

*Charlie Brown*

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## Open Sourcing Social Solutions Building Communities of Change

Since its founding in 1981, Ashoka has elected nearly 2,000 Fellows working in over 70 countries. These Fellows are leading social entrepreneurs who have pioneered innovative solutions to societal challenges. As agents of change, these individuals have been as inspiring as they have been effective. However, as Ashoka has grown, it has faced a new challenge: to leverage the collective knowledge of Ashoka Fellows and galvanize members of the broader community in order to identify, envision, and realize the many untapped possibilities to effect positive social change through social entrepreneurship. Innovators often struggle to communicate their mission and describe their successes to potential investors who, in turn, struggle to assess the prospects of nascent ventures. Bridging this gap between innovation and investment is a crucial step in this leveraging and galvanizing process.

Ashoka's approach to addressing this gap has been to develop networks of contacts guided by well-defined protocols in order to assess the entrepreneurial potential of social enterprises. The increasing number and diversity of entrepreneurial ventures worldwide specifically directed toward addressing social problems is a welcome trend that nonetheless creates its own set of challenges. While Ashoka has continued to identify and assess social entrepreneurs using tried and true methods, the organization has also begun to experiment with new approaches to leverage the knowledge of these social entrepreneurs to attract other innovators. Changemakers is an important initiative of this sort, drawing on open source models to join innovators around the world into communities of change with peers, experts, investors, and interested members of the public. Our experience leads us to distinguish between different types of "open" models, including open innovation, open sourcing, and crowd sourcing. Changemakers has established a blend of these, which we call "crowd collaboration," creating spaces where a wide range of voices can come together to propose, refine, reorient, reuse and reinvigorate innovative social solutions.

This paper reviews Ashoka's experience with Changemakers as a mechanism for accelerating innovation in order to take social change from a prospect for a few

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to a process for many. This experience shows that crowd collaboration has very promising incipient value as one of these tools.

#### SOCIAL ENTREPRENEURS: FROM ISOLATION TO COLLABORATION

Not every social enterprise is a strong source of innovation. Indeed, the core of the “citizen sector”<sup>1</sup> consists of many usually small-scale enterprises that deliver a well-understood solution to a well-defined societal problem. For example, the homeless shelters across the world that provide safe harbor for street people are essential services that meet an immediate need.

Social entrepreneurs are often in a different category. The term describes innovators whose ideas have the potential to disrupt existing patterns of actions, driving further societal change. However, the most promising innovations are often lost to view and lacking the resources to take effect; these innovators are working away quietly at a small-scale, local level, unknown to the much broader community that could benefit from them. They are “needles” lost in the societal haystack.

This isolation, often a major stumbling block for social innovators, is no coincidence: innovators often deliberately isolate themselves in order to realize a vision that may be at odds with existing norms or received wisdom. Even when successful and accepted, local solutions are often applied only to local problems although their broader application could greatly multiply their benefits. The innovators themselves often lack contact with peers who face comparable problems, experts who could offer potentially crucial advice, and with investors who could supply material resources. But how can we create spaces where innovation can be brought out of its isolation, welcomed into a collaborative environment that provides the material resources, access to networks and connections, and exposure to new ideas required to scale up social solutions? This is exactly how Ashoka’s Changemakers and similar endeavors can multiply social value by aggregating the effects of innovative social solutions.

If we start with the alarming scale of the world’s pressing social problems and the bewildering variety of potential solutions that might address them, it is easy for policy makers and innovators alike to become overwhelmed and hard pressed to determine the best path forward. Paradoxically, however, social solutions need to work at a large scale to address global problems even though the most effective solutions are often developed in small-scale local initiatives. We need a way to combine the global vision that international organizations provide with grassroots knowledge of conditions on the ground.

Organizations such as Ashoka that act as aggregators of social change try to bring the widest possible range of perspectives to bear on a given social problem, allowing local perspectives from around the world to contribute insights that can resonate with the concerns of others. These organizations are meeting grounds where innovators, collaborators, and investors come together to create new conditions for rendering judgment. These organizations work at a global level, helping to select, refine, foster, maintain, scale, and replicate social solutions. They support

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social entrepreneurs worldwide, integrating them into a network of new partnerships, helping them to tap the power of modern computer communications in order to form dynamic communities of innovators, experts, and change-minded investors. By doing this, aggregators of social change set up long-term structures that can continue to scale, reproduce, and multiply high-impact social innovations around the globe. This can bridge the innovation-investment gap by identifying and refining the best social solutions and by allowing investors to participate in the process.<sup>2</sup>

As mentioned earlier, bridging the gap between social entrepreneurs and the investors who can give them resources to succeed and scale up is not trivial. In grappling with this problem, we have identified four specific challenges:

- identifying innovation gaps and selecting the best solutions;
- assisting innovators in refining their approach to maximize their impact;
- evaluating progress and establishing the requirements for enterprise sustainability; and
- mobilizing the support and effort required to bring the most promising innovations to scale regionally, nationally, or globally.

