to be on '*relational processes* not representational procedures' (Rossiter, 2006: 13). Deliberative democracy models are inadequate (Hull, 2000; Rossiter, 2006). As Rossiter (2006) puts it frankly: 'It is time to abandon the illusion that the myths of representational democracy might somehow be transferred and realized within networked settings. That is not going to happen' (p. 95). The best plans feel as though they emerged from

the community organically, as if they sprung from the public in ways that enable all bodies to see themselves happily in a space. Lao Tzu knew that good leadership was the kind where leaders empowered others to feel a sense of ownership over their successes. Good leadership, effective democracy, well executed public involvement campaigns – each emphasizes the *process* of citizens achieving, realizing possibilities, and strengthening relationships. Urban planning is nothing if not the reaching for these ideals in the built environment. Forms like the crowdsourcing model can tap the possibilities for digital communication networks to mobilize citizens, foster creative input, and produce plans through democratic processes which more accurately address our lived experience within organized networks today.

Collective intelligence and the Web

If one reason for valuing local or non-expert knowledge is that new ideas may emerge that might never have been thought of within the bounds of the profession and the bureaucracy of the firm, then the question is how best to maximize this input. Presumably, a scaling-up of the public involvement process and a more concerted effort to recruit non-experts into the planning process would do the trick, but such actions are costly and labor-intensive. On the Web, though, the unidentified, non-expert talent is out there, accessible through the seemingly infinite scaled-up platform of the Internet. The Internet boom in the mid-1990s was related to this vast landscape of diverse users. Narrow niche businesses sprang up in the dot-com gold rush, eager to use the reach of the Web to attract a collective of shoppers with the most obscure tastes and needs. There was, of course, a limit to what the market would support in online micro-niche commerce, as was seen in the 2000 dot-com crash (Flichy, 2001/2007). Yet, the lesson here is that if businesses gambled heavily on the Web's reach to deliver them enough customers pulled from the digital woodwork, then planners can and should seek latent talent on the Web for their projects.

Collective intelligence

At the time of the Web's awakening, Lévy (1995/1997) wrote:

> It has become impossible to restrict knowledge and its movement to castes of specialists . . . Our living knowledge, skills, and abilities are in the process of being recognized as the primary source of all other wealth. What then will our new communication tools be used for? The most socially useful goal will no doubt be to supply ourselves with the instruments for sharing our mental abilities in the construction of collective intellect of imagination. (p. 9)

Since 'no one knows everything, everyone knows something, [and] all knowledge resides in humanity', we must consciously adopt the technologies and methods which harness this talent (Lévy, 1995/1997: 13–14). Lévy is an optimist. He called this far-flung genius *collective intelligence*, a 'form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills' (Lévy, 1995/1997: 13). His logical

choice to harness this intellect is the Web, and for reasons which resonate with Rossiter's (2006) argument for a new, networked democratic process:

> Cyberspace designates the universe of digital networks as a world of interaction and adventure, the site of global conflicts, a new economic and cultural frontier. There currently exists in the world a wide array of literary, musical, artistic, even political cultures, all claiming the title of 'cyberculture'. But cyberspace refers less to the new media of information transmission than to original modes of creation and navigation within knowledge, and the social relations they bring about . . . It is designed to interconnect and provide an interface for the various methods of creation, recording, communication, and simulation. (Lévy, 1995/1997: 118–19)

Given the will to act, problem solving with collective intelligence and networks can be scaled-up to address even global concerns (Ignatius, 2001). Several modes of technology – many of them Internet-based – already exist to encourage global communication and problem solving (Masum and Tovey, 2006).

Crowd wisdom

An interesting thing happens, too, when enough talent becomes collected in efficient ways, even without the aid of the Web to harness all ideas: people become collectively smarter. 'James Surowiecki, in his book *The Wisdom of Crowds*, examines several cases of crowd wisdom at work, where the very success of a solution is dependent on its emergence from a large body of solvers' (Brabham, 2008b: 79). Based on several empirical investigations, Surowiecki (2004) finds that 'under the right circumstances, groups are remarkably intelligent, and are often smarter than the smartest people in them' (p. xiii). This *wisdom of crowds* is derived not from averaging solutions, but from aggregating them:

> After all, think about what happens if you ask a hundred people to run a 100-meter race, and then average their times. The average time will not be better than the time of the fastest runners. It will be worse. It will be a mediocre time. But ask a hundred people to answer a question or solve a problem, and the average answer will often be at least as good as the answer of the smartest member. With most things, the average is mediocrity. With decision making, it's often excellence. You could say it's as if we've been programmed to be collectively smart. (Surowiecki, 2004: 11)

The medium of the Web

The Web enables a kind of networked, creative thinking, encourages the mind to wander down winding paths to unknown mental explorations (see Bush, 1945). Take, for instance, how hypertext can lead one down a rabbit hole of browsing. Getting delightfully lost in the catacombs of, say, Wikipedia, continually exploring new entries with a simple click, has even become a serious hobby for some. What is more, the Web enables the precise form of aggregation Surowiecki stipulates for a successful, wise crowd. Since too much collaboration and communication between problem solvers can lead to compromise or disaster (Surowiecki, 2004), the key to aggregating instead of averaging ideas is to allow individuals to develop complete single ideas and put them up for review among their peers in the crowd. Easily, the crowd can sift through the

bad ideas to find the good ones, a sorting that could be accomplished with a simple online voting scale.

