



Open-Source Collaboration in the Public Sector: The Need for Leadership and Value

Item Type	research;article
Authors	Hamel, Michael P.
Download date	2024-11-24 00:46:41
Link to Item	https://hdl.handle.net/20.500.14394/36211



Open-Source Collaboration in the Public Sector: The Need for Leadership and Value

Michael P. Hamel
*Center for Public Policy and Administration
University of Massachusetts, Amherst*
michael.p.hamel@gmail.com

NCDG Working Paper No. 07-004

Submitted June 22, 2007

This material is based upon work supported by the National Science Foundation under Grant No. 0131923. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

Acknowledgements

First, I would like to thank Professor Charles Schweik of the University of Massachusetts. Charlie has been an outstanding mentor, helped to expand my interest in government technology, and is the reason I became involved with this project.

I would also like to give a very special thanks to John Weathersby, Executive Director of the Open Source Software Institute and Andy Stein, Director of Information Technology for the City of Newport News, Virginia for their insights, support, candor, and help in coordinating the project.

I would like to thank the following individuals for giving their time and insights, which were invaluable. This project would not have been possible without their help.

Michael Balma, Hewlett-Packard

Deborah Bryant, Open Source Lab

John Allen Lever, United State Navy

Mark Lucas, RadiantBlue Technologies

Patrick McCormick , Former CIO – Somerville, Massachusetts

Kent Morrison, City of Steamboat Springs, Colorado

Scott Porter, Foundation for Free and Open Source Software in Government

Bill Welty, California Air Resources Board

For her guidance, wisdom, and genuine interest in her students, I would like to thank Professor Kathryn McDermott. I would also like to thank Professor William Gibson for his guidance throughout the project.

Finally, I would like to thank Lisa Hilt for her help in editing the paper and for her support throughout the process.

This report was prepared for the Capstone course at the Center for Public Policy and Administration at the University of Massachusetts, Amherst. The content and opinions represented herein are those of the researcher and not necessarily those of the Center or University.

Support for this study was provided by grants from the U.S. National Science Foundation (NSF) (0447623 & 0630239). Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

Table of Contents

EXECUTIVE SUMMARY	<i>i</i>
INTRODUCTION	1
BACKGROUND.....	2
<i>Open Source.....</i>	<i>2</i>
<i>Motivations of Developers and Organizations using FLOSS.....</i>	<i>2</i>
<i>Collaborative Governance.....</i>	<i>3</i>
METHODOLOGY	5
THE CASES.....	7
GOVERNMENT OPEN CODE COLLABORATIVE (GOCC)	7
<i>How it Began.....</i>	<i>7</i>
<i>The Community</i>	<i>8</i>
<i>Motivations</i>	<i>8</i>
<i>Governance & Memberships.....</i>	<i>9</i>
<i>Communications and Collaborative Infrastructure</i>	<i>10</i>
<i>The Software</i>	<i>11</i>
<i>Current State.....</i>	<i>12</i>
OPEN SOURCE SOFTWARE INSTITUTE (OSSI).....	13
<i>How it Began.....</i>	<i>14</i>
<i>The Community</i>	<i>14</i>
<i>Motivations</i>	<i>14</i>
<i>Governance & Memberships.....</i>	<i>15</i>
<i>Communications and Collaborative Infrastructure</i>	<i>16</i>
<i>The Software</i>	<i>17</i>
<i>Current State.....</i>	<i>17</i>
CASE COMPARISON.....	18
<i>The Communities & Their Motivations.....</i>	<i>18</i>
<i>Governance</i>	<i>19</i>
<i>Communication & Collaborative Infrastructure.....</i>	<i>21</i>
<i>Products.....</i>	<i>21</i>
CONCLUSION	23
APPENDIX A.....	26
<i>Table A-1: Key issues for community-led and sponsored open source projects</i>	<i>26</i>
APPENDIX B.....	27
<i>Table B-1: Open Source Software Institute Membership Schedule</i>	<i>27</i>
BIBLIOGRAPHY.....	28

Executive Summary

The “open-source” movement in information technology is largely based on the innovative licensing schemes that encourage collaboration and sharing and promise reduced cost of ownership, customizable software and the ability to extract data in a usable format. Government organizations are becoming increasingly intolerant of the forced migrations (upgrades) and closed data standards (or incompatible data standards) that typically come with the use of proprietary software. To combat the problems of interoperability and cost, governments around the globe are beginning to consider, and in some cases, even require the use of open-source software (Hahn, 2002; Wong, 2004).

While there are efforts to use pre-existing open-source software, and even develop new open-source software, it appears that there are very few efforts currently working to promote collaboration between organizations. To better understand how these collaborations get initiated and function, and to identify factors that contribute to their success or failure, I identified two such collaborations, the Government Open Code Collaborative (GOCC) and the Open Source Software Institute (OSSI), and performed a comparative case study analysis. The analysis was performed through interviews with four participants from each organization. The research centered around three major questions, (1) how and why do these collaborative efforts begin; (2) how are these collaborative efforts governed; (3) and what factors appear to help or hinder these collaborative efforts?