Ashoka's twenty-six years of experience in selecting Fellows has led to a comprehensive selection process that addresses these four challenges.<sup>3</sup> Ashoka's global nominator network (partner organizations, businesses, social entrepreneurs, and community leaders) proposes leading social entrepreneurs as potential Fellows, and each candidate is evaluated according to five selection criteria: an innovative idea, with real change potential; a history of creative approaches to engineering their visions into reality; entrepreneurial quality; the idea's social impact; and "ethical fiber."

This nomination, selection, and confirmation process at both local and global levels provides each Ashoka Fellow candidate the opportunity to receive unique feedback from a wide range of perspectives, helping them refine their own innovations and open their networks to new resources and peers. Ultimately, the elected Ashoka Fellows join a community of nearly 2,000 peers and gain access to a wealth of partners and resources.

As mentioned, the Ashoka Fellow selection process helps address the challenges of "innovation gap," difficulties to attain innovator support, achieving sustainability, and successfully scaling up. We are working to address these challenges using crowd-sourcing and open-innovation techniques to help build practitioner- and investor-engaged communities and bring innovations to scale around the world.

### CHANGEMAKERS: CREATING A SPACE FOR OPEN JUDGMENT

Created by Sushmita Ghosh, president emeritus of Ashoka, in 1993, Changemakers started as an in-print publication reporting on social entrepreneurs. As the initiative evolved, it went online and in 2003 began focusing on ways to build on- and off- line communities for social action by "open sourcing social solutions,"<sup>4</sup> that

draw on the same principles as those of the open source software community.

Changemakers does this by holding collaborative competitions to solicit, refine, enrich, and even implement innovative solutions to specific problems. The goal of Changemakers is to accelerate the speed at which social innovations go to scale and ultimately to help achieve Ashoka's mission.

Changemakers competitions have included themes ranging from "Disruptive Innovations in Health and Health Care" to "Ending Corruption," which challenge participants to provide the most innovative solution. A current competition looks at ways that video and computer games can be used to improve health and health care. All the entries to the competitions are displayed online, and any visitor to the site can comment. This allows competitors to revise their proposals with the broadest possible spectrum of input. A panel of judges selects roughly twelve finalists, and the Changemakers community and general public vote on-line for three winners according to three criteria: innovation, social impact, and sustainability. Winning proposals receive US\$5,000 and considerable public exposure, but the greatest value gained is from the various insights and solutions open to all the competitors and, in fact, to anyone who visits the site. Although many of the hundreds of competitors are small organizations, organizations such as the U.S. Army and the multinational Procter & Gamble have also submitted proposals.

Changemakers develops networks among peers and the greater public. Individuals and groups who participate in the competitions discover a wide set of possible connections to other people interested in the same social problems. Changemakers's open source model allows competitors and other visitors to the site to find and develop their own connections, many of which develop into fruitful relationships. A group of U.S. doctors, for example, discovered a health clinic in Nicaragua that entered the "How to Improve Health for All" competition and volunteered their professional services to assist the clinic.

#### THE MOSAIC TOOL: FRAMING CHALLENGES AND MAPPING SOLUTIONS

In the early 1990s, Ashoka founder Bill Drayton spent a week with several of Ashoka's India environmental Fellows. The discussion focused on barriers that they faced in their individual work, and a number of trends began to emerge. Noting this, Ashoka began to analyze the collective work of Fellows across a variety of fields and discovered striking similarities in two key areas: the barriers to success experienced by individual Fellows; and a series of general principles for innovative strategies. This analysis ultimately led to a series of knowledge management products and services centered on the idea of a Mosaic of Solutions.

