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Investigation of Governance Mechanisms for Crowdsourcing Initiatives

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Abstract

Crowdsourcing has increasingly become a recognized sourcing mechanism for problem-solving in organizations by outsourcing the problem to an undefined entity or the 'crowd'. While the phenomenon of crowdsourcing is not new, it has gained considerable attention in practice due to new crowdsourcing opportunities that have been enabled by new social networking and web 2.0 technologies. While crowdsourcing initiatives provide several benefits for the participants involved, it also poses several novel challenges to effectively manage the crowd. Drawing from the governance mechanisms in the open source literature, we develop an analysis framework to examine the governance mechanisms implemented in three different crowdsourcing initiatives and their impact on the outcome of the initiative.

Keywords

Crowdsourcing, collective intelligence, open innovation, control and governance mechanisms

INTRODUCTION

A rise in amateurism (Howe and Junker, 2008), hypercompetitive global marketplace, the increasing complexity of problems and customers' desire to participate in the product design and development process (Winsor, 2009), and deeper exploration of potential opportunities (Bonabeau, 2009) is pushing organizations to increasingly form and participate into new forms of collaborative alliances through what is known as 'Crowdsourcing '. Crowdsourcing includes "[initiatives] when a company outsources jobs once performed by employees to the crowd, but [also] when people come together of their own accord and begin performing that function" (Howe and Junker, 2008). Near ubiquitous presence of Internet connectivity has made application of crowdsourcing in various unexpected areas tremendously efficient and cheap process (Economist, 2008). Crowdsourcing can include "anything from gathering feedback on a new idea, asking for assistance to solve a product problem, or looking for contractors, investors or new employees interested in participating in a project" (Gale, 2008). Table 1 summarizes various crowdsourcing initiatives.

Crowdsourcing can provide organizations richer content and perspectives from a diverse crowd than what may be possible within a organizational unit or function, (PMNetwork, 2009) while allowing organizations a creative and cost-effective way to access innovative resources outside the boundaries of their unit, function, or even outside their organization (Walmsley, 2009). This model of opening up the boundaries of an organization to tap knowledge of external entities is increasingly becoming source of competitive advantage for organizations in various industries (Chesbrough, 2003) and customers are seen as biggest source for identifying the innovative ideas (Leimeister, Huber, Bretschneider and Krcmar, 2009). For example, in case of a new product development, crowdsourcing can provide organizations a better sense of their customers' needs (PMNetwork, 2009) while projecting favorable image to the consumers that businesses listen to them. It can also facilitate discovery of best talent with relative ease (Schmitt, 2009).

For contributors, crowdsourcing provides opportunities for working with large organizations to increase exposure and work on real problems (Drummond and Perkins, 2009). Crowdsourcing has allowed people to tap, explore, and turn their hobbies into something more beneficial (MacMillan, 2009). Participation in crowdsourcing project can provide individuals with opportunities to get noticed, sharpen their creative skills, and stay involved with things they enjoy while sharing knowledge and experiences with each other (Bonabeau, 2009; Schmitt, 2009; Winsor, 2009; MacMillan, 2009). Participation in such initiatives also strengthens the sense of community (Winsor, 2009). When crowdsourcing projects are initiated by a nonprofit

and/or a government institution, sense of civic duty (Bonabeau, 2009), drive to contribute to the community, concerns about the democracy, and the healthy functioning of governmental agencies can also be powerful motivators for individuals to contribute (Howe and Junker, 2008).