Other aspects of the Web which make it an ideal medium for facilitating creative participation include its speed, reach, asynchrony, anonymity, interactivity, and its ability to carry every other form of mediated content. The Web is an instant communications platform, where messages, and thus idea exchange, can travel so fast along its channels that the medium works in effect to virtually erase the issue of time. Furthermore, the Web has a more or less global reach, or it least it *can* have a thoroughly global reach. This means that communication can take place between people in different places. Coupled with the virtual erasure of time, this global character of the Web works to also erase space. Carey (1989) first best pondered the cultural transformations and the societal capabilities of communications technologies unmoored from time and space, noting that inventions like the telegraph which accomplished this erasure worked to unite nations in common cultural visioning.

Unhinged from the constraints of time by its speed, the Web is also at the same time an asynchronous mode. That is, online bulletin board systems and similar applications enable users to post commentary and ideas to a virtual 'location' at one point in time, and other users can engage those thoughts at much later points in time. Much like the leaving and taking of notes on a bulletin board in a town square, the Web can foster a sense of ongoing dialogue between members of a community without those members having to be present at the same time (Ostwald, 1997/2000). This capability for the Web is already being realized in some urban planning projects, as posting podcasts and meeting minutes on planning project Web sites is an exploitation of the Web's asynchrony and virtual permanence, particularly if these kinds of project Web sites are coexistent with online bulletin board systems.

Aggregating the single ideas of individuals in the crowd by putting them in competition with one another does not mean the disappearance of qualitative input. Planning decisions are not about the will of the simple majority. They are about the ways in which communities provide qualitative commentary on how they want to see their future built environment. In an online context, individuals make qualitative input available primarily through online bulletin board systems and other modes of asynchronous communication. Ideally, individuals in the wise crowd incorporate discussion and exchange as they develop a series of individual solutions to contribute to a commons. It is then the aggregate of these individual ideas which results in crowd wisdom. The process is not unlike peer review. This is also different from the deliberative democratic model, which favors compromise and debate to produce collective solutions.

Furthermore, the Web is an anonymous medium. Users are able to develop their own online identities largely on their own terms, or they can choose to remain anonymous entirely. In a chat room or bulletin board system, for example, people can develop whole new personas or design entirely differently-bodied avatars to represent themselves and their interests. In line with much of the scholarly literature on nonverbal communication, Campbell and Marshall's (2000) discovery that people's body language, positioning in the space of a

room, and small talk work to 'script' the ensuing power dynamics of a planning meeting is relevant here. In an online environment, people are free to contribute to online discussions and the vetting of ideas without the burden of nonverbal politics. That is to say nothing of the very real power inequities at play with embodied forms of difference (e.g. race, gender, (dis)ability), inequities buttressed many times over by empirical research in communication, sociology, health, psychology, and other disciplines. The medium of the Web can work to liberate people from the constraints of identity politics and performative posturing by endowing users with the possibility for anonymity in participatory functions (Sotarauta, 2001).

Finally, the Web is an interactive technology and a site of convergence, where all other forms of media can be utilized. Rather than the simple transmission mode of information native to 'older' forms of media (e.g. television, radio, newspaper) and much policy, the Web encourages ongoing co-creation of new ideas. Content on the Web is generated through a mix of bottom-up (content from the people) and top-down (content from policy-makers, businesses, and media organizations) processes, as opposed to solely a top-down model. It would seem that public participation programs folded into urban planning processes try to achieve this meeting in the middle of ideas from the 'bottom' and from the 'top', but as outlined above in the section on deliberative democracy's shortcomings, this stilted format for idea exchange may be outdated. To some, the Web has many shortcomings, including the ways in which the Web may alienate us from our neighbors interpersonally and the ways some companies seek to position Web users as consumers ripe for profit (Bugeja, 2005; Putnam, 2000). In a 'Web 2.0' era of increased content creation, though, Web users are becoming particularly savvy at broadcasting their own ideas, uncovering buried information, and remixing previous ideas and content into new, innovative forms. Web users are potentially problem solvers, are potentially creative. We should turn to the Web to transform the public participation process, to enlarge our narrow perspective on how citizens actually participate in democracies today (Mack, 2004).

So, what is crowdsourcing?

Crowdsourcing operationalizes crowd wisdom, and it is a mechanism for leveraging the collective intelligence of online users toward productive ends. Jeff Howe (2006e) coined the term *crowdsourcing* in an issue of *Wired* magazine. The term 'describes a new Web-based business model that harnesses the creative solutions of a distributed network of individuals through what amounts to an open call for proposals' (Brabham, 2008b: 76). In a companion blog to his breakthrough article, Howe (2006a) defines the model in his own words:

> Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call . . . The crucial prerequisite is the use of the open call format and the large network of potential laborers. (para. 5)

Howe (2006b) further clarifies that 'it's only crowdsourcing once a company takes that design, fabricates [it] in mass quantity and sell[s] it' (para. 1). 'In other words, a company posts a problem online, a vast number of individuals offer solutions to the problem, the winning ideas are awarded some form of a bounty, and the company mass produces the idea for its own gain' (Brabham, 2008b: 76).