The Mosaic of Solutions is a tool used in Changemakers that begins the competition process and is then refined post competition based on the results and findings. It serves as an intellectual framework for the competition, offering an entrepreneurial perspective on the future of the field. Each competition's Mosaic is created by a team at Ashoka and begins by analyzing the work of Ashoka's 26-

MAIN BARRIERS			
<b>PRINCIPLES</b> Emerging from Innovative Solutions	<b>Cultural taboos and health illiteracy</b>	<b>Limited reach of healthcare infrastructure</b>	
Adopt market-based models as a scaling-up strategy	<b>Foster demand for healthcare</b> PSI, Global	<b>Change the logic of your distribution model</b> Srinivasan, Locost, India	<b>Establish micro-franchise model</b> SHEF, Kenya
Design inclusive systems	<b>Run effective prevention campaigns through cross-sector partnerships</b> BASICS and EHP, USAID, Guatemala	<b>Put customers first</b> Rebeca Villalobos, ASEMBIS, Costa Rica	<b>Provide health-related consumer products</b> Unilever, Ghana
	<b>Address poverty-health vicious circle</b> Vera Cordeiro, Renascer, Brazil	<b>Introduce disruptive competition</b> David Green, Project Impact, Global	<b>Co-create indigenous programs</b> Abhay and Rani Bang, SEARCH, India
Leverage abundant resources at the community level	<b>Piggyback on established local practices</b> Fidela Ebuk, Nigeria	<b>“System-wide” cost savings through preventive care</b> Jeff Palmer, Coordinated Care Network, US	
	<b>Use peer networks for behavior change</b> Linzi Smith, South Africa	<b>Build economies of scale</b> Aravind Hospital, India	<b>Barefoot doctors</b> Fazle Abed, BRAC, Bangladesh
Introduce novel uses of technologies	<b>Establish multi-service internet kiosks</b> Satayan Mishra, Drishtee, India	<b>Community-Based Health Financing</b> Mutual Health Organization, Sub-Saharan Africa	<b>Self-reliant primary health care</b> FRLHT, India
		<b>Leverage existing technologies for low-resource settings</b> Victoria Hale, OneWorld Health, Global	<b>Hotline for emergency services</b> Subroto Das, India
		<b>Identify value-creation opportunities to improve sanitation</b> Sulabh, India	<b>Provide tertiary care through telemedicine centers</b> Narayana Hrudayalaya, India

Figure 1. Ashoka, How to Improve Health for All, “Mosaic of Innovative Solutions.”

year history, including the nearly 2,000 Fellows. Additional innovations are included in the analysis depending on the field of work. The instrument is designed to map underlying factors that cause or entrench a given problem against a series of relevant principles of innovation. By beginning with the work of Ashoka Fellows, the tool provides a quality base of information and insights driven by on-the-ground work. As shown below in the sample Mosaic on Health Care, each Mosaic is presented as a simple matrix, outlining barriers on the x-axis and principles on the y-axis. Each cell of the resulting table maps specific solutions to particular problems, allowing users to see, at a glance, the precise purchase offered by the most innovative solutions.

All competition entrants plot themselves on the mosaic when completing the entry form. Using a drop-down menu the entrant selects the appropriate barrier and principle that reflects their particular innovation. The process offers an opportunity for the entrant to see how their work fits into a broader landscape of social change as they are plotting themselves among examples of the best known innovations from the field. Once plotted on the Mosaic, entrants often search out other entries of similar or different location, opening new opportunities to connect—conceptually or in person—with these innovations. Entrants have used the Mosaic to benchmark from other innovations, spot new opportunities for expansion, and develop partnerships with other entrants.

Such a graphical and system-wide view of the many innovators in the Ashoka network makes it possible to draw on insights from work that, at first glance, may not be an obvious match with the specific social problem on the table. For example, if urban migration is a major enabler of human trafficking, then a rural electrification project that effectively reverses urban migration turns out to be a relevant solution to the human trafficking problem.

Ashoka Fellows also have participated directly in the use of Mosaics of Solutions in the areas of health care, ending corruption, and sports for social change. In addition, a pool of investors now uses the tool as a source of information in making their philanthropic decisions. The Mosaic is proving itself as a key tool for Ashoka to create a process of sourcing and supporting leading social entrepreneurs: it integrates them into a growing knowledge base that facilitates more effective decision-making by social innovators, social decision makers, and the general public.