Table 1: Examples of Popular Crowdsourcing Initiatives

Type	Company	Description
Public or government initiatives	Open for Questions (Phillips, March 26 2009)	• President Obama's experimental initiative "to open up the White House to American people… to get perspectives from outside Washington", to incite feedback on the most important issues plaguing the American people. While the initiative was able to identify several important public concerns, among the top issues was issue of 'marijuana legalization', casting doubts on the usefulness and effectiveness of such initiatives.
	Guardian (Findlay, 2009)	• To tackle the largest British political scandal (British MPs charged millions of dollars worth of frivolous expenses - from clearing moats to building duck houses - to the public) before a rival newspaper Daily Telegraph could complete document analysis. • Within the first 80 hours, 170,000 documents were reviewed and half of the 456,000 documents with details of MPs' expenses were read.
New product development	Cambrian (Marshall, 2008)	• An online platform where innovative people could harness the wisdom of the masses, engage the participation of experts and secure funding to turn ideas into products and services.
	Riversimple (Sampson, 2009)	• An automotive start-up firm working on hydrogen-fuelled urban two-seater. A mechanical system, a part of the suspension system, and an electronic hardware component to be made available to the community for their input on design.
Problem solving	Netflix (Lohr, 2009)	• Thousands of teams from 186 countries made submissions on improving Netflix's movie recommendation system's outcome by 10% for a cash prize of $1 million. New contest will present the contestants with demographic and behavioral data and they will be asked to model individuals' taste profiles.
Crowdsourcing market places	InnoCentive	• Marketplace for business projects, where companies post challenges — often in areas like product development or applied science — and engineers and scientists working alone or in teams compete for cash payments or prizes offered by the companies (Lohr, 2009), lending intellectual gravitas to the open innovation industry (Hoffmann, 2009)
	TopCoder (Brandel, 2008)	• Software programming tasks are posted as contests. The developer of the best solution wins the top prize while other participants walk away with smaller rewards and garner skill ratings that can be included on their résumés.

Despite the increasing popularity of crowdsourcing due to the aforementioned benefits, careful evaluation of the issues and challenges of crowdsourcing is critical to ensure that firms can effectively exploit its potential. One of the major concerns for organizations that undertake such hybrid collaboration is managing and controlling the crowd. Consider the 'Marijuana legalization' as the topmost priority resulting from the 'Open for Questions' government crowdsourcing initiative mentioned in Table 1. Primary research question driving our research is *"What is the nature of governance mechanisms used in crowdsourced projects?"*

In the next section we will analyze various challenges faced by organizations in implementing crowdsourcing initiatives, followed by the extant review of the various governance mechanisms in open source software development. Drawing from the governance mechanisms in the open source literature, we develop an analysis framework to examine the governance mechanisms implemented in three different crowdsourcing initiatives. We then present details of our qualitative research approach, data collection, and data analysis. We then present our preliminary analysis of governance mechanisms used in three crowdsourcing initiatives in various domains. We conclude by discussing the potential contributions of our research and discussing our next steps.

THEORETICAL BACKGROUND

Below we analyze some of the challenges as identified in the crowdsourcing literature.

Challenges in the management of crowdsourcing projects

1. *Effective incentive mechanisms:* When crowds are invited by for-profit organizations, the dynamics of the crowd become different from those invited to participate in a non-profit or government institution sponsored initiative. Lack of proper incentive mechanisms can be viewed by the crowd as unethical and exploitive (Hoffmann, 2009) and a practice that leads to cheap source of labor (Brandel, 2008). Thus organizations will need to ensure that their incentive mechanisms are designed to thwart such impressions and to receive good-faith efforts from the crowd.

2. *Managing submissions:* Since crowdsourcing projects can yield tremendous amount of information, managing the idea generation process end-to-end is extremely critical. For example, the IT platform should be capable of supporting active participation of the crowd by enabling the support for features that drive individuals to participate in the idea generation process (Leimeister et al., 2009). Firms also need to delicately balance encouraging participation and maintaining clarity of overall business objectives (Winsor, 2009). Organizations should also develop a clear strategy for evaluating crowdsourced results and incorporating them into the project (PMNetwork, 2009). For example, when evaluating ideas received from the crowd to improve its product offerings through the IdeaStorm, Dell did not simply adopt the most popular ideas or the one that provided Dell with relative advantage, but decision to adopt was based on the complexity of the ideas (Di Gangi and Wasko, 2009). Participants also expect sponsoring organizations to be actively engaged in the project to provide needed information and to bring transparency in the process (Bonabeau, 2009). Lack of such transparency can raise concerns among participants about the accuracy of the output and suspicions about manipulation (Bonabeau, 2009). Organizations may also need to train internal stakeholders to effectively engage with the community and tap the crowd's potential for generating new products (PMNetwork, 2008). Depending upon the nature of the project, 'idea-incubation support' to the finalists may be needed to address an idea's weaknesses and make the most of its strengths (Jouret, 2009).

3. *Loss of control:* By allowing crowds to participate in product development processes, firms are likely to lose significant degree of control over the behavior of crowd and outcome of the project, as crowds may make unpredictable moves or are steered by undue influences from those who may not consider the firm's best interests (Bonabeau, 2009). Organizations will need to identify appropriate governance mechanisms to steer the crowd toward completing the task without losing their focus.