Brabham (2008b) and Howe (2008) outline some of the more notable cases of crowdsourcing, all of which are for-profit business cases. Threadless.com, InnoCentive.com, and the Doritos Crash the Super Bowl Contest are perhaps the most illustrative of the crowdsourcing model's diverse capabilities. Threadless is a crowdsourced t-shirt company, where users join the Threadless community with a free account. Once in the community, users can do one or more of the following: design, vote, shop, or chat in the user forum. Users who choose to design shirts download a template for home illustration software programs, create a silk-screen design for a shirt, and upload the design back to Threadless. In the voting capability, users provide votes and criticism of each of the uploaded designs from their Threadless community peers. The top vote-getting designs after a week win a small cash prize from the company for the designer. These winning designs are then owned by Threadless, printed on t-shirts, and sold back to the 'crowd' of users. The shopping capability of the site, then, is where users can buy the shirts that they and their peers have designed. This production mode is profitable for the company: as of June 2006, Threadless was 'selling 60,000 t-shirts a month, [had] a profit margin of 35 per cent and [was] on track to gross [US] $18 million in 2006', all with 'fewer than 20 employees' (Howe, 2006c, para. 1).

InnoCentive is a crowdsourcing alternative to traditional, in-house, corporate research and development (R&D). Some of the world's top innovators in science and engineering – Boeing, DuPont, Proctor & Gamble – have come to InnoCentive to post the problems that stump their in-house scientists. These 'seeker' companies 'broadcast scientific challenges to over 80,000 independent scientists from over 150 countries' (Lakhani et al., 2007: 5). Seeker companies pose their problems on the Web site and offer high monetary rewards to anyone who can provide successful solutions. Users who sign up for free with the site – 'solvers' – then take on these challenges and try to find solutions. Like Threadless, winning solutions are then rewarded and owned by the companies who sought the solutions in the first place. InnoCentive is a very successful R&D model, where a pool of users on the Web, some of them not experts in the particular disciplinary domain of a given problem and some of them not professional scientists at all, crack some of the most vexing complex problems that even the top corporate R&D minds cannot solve (Lakhani et al., 2007; Lakhani and Jeppesen, 2007).

Finally, potato chip company Doritos launched a 'Crash the Super Bowl' user-generated advertising contest for the 2007 Super Bowl. People were invited to submit their own television commercial spots showcasing the Doritos brand to an online forum set up specifically for the contest. Users then voted on the best commercials, and the top three commercials aired during the 2007

Super Bowl television broadcast. Though Doritos is by no means an all-crowd-sourcing company, it employed the crowdsourcing model for the specific task of selecting a commercial for the coveted, expensive airtime of the Super Bowl. As in Threadless and InnoCentive, the company posted some form of a call for proposals to a problem or need it described, a pool of interested Web users offered solutions and selected the best solutions, and then the company took ownership of those solutions for its own benefit.

Brabham (2008b) argues that:

> crowdsourcing is a legitimate, complex problem-solving model, more than merely a new format for holding contests and awarding prizes . . . It is a model capable of aggregating talent, leveraging ingenuity while reducing the costs and time formerly needed to solve problems. (76, 87)

The model holds enormous promise for non-profit and governmental functions, and the model is already being tested in the screening of applications to the US Patent and Trademark Office with much success (Noveck, 2006). Urban planning projects can take up the crowdsourcing model, too, particularly as a means to enable public participation.

In essence, any urban planning project is predicated on a problem. Typically that problem is how best to accommodate changing populations with different infrastructure, all while considering the interests of residents, developers, business owners, and the environment. If a problem can be framed clearly, and if all the data pertaining to a problem can be made available, then that problem can be crowdsourced. People have a remarkable ability to solve problems, particularly *en masse* (Surowiecki, 2004). The traditional format for citizen involvement in planning projects has involved town hall meetings, workshops, and charrettes, but these face-to-face meetings have their limits in maximizing the creative input of citizens. This process needs to go online.

How to crowdsource public participation in planning

To argue for the capabilities of the crowdsourcing model for citizen partici-pation functions in planning projects, I will illustrate the model in a hypotheti-cal planning case. I embark on this through a kind of 'visioning exercise' to imagine a future use of the crowdsourcing model in the planning of a new neighborhood development (see Bryson, 1995). For the sake of this article, a hypothetical new neighborhood development is proposed to the city planning commission, and the city launches a program for public involvement to identify the potential impact of the development on the community and to find solutions to potential problems.

To begin to crowdsource the public participation process, the city would have to clarify its problem. Precisely where is the proposed neighborhood develop-ment site? What is the time table? How many more residents might it bring to the city? These questions and more would form the basic elements of a crowd-sourcing call. In addition to detailing the exact scope of the proposed development, the city would also have to make all data available as part of the

call. This would mean any and all maps, lists of businesses in the area, locations of parks, and so on would all be made available as supporting data for the call. Even highly technical data should be made available: dimensions of roadways, environmental and municipal laws and codes, data about traffic flows. The crowd's ability to handle complex data should not be underestimated (Schlossberg and Shuford, 2005), as InnoCentive, as well as other highly technical crowdsourcing projects, such as the Goldcorp Challenge (see Brabham, 2008b), have proven. The call for solutions could be of any size, from the very small (challenging the crowd to design a small urban park) to the very large (challenging the crowd to design an entire regional plan).

The call for solutions, along with all of the available data, would be posted on a Web site operated by the city. Part of the call would stipulate that winning solutions would be implemented by the city in some way, and winning solvers might be rewarded a bounty in a number of forms: cash, free utilities for a few years, various in-kind prizes from the city's businesses, or, perhaps most economically and most impressively, naming rights to various spaces or buildings in the plan.[2] Finally, the call for solutions would clearly stipulate the format for uploading solutions. A specific set of guidelines for written comments, like at InnoCentive, or a specific template for solvers to work within, like at Threadless, would be ideal. For instance, if the city wanted to see where citizens wanted various parks or how they desired the shapes of streets, a simple template could be offered. This template might be incredibly simple, with shapes designating various buildings and spaces. Users could easily move the shapes around within a geographical boundary proposed for the project and, could, through that simple exercise, propose the entire general feel for a neighborhood. This kind of template could be downloadable, like on the Threadless site, or it could be an interactive Flash activity online, where people can click and drag various shapes and symbols around on a map overlay and click 'submit' when done.