#### A TALE OF TWO TECHNIQUES: OPEN INNOVATION AND CROWD SOURCING

Open innovation is a process whereby organizations—both social and commercial— collaborate across institutional boundaries in developing new products, processes, and services. Crowd sourcing, on the other hand, involves the delegation of one or more specific analytic tasks to a large, diffuse group, through open invitation and (often but not always) a mechanism for aggregating offered views. Tasks accomplished through such open invitation (as oppose to open innovation) do not

necessarily, or usually, involve creativity or novelty, but rather are linked to specific business or strategic objectives. Changemakers' aim is to deploy both of these techniques.

Several features of the Changemakers website illustrate further important aspects of open innovation. The site structures direct, person-to-person feedback, with any visitor to the site able to comment on a project in a way that may potentially change the project's description, potentially leading to a further cycle of feedback. For example, a Thai entry in the 2006 "How to Provide Affordable Housing" Changemakers competition enabled the global building materials corporation LaFarge to source a new innovation for their work in China. Changemakers frames its process not in terms of individuals proposing projects but as a learning experience for each visitor to the site, and for the proposing organization itself.

In the field of social innovations, the use of crowd sourcing and open innovation techniques includes the public in decisions to enhance the public good. Because potential investors are included in the process, they can see and select from a range of innovative solutions, and have input into the process of prioritizing, refining, and scaling up those solutions. The innovation-investment gap is bridged through openness: both sides are seated at the same virtual table, where their interests and needs form part of the collaborative process that plots and identifies the most pressing innovation gaps and the most innovative solutions. This process streamlines and enhances the ability for high-impact social innovations to go to scale in a fraction of the time previously required.

Mainstream business also recognizes the value of crowd sourcing. For example, Marketocracy<sup>5</sup> spent three years tracking over 55,000 people to see who did the best job managing virtual mutual fund portfolios. The top 100 were aggregated to generate the Marketocracy m100 Index, which was launched in 2001. This crowd-sourced approach to mutual funds regularly outperforms Standard & Poor's 500-stock index. Burger King asked contributors to the broadband entertainment site Heavy.com to produce their own BK ads, resulting in over 3.5 million downloads or streams of the ads. According to Steve Smith in the October, 2006 issue of EContent: "What the BK campaign demonstrates is nothing less than the first fault line in a tectonic shift away from the ad model that dominated mass media in the last century."<sup>6</sup> This "co-creation" model enables consumers to submit their own ideas for ad campaigns and according to Steve Henry, executive creative director of the London office of advertising company TBWA, replaces "the old-fashioned model of an agency pumping out an idea." Now, according to Henry, "you've got access to a global creative department of 4 billion people."<sup>7</sup>

A useful way to assess the value of crowd sourcing for addressing social problems is to examine its limitations from the perspective of business entrepreneurs. The centrality of profit as a basic value can limit the openness of the innovation process within business enterprises. We see that the website of the TBWA ad agency makes it clear that they view open innovation as proprietary: "Any idea you submit becomes the property of TBWA. But we promise, any idea we use, you will get paid for."<sup>8</sup> On the other hand, social innovation's emphasis on social values and on

cooperation allows open innovation and crowd sourcing techniques to contribute more effectively to a broader set of outcomes. This premise has allowed Changemakers to build a platform for social innovation, rather than attempting to control or own the innovations that emerge.

Greater use of these techniques is correlated with a progressive advance in forging social networks which can be broken into three categories of community making: among social innovators; between social innovators and experts; and between social innovators and the general public. Stimulating these linkages is critical. According to Ashoka founder Bill Drayton and his co-authors of an article on health networks, “‘cross-pollination’ between sectors is desirable if sustained progress . . . is to be a reality, and cross-sectoral success stems from the ownership that develops when various stakeholders participate in developing action and policy.”<sup>9</sup>

Philanthropic organizations are beginning to work with crowd sourcing and open innovation techniques to great effect, a development that Edward Skloot, former executive director of the Surdna Foundation, calls “philanthropopulism.”<sup>10</sup> The Rockefeller Foundation recently created an “Ideas Portal”<sup>11</sup> that allows interested individuals and organizations to submit ideas for programs that address social problems. The site has received more than 2,400 ideas and the Foundation is seriously considering about thirty of these.<sup>12</sup> The Robert Wood Johnson Foundation is currently sponsoring the third in a series of Changemakers collaborative competitions that focus on health care issues. Nancy Barrand, a senior program officer of the Foundation believes the competition is a tool that “helps us reach a different audience and gain access to ideas and information much more quickly.”