4. *Quality of the ideas:* If solutions demand multiple perspectives or viewpoints then firms may be unable to capture truly diverse populations since participation may trend toward the upscale, educated, and tech-savvy crowd (Brandel, 2008) and thus firms need to ensure that the crowd does not exert undue influence over their decision-making process. Also crowdsourcing works more effectively when individuals are expressing their individuality to the utmost (PMNetwork, 2009). Another issue, especially when identifying popular products, is 'information cascading' which arises when individual's opinion about the merit of a given product or service are influenced by those of others (Johnson, 2007). This can make evaluation of idea quality solely based on popular voting mechanism unpredictable.

5. *Creating trust:* Finally, one of the most crucial challenges that organizations face in crowdsourcing is in creating the environment of mutual trust between the crowd and the organization itself. Without such trust, open collaboration and innovation cannot happen. Standard ways of doing business, such as detailed contracts, often do the very opposite (2008). This suggests that organizations need to implement control mechanisms that do not overly constrain their ability to create environment of mutual trust, yet provides them sufficient contractual framework.

With these concerns in mind, our primary concern is to investigate how organizations overcome these challenges through the use of various governance mechanisms. We next review the literature on the open source software development to identify various governance mechanisms.

Governance mechanisms in open source software development

Open source software development projects are developed and managed by "Internet-based communities of software developers who voluntarily collaborate to develop software that they or their organizations need (von Hippel and von Krogh, 2003)." Popular examples of open source include the development of Linux operating system, Apache web server, and OpenOffice suite. Realizing the benefits and competitive threat posed by open source initiatives, various software firms are joining forces with open source software development communities to identify common grounds and collaborate (Shah, 2006; O'Mahony and Bechky, 2008). From literature on open source software development, we identified commonly deployed governance mechanisms.

Table 2: Governance Mechanisms in Open Source Software Development

Governance mechanism	Source	Description
Membership management	(Sharma, Sugumaran and Rajagopalan, 2002)	• Provide mechanisms for qualified people to join and contribute to the project • Community members must be allowed to forge and dissolve relationships with outside entities
	(Markus, Manville and Agres, 2000)	• Ensure that there is a manageable number of high-quality contributors
Rules and institution	(Markus et al., 2000)	• Rules and institutions that members can adapt to their individual needs • Community members participate in making and changing the rules • Procedures for discussing and voting on important issues
Reputation	(Markus et al., 2000)	• The desire to maintain a good reputation is a key motivator and a control mechanism • The fear of exclusion, transparency of performance and behavior can also be used regulate member's behavior
	(Gallivan, 2001)	• Self-control: the emphasis on the individual's professional reputation to regulate member's behavior
	(Franck and Jungwirth, 2003)	• Reputation game to reconcile the interests • Peers must also have incentives to make fair assessments of the contributions of others
Monitoring and sanction	(Markus et al., 2000)	• Strong social pressures against noncompliance with norms
	(Gallivan, 2001)	• Social control: tactics include behavioral norms and member voting • Sanctioning members' behavior: 'voting a member out', reducing a member's privileges or not allowing them to be 'voted in' to begin with.
Leadership	(Bonaccorsi and Rossi, 2003)	• A widely accepted leadership setting the project guidelines and driving the decision process • The authority of the project leaders arises naturally from a bottom up investiture as a result of the contributions. • The leadership deeply influences the evolution of the project by selecting the best fitting solution
Coordination	(Bonaccorsi and Rossi, 2003)	• Co-ordination mechanism based on shared protocols: a common notion of validity (solutions that not only exhibit the best performance but also look simple, clear and logic are selected, thus guaranteeing non-chaotic future expansion of the work)
Task decomposition	(Markus et al., 2000)	• Effective work structures and processes, such as task decomposition and project management in software-development work • Legal arrangements designed to ensure fairness
Decision making	(Shah, 2006)	• Open license as contract. Decision-making rights • Property rights, Restrictions on use, modification, and distribution • Proprietary modifications

Before discussing our preliminary findings on governance mechanisms in crowdsourcing initiatives, we briefly present our research methodology and approach to data analysis.

RESEARCH METHODOLOGY

Given the lack of empirical research on governance mechanisms in crowdsourcing, our primary objective was to achieve better understanding of these mechanisms, gaining insights into why and how these mechanisms work. As a result, our research approach is exploratory in nature rather than confirmatory (Yin, 1989). We used the mechanisms identified from the open source software development literature (summarized in Table 2) as guiding framework for data analysis. Such approach that draws upon prior theoretical work is well established in IS research (See for example, (Olsson, Ó Conchúir, Ågerfalk and Fitzgerald, 2008)).