Proposals from the city's residents would be available online in a kind of gallery, where other citizens could comment in online bulletin boards and vote on the best designs. In the end, winning designs could be handled in a variety of ways, depending on the city's willingness to commit to the solution. The city could, if it desired to, commit to directly implementing the top vote-getting plan in the crowdsourcing contest. On the other end of the implementation spectrum, the city planning commission could take the top few vote-getting designs and use them as an advisory element in the design of the actual plan through traditional public participation methods. Somewhere between this 'policy' and 'advisory' interpretation of the implementation spectrum could be an instance where the city planning commission takes the top few vote-getting designs, weighs their ability to be implemented according to budget, time, and a technical analysis, and then chooses one of the top designs as the single best option. Additionally, the city could choose to combine elements of two or more top plans to create a better plan overall. As much as crowdsourcing operates best when the crowd is left to produce solutions *and* choose the best solutions among them, the model does not have to mean a complete release of control by government. The very crafting of the problem, the stipulations for accepting

proposals, ways winning designs are chosen, and the level of commitment to implement a design are all factors under the control of governments conducting a crowdsourcing venture in the first place. The model is actually quite hierarchical and organized; it is only the creative process that is uninhibited, 'open', and at the will of the crowd. Ultimately, too, this same range of options for how much voice to give citizens in the crowdsourced version of the planning process exists in the realm of traditional public involvement methods. Crowdsourcing does not necessarily have to replace traditional public participation methods; crowdsourcing can be seen as an additive approach.

In the end, this hypothetical city's crowdsourcing experiment would accomplish much. First, all citizens would be empowered to participate. Any citizen – given access to an Internet-connected computer – would have access to the online participation process, no matter their political standing in the community, their ability to attend a public involvement meeting at a specific time and place, or their apprehensions about public speaking at a planning meeting. Advocates for the hypothetical neighborhood development and the development's opponents could all be 'heard' online, in ways that would hinder the ability for strong interest groups to use emotional appeals, rhetorical domination, and other polarizing measures that occur in face-to-face public meetings (Campbell and Marshall, 2000). This process gives voice not only to those typically excluded from the participation process altogether, but it also gives voice to those who are typically involved, but who are drowned out by polar arguments and the influence of 'experts'.

Furthermore, citizens would have the opportunity to participate in ways that fit their interest in the project. That is, people in various orbits of participation, from the most involved 'power centre' to the apathetic 'silent majority', could realize whatever level of involvement they prefer in the process (Maier, 2001). The more involved citizens could upload one or more solutions, could engage in meaningful critique of others' plans on the Web site, and could be active voters on the best plans. Meanwhile, less involved citizens might at least visit the site and cast a few votes for others' design proposals. Simply put, some people are more interested in generating ideas, while some are more interested in critiquing them. A crowdsourcing application could accommodate this range of involvement.

A second accomplishment of crowdsourcing the citizen involvement process would be an emergence of new, creative ideas. Perhaps a panel of expert planners might be able to generate the same proposed solutions as the crowd, but so many instances of crowd wisdom suggest otherwise. Local knowledge borne out of the lived, daily experience of citizens works to interject certain insights into the problem solving process that a panel of experts, especially experts from out of town, could. Some of these local proposals 'might be superior solutions because the ideas might consider the unique needs of diverse constituencies' (Brabham, 2007: para. 3). Von Hippel (2005) has argued for user-centered design, generally, because it more fully addresses the local needs of everyday users than any top-down process can. Why not expand this notion of letting users lead design processes for the towns they live in? Traditional

public involvement meetings aim to do this, but in reality – and, again, as deliberative democracy models prove ineffective in increasingly networked societies – those meetings are, in practice, top-down processes where citizens are 'heard' more than they are 'empowered'.

Up to a point, crowdsourcing the public participation process for this hypothetical neighborhood development does not seem very different from participatory land-use mapping (Di Gessa, 2008; Randolph, 2004), participatory 3-D modeling, 'chip games', PPGIS, or Web-based urban information-gathering networks (Sotarauta, 2001) and mapping activities (Kingston, 2007). It is the process whereby the everyday citizens who design solutions also vet those solutions that makes crowdsourcing distinct from these other methods.

Challenges for crowdsourcing

An obvious limitation to the crowdsourcing model is rooted in the digital divide literature. In the so-called digital divide, there is a chasm between those who have computers, computer skills, and Internet access and those who do not. Issues of access to technology are important ones, for any democratic model is problematic if it is predicated on access to something that not everyone has access to. As of 2005 in the US, about 32 percent of adults did not use the Internet, and not always by choice (Fox, 2005). Members of lower income households have the most glaring lack of access to computing technology, due to the still relatively high cost of owning a computer with Internet access, despite many claims recently that technology has now become universally affordable in the US. Some US population segments lagging behind most in Internet adoption include Latinos (Fox and Livingston, 2007), rural communities (Bell et al., 2004; Horrigan and Murray, 2006; LaRose et al., 2007; Warren, 2007), and older people (Fox and Madden, 2006; Millward, 2003). Globally, Western Europe, the US, Canada, Australia, and Japan have the highest rates of Internet access, with much of sub-Saharan Africa, South America, and Southeast Asia at the bottom of the connectivity rankings (Birdsall and Birdsall, 2005).