#### FROM CROWD SOURCING AND OPEN INNOVATION TO CROWD COLLABORATION

Beyond crowd sourcing and open innovation is a natural evolution, a process that seeks an effervescent process of mass collaboration, which we call “crowd collaboration.” Crowd collaboration represents the accumulation of ideas from many people with varying skills sets and backgrounds, refined by mutual feedback and productive critique, and with unfettered replication, redistribution, and reuse of innovations. In open innovation, a wide variety of people participate in the innovation process itself, providing unique and broad critiques while crowd sourcing remains fundamentally individualistic whereby many people propose ideas, and the best idea is selected. For example, Alpheus Bingham, vice president of Eli Lilly’s e.Lilly research unit, recently said, “If I can tap into a million minds simultaneously, I may run into one that’s uniquely prepared.”<sup>13</sup> Bingham’s idea is that using the Internet to cast a broad net can help companies to find that one uniquely skilled individual who could provide what they are looking for. In other words, traditional crowd sourcing cherry picks from a digitally enlarged tree and open innovation brings to bear value from external ideas while crowd collaboration moves closer to the



model of open sourcing by allowing many stakeholders to contribute to improving and implementing the initial challenge presented.

Changemakers reflects this evolution by, beginning with the key dimensions of crowd sourcing, casting the wide net for solutions to a proposed challenge, then allowing a panel of judges to choose roughly 12 finalists from which the general public votes for three winners. This technique has allowed competition sponsors and Ashoka to engage a broader audience in the traditional decision-making process while simultaneously finding new high-impact solutions.

Changemakers shows that open innovation is moving beyond trying to “bring home” the best solution from “out there,” to a system that offers the potential to move innovations from one context to another. For example, Denmark’s Global Advice Network entered its Business Anti-Corruption Portal in a recent Changemakers competition on “Ending Corruption.”<sup>14</sup> As with all competition entries, the process included a wide-open on-line discussion and, as is often the case, much of the discussion centered on how to expand, replicate and redirect the innovations presented by the project. To just give one

more of many possible examples, the University of New Mexico Health Sciences Center entered its initiative, Project ECHO: Knowledge Networks for the Treatment of Complex Diseases in Remote, Rural, Underserved Communities, in a separate Changemakers competition on Disruptive Innovation in Healthcare.<sup>15</sup> The resulting discussion addressed various issues: extending this particular telemedicine model “in the treatment of HIV AIDS ... in resource-poor or isolated regions anywhere in the world” or “to educate and monitor the outcome in school based interventions for many chronic disease including childhood obesity.” The replicability of the project in other areas was a common discussion topic for this entry. For example, Roxie June, a member of the Navajo Nation, commented that the ECHO could “serve as a model for other health care providers in other states such as Arizona” and Uday Pathak, a doctor from Bihar, India wrote that “we could ... use your model for disseminating information on a host of other diseases.”

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Changemakers is now leveraging crowd sourcing and open innovation techniques to build communities of innovators through crowd collaboration.<sup>16</sup> The Changemakers model allows participants to bring together disconnected ideas and processes thanks to their membership in different communities.<sup>17</sup> The core value of open innovation is bringing a plurality of voices together to discuss fundamental principles of successful social innovation, allowing the solutions that result to have greater concrete impacts around the world. Changemakers is now embarking on allowing the plurality of voices to not just discuss but act on new ideas. A group including seven finalists from the 2006 “How to Improve Health for All” Changemakers competition has formed a collaboration to replicate their individual innovations among themselves, effectively taking their solutions global. This group used Changemaker’s online infrastructure to develop and subsequently present their collective strategy at the 2007 Skoll World Forum.

#### THE FUTURE OF CROWD COLLABORATION AS AN ACCELERATOR OF SOCIAL CHANGE

Crowd sourcing has provided opportunities to widen the traditional decision making process, within foundations and other philanthropic or business ventures. An initial step beyond crowd sourcing and open innovation is to allow the general public to engage in the process by not just ranking or selecting the “best” solutions but also providing critique and new ideas to the solutions. True crowd collaboration opens up this process even further by making it possible for various constellations of interested parties to find a spectrum of common measures for different problems in various contexts around the world. Ashoka’s elaboration of this process through Changemakers has provided a key first step toward engaging the public in decisions and opening the door for a much larger engagement.