Data Sources

The primary source of data for our research is a collection of publicly available accounts of three crowdsourcing initiatives in private and public sector domains. Since most of these projects are conducted in open online environments, these accounts

provide in-depth access to how the projects were managed and how they evolved over a period of time. We examined publicly available accounts for the following projects:

- Private sector
  - Netflix (Improving recommendation algorithm)
  - A Million Penguins (Crowd collaborative wikinovel-writing project)
- Public Sector
  - UK Department for Work and Pensions (Developing IT strategy)

We examined various newspaper, magazine, and wikipedia articles (Bell, Bennett, Koren and Volinsky, 2009; Copeland, 2009; Gomes, 2009; Lohr, 2009; Leonhardt, 2007) and books (Howe, 2009) to obtain the data for the Netflix recommendation competition.

Primary source of data for 'A Million Penguins' was publisher's blog (2007) that accompanied the wikinovel project and contained the notes from the editors on the progress of the novel over the two month duration of the project. It has more than 20+ blog postings from the editors and 250+ comments on these postings. We also examined the wikinovel blog itself (2007). Both blogs provide very rich data on what editors and contributors felt as the wikinovel-writing progressed.

The case on UK's Department for Work and Pensions documents the department's effort to develop an IT strategy document using crowdsourcing. This initiative was different in that the department experimented with crowdsourcing to individuals within the department that were not part of the IT strategy team. The CIO, James Gardner, details his experiences on his blog (http://bankervision.typepad.com) and in a CIO magazine article (Gardner, 2010).

Data analysis

We used the open coding techniques from the grounded theory methodology to analyze the case study data (Strauss and Corbin, 1990). The goal of open coding is to reveal the essential ideas found in the data. The first step is to decompose observations into discrete incidents or ideas, each of which receives a name or label that represents the concepts inherent in the phenomenon. The second step is to discover categories by finding related phenomena or common concepts and themes in the accumulated data in order to group them under joint headings. This step identifies categories and sub-categories of data.

FINDINGS

All the above projects, except 'A Million Penguins', were completed successfully or were deemed successful. Outcome of novel-writing effort as part of the 'A Million Penguins' project was considered to be less than desirable and became known as the most written novel than the most read novel (Creasey, 2009). The wikinovel project resulted in 4,000+ pages of meandering, incoherent, anarchic, and uncontrollable mess.

We summarize findings of our preliminary analysis of the governance mechanisms implemented in each of these crowdsourcing initiatives in Table 3. Initial comparison of the governance mechanisms implemented in the 'A Million Penguins' project with those implemented in the other three crowdsourced projects reveals that governance mechanisms will need to be aligned to the objectives of the crowdsourced initiative. We will present detailed analysis and findings at the conference.

Table 3: Preliminary analysis of governance mechanisms in crowdsourcing

Project	Outcome	Governance mechanisms identified
Netflix	Competitors successfully improved the Netflix's recommendation algorithm by a specified factor of 10%	Outcome control
		Effective incentive mechanisms
		Process transparency
		Online collaboration platform for knowledge sharing and learning
		Effective task decomposition
A Million Penguins	Unreadable novel	Process transparency
		Online collaboration platform for knowledge sharing and learning
		No outcome control
		No coordination mechanisms
		No overview storyline or framework
		No task decomposition e.g. no decomposition of plot, characters, etc.
		No 'benevolent dictator' to steer the wiki-novel in a firm direction
UK Department for Work and Pensions	Successfully developed the IT strategy document that was substantially detailed, actionable, highly innovative, well-supported, and broad-reaching	Process transparency
		'Benevolent dictator' to keep the work of IT strategy on track
		Effective task decomposition and integration
		Overview storyline or framework
		Member management

CONCLUSION

Given the dearth of research that examines governance mechanisms in crowdsourcing, findings of our research have several important contributions to both IS research and practice community. First, findings of our research provide better insights into how governance mechanisms may impact the outcome of the crowdsourcing initiative. We are currently examining nature of the task/project to be completed and their characteristics that maps with a set of governance mechanisms to develop a guiding framework. We are also examining other crowdsourcing projects such as Wikipedia and OpenGov to enhance generalizability of the framework that would result from the above analysis. We expect to present the completed analysis and the framework at the conference.

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