Further still, a new digital division is of concern, especially for crowdsourcing: high-speed versus dial-up connections (Horrigan, 2007a, 2007b; Horrigan and Smith, 2007). Really, Internet access should be conceived of in terms of a spectrum of use rather than a dichotomy between 'haves' and 'have-nots' (Gunkel, 2004). High-speed Internet connections are needed to maximize user-generated content online and to communicate large volumes of data to users. Thus, the faster the connection, the more able one is to participate in a crowdsourcing application. This division between those with high-speed connections and those with dial-up connections needs to be carefully considered by organizations looking to crowdsource, seeking 'lighter' bandwidth alternatives for file sizes and modes of participation.

One remedy could be the setting up of community technology centers, or the promotion and expansion of technology centers in public libraries. Hayden and Ball-Rokeach (2007) make an argument for the maintenance of community technology centers on democratic, civic participation, and

community empowerment grounds. One now-famous experiment with technology-aided government was successful in capturing the concerns of some of the town's often overlooked citizens. The Public Electronic Network (PEN) in Santa Monica, California, in 1989 involved a 'system, accessible to all citizens equipped with a microcomputer (twenty terminals were also installed in public places)', where residents could voice their concerns with government (Flichy, 2001/2007: 81). The key to this project, particularly in how it brought in the commentary of many homeless people, was the maintenance of public computers for this purpose. Such a remedy is possible for crowdsourcing projects which seek public input on issues of vital community concern. With public computer terminals, though, comes the responsibility of governments to provide training, assistance, and personnel for those wanting to use the technologies, but who lack the skills to do so. Until computers and Internet access becomes more widespread and affordable, crowdsourcing may be best suited as a supplement to traditional, face-to-face planning meetings.

Other obstacles for crowdsourcing involve the construction of the Web interface and the sustaining of an online community. Issues surrounding the design of the interface include accessibility, usability, and cost, and issues surrounding the sustaining of an online community include timing, promotion, inclusion, and dealing with crowd resistance. Mandated by law in some countries, Web sites that serve the public good ought to be maximally accessible, including to people with disabilities. Additionally, a Web site for a crowdsourcing project should be optimally usable. That is, good Web usability principles should underscore the design of human–computer interfaces to maximize user experience, deliver the appropriate information, and minimize kick-outs. These necessary Web design considerations are best realized through the services of professional Web designers and usability consultants. These services can be costly, but the benefit of a Web application is that if it is designed properly it can be replicated and re-used for future crowdsourcing projects with diminishing design costs.

What makes an online community vibrant and productive is one of the great mysteries of the Web. Surely, though, a challenge facing any crowdsourcing venture is how to kick start the crowd that will be responsible for generating needed solutions. An aggressive marketing and public relations plan should be implemented with the launch of any crowdsourcing project. These tactics should include both mainstream marketing and public relations tactics (e.g. press releases, paid advertising, public service announcements) as well as alternative tactics (e.g. viral marketing through social networking sites, guerilla marketing, image events). The point is to draw an initial rush of visitors to the crowdsourcing Web site to get the online community started. Crowdsourcing administrators may even consider seeding the crowdsourcing project with existing solutions that appear to have been submitted by users and to include staged comments in bulletin boards. If people visit a site that is supposed to be vibrant, but it looks like a ghost town, they will likely think the project a failure and leave the site. Online communities seem to have a pulse of their own, and the key for crowdsourcing projects is to begin that momentum.

A final challenge with crowdsourcing involves knowing when to include or exclude individuals in the process, and how to deal with a crowd that is resistant to a crowdsourced task. Following the concept of collective intelligence, it makes sense to cast as wide a net as possible to bring in more creative input. However, there is a potential conflict that may arise in that anyone on the Web may be able to weigh-in on a localized problem. In other words, why should someone who does not live in a certain geographic area have a say over what happens with that area's future? As legal theorist Lawrence Lessig (1999) would suggest, the remedy for this problem lies in the architecture of the system: the software code. That is, verification systems can be put in place that give varying weight to certain users' votes in a crowdsourcing application based on where they live or what interests they may have in a project, or certain users can be screened out entirely from participating. There is much that can be done with a well-designed Web interface and a corresponding database system which controls who may or may not 'play' in the space of the Web site. Finally, organizations should be prepared to deal with individuals in the crowd who may be entirely hostile toward a crowdsourcing project. For instance, if a crowdsourcing problem asks the crowd to best plan how development will take place on a particular parcel of land, it should be expected that some individuals in the crowd will be resistant entirely the idea of development. This resistance from the crowd – 'crowdslapping' as it is called (Howe, 2006d) – may destabilize an online community and thus may interfere in the problem solving abilities of a crowd. Though it may be tempting to silence these disruptive crowdslappers, there is a range of negative consequences for censoring the crowd. These consequences range from depressing the creative input necessary for innovation and problem solving, to – depending on the country – treading on the basic free speech rights of individuals, especially if crowdsourcing projects are publicly funded (Brabham, 2008a). The best plan for dealing with crowdslapping is likely a combination of well-designed software code (e.g. a peer reputational rating system similar to the system for sellers at eBay) and a belief in the crowd's ability to self-regulate through community standards (Post, 1995) with these kinds of rating tools.

Conclusion

It is time for new citizen participation methods in public planning. Technology can enable deeper levels of engagement between people and governments, particularly through the medium of the Web. The crowdsourcing model, in particular, is a method for harnessing collective intellect and creative solutions from networks of citizens in organized ways that serve the needs of planners. What is needed is an embrace of the crowdsourcing model in particular and of the Web in general by the planning profession. Planning professionals and policymakers need to take risks with innovative models such as crowdsourcing. Small scale, low-risk experiments with crowdsourcing in the public involvement process of planning efforts can and should be undertaken by governments.