Democratizing the processes of finding social solutions and judging their worth creates a market place where beneficiaries can spell out what they need and how they think those needs can be met, and where investors can play a more active role in selecting, refining, replicating and scaling up projects. This process not only provides a larger pool of solutions but allows the criteria for what makes a great solution more clear and multi-pronged. Ashoka’s exploration of this technique has allowed it to integrate a very innovative tool into its core structure in a manner that builds on the knowledge of its community of its efforts to aggregate the effects of innovative social solutions.

Open Innovation also allows us to join social problems with solutions in many possible ways. A plurality of voices proposes, critiques, and refines possible innovations, and a plurality of stakeholders brings to bear an equally broad spectrum of criteria in judging them. The process does not apply a single criterion to find an optimal solution. It does not winnow out a single winner. Instead, it allows all those who participate in the process to offer, and to take away, something of value, be it an idea that can be applied to a different problem in a different context; an

expert opinion; advice from a peer who has already made it past a barrier, connections with peers; or access to a growing archive of social solutions to social problems. The \$5,000 prize for winning entries in the Changemakers competitions is valuable, but the value that emerge through the process are worth more and are more widely distributed. From this perspective, what counts is not one single point where judgment and innovation converge, but the entire field of possibilities that they frame.

Ashoka has chosen a strategy of openness as way to leverage its community and the knowledge generated by that community in order to increase the rate and scope of social change. This process is not unique to Ashoka. The “open sourcing of social solutions” movement has spread to other organizations such as the Robert Wood Johnson Foundation and the National Geographic Society and is helping to build new and stronger innovator communities and is transforming isolated innovations into global solutions.

### Acknowledgements

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1. The term “citizen organization” is preferable to “nongovernmental organization” (NGO) and “citizen sector” to “non-profit sector” for two reasons. They are positive terms, not “non” terms emphasizing difference, as if government and business organizations are more basic or important. They also emphasize that citizens are the primary agents who make social changes happen. See <[www.ashoka.org/citizensector](http://www.ashoka.org/citizensector)>.
2. John L. Thompson identifies four elements of the entrepreneur process: envisioning a need; engaging the opportunity; enabling through resource allocation; and enacting the project. He underlines the central role of “entrepreneur enablers,” people or organizations that help in acquiring and allocating resources. Ashoka, Changemakers and similar organizations are entrepreneur enablers with a difference: the network of connections that they foster is the key resource that they provide. J. L. Thompson (2002), “The world of the social entrepreneur.” *The International Journal of Public Sector Management*, 15(4&5): 412-431.
3. See <[www.ashoka.org/support/sands](http://www.ashoka.org/support/sands)>.
4. Open Sourcing Social Solutions™ and Mosaic of Solutions™ are registered trademarks of Ashoka.
5. < [marketocracy.com](http://marketocracy.com) >
6. S. Smith, 2006, “Advertising On-Demand.” *EContent* 29(8).
7. A. Z. Cuneo, 2006, “Got any ideas? TBWA wants you to do its work.” *Advertising Age* 77(46).
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9. W. Drayton, C. Brown, and K. Hillhouse (2006), “Integrating social entrepreneurs into the ‘health for all’ formula.” *Bulletin of the World Health Organization* 84(8): 591-592. p. 591
10. S. Strom, 2007, “Foundation lets public help award money.” *New York Times*, June 26. <http://tinyurl.com/2cyp9p>
11. <[www.rockfound.org/grants/grants.shtml](http://www.rockfound.org/grants/grants.shtml)>.
12. Strom, “Foundation lets public ...”
13. R.D. Hof (2005). “The Power of us: Mass collaboration on the Internet is shaking up business.” *Business Week* 3938. June 20. 74-82.
14. The Portal is accessible at <[www.business-anti-corruption.com](http://www.business-anti-corruption.com)>. The open discussion of the project is at <[www.changemakers.net/en-us/node/237](http://www.changemakers.net/en-us/node/237)>.

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15. The ECHO project is accessible at < echo.unm.edu >. The open discussion of the project is at <www.changemakers.net/en-us/node/1036>.
16. In theorist of innovation Eric Von Hippel's terms, innovation communities are "nodes consisting of individuals or firms interconnected by information transfer links which may involve face-to-face, electronic, or other communication." E. Von Hippel, *Democratizing Innovation*. (Cambridge, MA: MIT Press, 2005). p. 96. <http://web.mit.edu/evhippel/www/democ1.htm>
17. Von Hippel, *Democratizing Innovation*, p. 94.