Acknowledgement

Notes

1. Open source production involves making the root, or source, material of a product available to users to manipulate and improve upon. Users then contribute their improvements to the product back to a commons for other users to freely use. Software development is perhaps the clearest example, and the Linux operating system, the Mozilla Firefox Web browser, and the Apache HTTP server are the best known examples of open source software. A number of principles surround this method of software development, and an 'official' definition for 'open source' can be found on the Open Source Initiative's Web site, at [http://www.opensource.org]. Despite its similarity to crowdsourcing, open source production is different from crowdsourcing in important ways (see pp. 81–3 in Brabham, 2008b, for these distinctions).
2. Bounties are important for crowdsourcing. In a study of the motivations of users at crowdsourcing company iStockphoto, Brabham (2008c) found that the desire to make money was one of the strongest motivators for participation.

References

Abram, S. and Cowell, R. (2004) 'Learning Policy: The Contextual Curtain and Conceptual Barriers', *European Planning Studies* 12(2): 209–28.

Alfasi, N. (2003) 'Is Public Participation Making Urban Planning More Democratic? The Israeli Experience', *Planning Theory & Practice* 4(2): 185–202.

Appadurai, A. (1996) *Modernity at Large: Cultural Dimensions of Globalization*. Minneapolis: University of Minnesota Press.

Beebeejaun, Y. (2006) 'The Participation Trap: The Limitations of Participation for Ethnic and Racial Groups', *International Planning Studies* 11(1): 3–18.

Bell, P., Reddy, P. and Rainie, L. (2004) 'Rural Areas and the Internet', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2004/PIP_Rural_Report.pdf.pdf], accessed 11 May 2009.

Birdsall, S.A. and Birdsall, W.F. (2005) 'Geography Matters: Mapping Human Development and Digital Access', *First Monday* 10(10), available online at: [http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1281/1201], accessed 17 December 2008.

Brabham, D.C. (2006) 'Noticing Design/Recognizing Failure in the Wake of Hurricane Katrina', *Space and Culture* 9(1): 28–30.

Brabham, D.C. (2007) 'Speakers' Corner: Diversity in the Crowd', Crowdsourcing: Tracking the Rise of the Amateur, Weblog, 6 April, available online at: [http://crowdsourcing.typepad.com/cs/2007/04/speakers_corner.html], accessed 17 December 2008.

Brabham, D.C. (2008a) 'Crowdslapping the Government: First Amendment Protections for the Crowd in Government Crowdsourcing Ventures', paper presented at the annual meeting of the Association for Education in Journalism and Mass Communication, Chicago, IL, August.

Brabham, D.C. (2008b) 'Crowdsourcing as a Model for Problem Solving: An Introduction and Cases', *Convergence: The International Journal of Research into New Media Technologies* 14(1): 75–90.

Brabham, D.C. (2008c) 'Moving the Crowd at iStockphoto: The Composition of the Crowd and Motivations for Participation in a Crowdsourcing Application', *First Monday* 13(6), available online at: [http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2159/1969], accessed 17 December 2008.

Brody, S.D. (2003) 'Measuring the Effects of Stakeholder Participation on the Quality of Local Plans Based on the Principles of Collaborative Ecosystem Management', *Journal of Planning Education and Research* 22(4): 407–19.

Brody, S.D., Godschalk, D.R. and Burby, R.J. (2003) 'Mandating Citizen Participation in Plan Making: Six Strategic Planning Choices', *Journal of the American Planning Association* 69(3): 245–64.

Bryson, J.M. (1995) *Strategic Planning for Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement*, rev. edn. San Francisco, CA: Jossey-Bass.

Bugeja, M. (2005) *Interpersonal Divide: The Search for Community in a Technological Age*. New York: Oxford University Press.

Burby, R.J. (2003) 'Making Plans that Matter: Citizen Involvement and Government Action', *Journal of the American Planning Association* 69(1): 33–49.

Bush, V. (1945) 'As We May Think', *Atlantic Monthly* 176(1): 101–08.

Campbell, H. and Marshall, R. (2000) 'Public Involvement and Planning: Looking Beyond the One to the Many', *International Planning Studies* 5(3): 321–44.

Carey, J.W. (1989) *Communication as Culture: Essays on Media and Society*. Winchester, MA: Unwin Hyman.

Carp, J. (2004) 'Wit, Style, and Substance: How Planners Shape Public Participation', *Journal of Planning Education and Research* 23(3): 242–54.

Carson, L. and Hartz-Karp, J. (2005) 'Adapting and Combining Deliberative Designs: Juries, Polls, and Forums', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook: Strategies for Effective Civic Engagement in the Twenty-first Century*, pp. 120–38. San Francisco, CA: Jossey-Bass.

Castells, M. (1996) *The Rise of the Network Society*. Malden, MA: Blackwell.

Corburn, J. (2003) 'Bringing Local Knowledge into Environmental Decision Making: Improving Urban Planning for Communities at Risk', *Journal of Planning Education and Research* 22(4): 420–33.

Creighton, J.L. (2005) *The Public Participation Handbook: Making Better Decisions Through Citizen Involvement*. San Francisco, CA: Jossey-Bass.

Crewe, K. (2001) 'The Quality of Participatory Design: The Effects of Citizen Input on the Design of the Boston Southwest Corridor', *Journal of the American Planning Association* 67(4): 437–55.

Di Gessa, S. (with Poole, P. and Bending, T.) (2008) *Participatory Mapping as a Tool for Empowerment: Experiences and Lessons Learned from the ILC Network*. Rome: International Land Coalition. Available online at: [http://www.landcoalition.org/pdf/08_ILC_Participatory_Mapping_Low.pdf], accessed 17 December 2008.

Fiskaa, H. (2005) 'Past and Future for Public Participation in Norwegian Physical Planning', *European Planning Studies* 13(1): 157–74.

Flichy, P. (2007) *The Internet Imaginaire*, trans. L. Carey-Libbrecht. Cambridge, MA: The MIT Press. (Original work published 2001.)

Forester, J. (2006) 'Making Participation Work when Interests Conflict: Moving from Facilitating Dialogue and Moderating Debate to Mediating Negotiations', *Journal of the American Planning Association* 72(4): 447–56.

Fox, S. (2005) 'Digital Divisions: There are Clear Differences among those with Broadband Connections, Dial-up Connections, and No Connections at All to the Internet', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2005/PIP_Digital_Divisions_Oct_5_2005.pdf.pdf], accessed 11 May 2009.

Fox, S. and Livingston, G. (2007) 'Latinos Online: Hispanics with Lower Levels of Education and English Proficiency Remain Largely Disconnected from the Internet', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2007/Latinos_Online_March_14_2007.pdf.pdf], accessed 11 May 2009.

Fox, S. and Madden, M. (2006) 'Generations Online', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2006/PIP_Generations_Memo.pdf.pdf], accessed 11 May 2009.

Gunkel, D. (2004) 'Second Thoughts: Towards a Critique of the Digital Divide', *New Media & Society* 5(4): 499–522.

Hanna, K.S. (2000) 'The Paradox of Participation and the Hidden Role of Information: A Case Study', *Journal of the American Planning Association* 66(4): 398–410.

Hartz-Karp, J. (2007) 'How and Why Deliberative Democracy Enables Co-intelligence and Brings Wisdom to Governance', *Journal of Public Deliberation* 3(1), article 6, available online at: [http://services.bepress.com/jpd/vol3/iss1/art6], accessed 17 December 2008.

Hayden, C. and Ball-Rokeach, S.J. (2007) 'Maintaining the Digital Hub: Locating the Community Technology Center in a Communication Infrastructure', *New Media & Society* 9(2): 235–57.

Hibbard, M. and Lurie, S. (2000) 'Saving Land but Losing Ground: Challenges to Community Planning in the Era of Participation', *Journal of Planning Education and Research* 20(2): 187–95.

Horrigan, J. (2007a) 'Broadband: What's All the Fuss About?', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2007/BroadBand%20Fuss.pdf.pdf], accessed 11 May 2009.

Horrigan, J. (2007b) 'U.S. Lags Behind: Why It Will Be Hard to Close the Broadband Divide', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2007/Broadband_Commentary.pdf.pdf], accessed 11 May 2009.

Horrigan, J. and Murray, K. (2006) 'Home Broadband Adoption in Rural America', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2006/PIP_Rural_Broadband.pdf.pdf], accessed 11 May 2009.

Horrigan, J. and Smith, A. (2007) 'Home Broadband Adoption 2007', available online at: [http://www.pewinternet.org/~/media//Files/Reports/2007/PIP_Broadband%202007.pdf.pdf], accessed 11 May 2009.

Hou, J. and Kinoshita, I. (2007) 'Bridging Community Differences through Informal Processes: Reexamining Participatory Planning in Seattle and Matsudo', *Journal of Planning Education and Research* 26(3): 301–14.

Howe, J. (2006a) 'Crowdsourcing: A Definition', Crowdsourcing: Tracking the Rise of the Amateur, Weblog, 2 June, available online at: [http://crowdsourcing.typepad.com/cs/2006/06/crowdsourcing_a.html], accessed 17 December 2008.

Howe, J. (2006b) 'Customer-made: The Site', Crowdsourcing: Tracking the Rise of the Amateur, Weblog, 12 June, available online at: [http://crowdsourcing.typepad.com/cs/2006/06/customermade_th.html], accessed 17 December 2008.

Howe, J. (2006c) 'Pure, Unadulterated (and Scalable) Crowdsourcing', Crowdsourcing: Tracking the Rise of the Amateur, Weblog, 15 June, available online at: [http://crowdsourcing.typepad.com/cs/2006/06/pure_unadultera.html], accessed 17 December 2008.

Howe, J. (2006d) 'Neo neologisms', Crowdsourcing: Tracking the Rise of the Amateur, Weblog, 16 June, available online at: [http://crowdsourcing.typepad.com/cs/2006/06/neo_neologisms.html], accessed 17 December 2008.

Howe, J. (2006e) 'The Rise of Crowdsourcing', *Wired* 14(6), available online at: [http://www.wired.com/wired/archive/14.06/crowds.html], accessed 17 December 2008.

Howe, J. (2008) *Crowdsourcing: Why the Power of the Crowd is Driving the Future of Business*. New York: Crown Business.

Hull, A. (2000) 'Modernizing Democracy: Constructing a Radical Reform of the Planning System?', *European Planning Studies* 8(6): 767–82.

Ignatius, D. (2001) 'Try a Network Approach to Global Problem-solving', *International Herald Tribune*, 29 January, available online at: [http://www.iht.com/articles/2001/01/29/edignatius.2.t_1.php?page=1], accessed 17 December 2008.

Innes, J.E., Connick, S. and Booher, D. (2007) 'Informality as a Planning Strategy: Collaborative Water Management in the CALFED Bay-Delta Program', *Journal of the American Planning Association* 73(2): 195–210.

Kingston, R. (2007) 'Public Participation in Local Policy Decision-making: The Role of Web-based Mapping', *The Cartographic Journal* 44(2): 138–44.

Lakhani, K.R. and Jeppesen, L.B. (2007) 'Getting Unusual Suspects to Solve R&D Puzzles', *Harvard Business Review* 85(5): 30–2.

Lakhani, K.R. and Panetta, J.A. (2007) 'The Principles of Distributed Innovation', *Innovations: Technology, Governance, Globalization* 2(3): 97–112.

Lakhani, K.R., Jeppesen, L.B., Lohse, P.A. and Panetta, J.A. (2007) 'The Value of Openness in Scientific Problem Solving', Harvard Business School Working Paper No. 07–050, available online at: [http://www.hbs.edu/research/pdf/07–050.pdf], accessed 17 December 2008.

Lane, M.B. (2003) 'Participation, Decentralization, and Civil Society: Indigenous Rights and Democracy in Environmental Planning', *Journal of Planning Education and Research* 22(4): 360–73.

LaRose, R., Gregg, J.L., Strover, S., Straubhaar, J. and Carpenter, S. (2007) 'Closing the Rural Broadband Gap: Promoting Adoption of the Internet in Rural America', *Telecommunications Policy* 31(6/7): 359–73.

Laurian, L. (2003) 'A Prerequisite for Participation: Environmental Knowledge and What Residents Know about Local Toxic Sites', *Journal of Planning Education and Research* 22(3): 257–69.

Lessig, L. (1999) *Code: And Other Laws of Cyberspace*. New York: Basic Books.

Lévy, P. (1997) *Collective Intelligence: Mankind's Emerging World in Cyberspace*, trans. R. Bononno. New York: Plenum. (Original work published 1995.)

Mack, T.C. (2004) 'Internet Communities: The Future of Politics?', *Futures Research Quarterly* 20(1): 61–77.

Maier, K. (2001) 'Citizen Participation in Planning: Climbing a Ladder?', *European Planning Studies* 9(6): 707–19.

Masum, H. and Tovey, M. (2006) 'Given Enough Minds . . .: Bridging the Ingenuity Gap', *First Monday* 11(7), available online at: [http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1370/1289], accessed 17 December 2008.

Mau, B. (with Leonard, J. and The Institute Without Boundaries) (2004) *Massive Change*. New York: Phaidon.

Millward, P. (2003) 'The "Grey Digital Divide": Perception, Exclusion and Barriers of Access to the Internet for Older People', *First Monday* 8(7), available online at: [http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1066/986], accessed 17 December 2008.

Miraftab, F. (2003) 'The Perils of Participatory Discourse: Housing Policy in Postapartheid South Africa', *Journal of Planning Education and Research* 22(3): 226–39.

Mouffe, C. (2000) *The Democratic Paradox*. London: Verso.

Nance, E. and Ortolano, L. (2007) 'Community Participation in Urban Sanitation: Experiences in Northeastern Brazil', *Journal of Planning Education and Research* 26(3): 284–300.

Noveck, B.S. (2006) '"Peer to Patent": Collective Intelligence, Open Review, and Patent Reform', *Harvard Journal of Law and Technology* 20(1): 123–62.

Ostwald, M. (2000) 'Virtual Urban Futures', in D. Bell and B.M. Kennedy (eds) *The Cybercultures Reader*, pp. 658–75. New York: Routledge. (Original work published 1997.)

Pearson, L.B. (1957) 'Nobel Lecture: The Four Faces of Peace', speech presented to the University of Oslo, Norway, 11 December, available online at: [http://nobelprize.org/nobel_prizes/peace/laureates/1957/pearson-lecture.html], accessed 17 December 2008.

Pimbert, M. and Wakeford, T. (2001) 'Overview: Deliberative Democracy and Citizen Empowerment', *PLA Notes* 40: 23–8.

Post, R.C. (1995) *Constitutional Domains: Democracy, Community, Management*. Cambridge, MA: Harvard University Press.

Putnam, R. (2000) *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.

Randolph, J. (2004) *Environmental Land Use Planning and Management*. Washington, DC: Island Press.

Rossiter, N. (2006) *Organized Networks: Media Theory, Creative Labour, New Institutions*. Rotterdam: NAi Publishers.

Schlossberg, M. and Shuford, E. (2005) 'Delineating "Public" and "Participation" in PPGIS', *URISA Journal* 16(2): 15–26.

Sotarauta, M. (2001) 'Network Management and Information Systems in Promotion of Urban Economic Development: Some Reflections from CityWeb of Tampere', *European Planning Studies* 9(6): 693–706.

Surowiecki, J. (2004) *The Wisdom of Crowds: Why the Many Are Smarter than the Few and How Collective Wisdom Shapes Business, Economies, Societies, and Nations*. New York: Doubleday.

Van Herzele, A. (2004) 'Local Knowledge in Action: Valuing Nonprofessional Reasoning in the Planning Process', *Journal of Planning Education and Research* 24(2): 197–212.

Von Hippel, E. (1988) *The Sources of Innovation*. New York: Oxford University Press.

Von Hippel, E. (2005) *Democratizing Innovation*. Cambridge: MA: MIT Press.

Warren, M. (2007) 'The Digital Vicious Cycle: Links between Social Disadvantage and Digital Exclusion in Rural Areas', *Telecommunications Policy* 31(6/7): 374–88.

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