The GOCC is a “voluntary collaboration between public sector entities and non-profit academic institutions created for the purposes of encouraging the sharing, at no cost, of computer code developed for and by government entities...” (Welcome, 2005). The organization is primarily interested in state and local government. The OSSI, on the other hand, is a non-profit organization whose mission is to “promote the development and implementation of open-source software solutions within Federal, state, and municipal government agencies and academic entities” (Weathersby, 2007). The organization acts as a facilitator, typically between government entities and private sector organizations, aiding in the process of adoption, development, and implementation of open-source software. The major difference between the two efforts is that the GOCC actively blocks private organizations from participating, while the OSSI depends on private actors to make up its primary membership base and finance its efforts.

In looking at these two cases, I found that value and leadership are the most important components of open source collaborations focused on the public sector. Participants in both efforts believe that having one person who can focus his or her energy on the effort, and is passionate about the goals, is critical to the success of the effort. Participants in both groups also believe that the creation of value, or products that are appropriate and effective in addressing members’ wants and needs, is critical. Lack of value and leadership were cited by members of the GOCC as a factor contributing to the effort’s decline.

An assurance of continuity, face-to-face communication and a strong legal framework were also viewed as important factors. Participants noted that open-source advocates take on great risk, and having some assurance that the project will not be dropped, and has a community to support it, is an important consideration. Participants also noted that while a lack of face-to-face communication may not destroy an effort, it has a very positive effect in building social capital—specifically, trust and commitment to the project. Finally, a strong and broad legal framework was found to be extremely important to efforts that encompass a variety of organizations operating under conflicting local laws.

Introduction

The “open-source” movement in information technology is largely based on the innovative licensing schemes that encourage collaboration and sharing and promises reduced cost of ownership, customizable software and the ability to extract data in a usable format. The term “open source” refers to more than just the development of free software; it is also about being in control of one’s information, creating a framework for sharing intellectual property and creating community (Wong, 2004). The use of open-source software is particularly attractive in the government context because the use of proprietary software (commercially available products, such as Microsoft software) often leads to dependency, as the software tends to be tightly controlled. Furthermore, government organizations often find that the market does not meet all of their software needs or take into account their fiscal constraints. To address these issues, many government entities have chosen to use existing open-source solutions or create software in-house. While there are higher-level efforts promoting collaboration between government entities or between government entities and private entities, they are very limited. The goal of this research is to provide insights on how these collaborations develop and function, and what participants believe are the projects’ fundamental needs. The study was conducted based on three broad research questions: (1) how and why do these collaborative efforts begin; (2) how are these collaborative efforts governed; and (3) what factors appear to help or hinder these collaborative efforts?

The paper begins with a review of relevant literature, which includes research on open-source software generally, motivations, and common governance structures. This is followed by a description of the methodology used in the study, which outlines the case selection and interview methods used. The next section provides a description in sequence the two cases

selected for this study, the Government Open Code Collaborative (GOCC) and the Open Source Software Institute (OSSI); including information on the communities involved, their governance models, and the infrastructures used. This is followed by a comparison of the two cases, noting their similarities and differences. Finally, the conclusion highlights the important findings from this research, and recommendations for future research and collaborative efforts.

Background

Open Source

While the term “open source” is typically used in regard to computer software available at no cost, open-source software is not necessarily without cost in terms of licensing and can require infrastructure and support expenditures. The term Free/Libre Open Source Software (FLOSS) was developed to mitigate the confusion between the term free as in freedom, and free as in without cost (Weber, 2004). In keeping with the theme of this paper, I will adopt the open source definition from Wikipedia, a free online encyclopedia developed by volunteers across the globe, “Open source describes the principles and methodologies to promote open access to the production and design process for various goods, products, resources and technical conclusions or advice” (Open Source). The term “open source,” when used in regard to computer programs, refers to the ability to view and modify the source code (or the underlying programming). The difference between this and proprietary software is that proprietary code typically comes in binary form, which is not readable by humans and prohibits modification or customization.

Motivations of Developers and Organizations using FLOSS

While there are a number of motivations cited in the literature, personal and professional needs have been seen as a major driver of participation. Meeting needs, whether they be breaking free from large software companies (Bonaccorsi & Rossi, 2006), or meeting new software and programming requirements, tends to be an important factor leading to participation

(Lakhani & von Hippel, 2003; Shah, 2006). In reviewing the literature on collaborative alliances, Gray (1991) suggests that factors motivating individuals or groups to collaborate include high stakes, a high level of interdependence, a shared desire to effect change, a shared understanding of a problem, or a desire to gain a competitive advantage.

The motivations of individuals and firms often overlap, but there are important differences. Recent work has found that firms are typically motivated by economic and technical benefits, while individuals often become involved to fulfill social needs (Joode, Lin, & David, 2006; Bonaccorsi & Rossi, 2006). Firms are typically motivated by the ability to experiment with a new software development model, evaluate the competition, boost public relations (by contributing to a public good), or to develop a new profit opportunity (Lerner & Tirole, 2005). Lerner and Tirole suggest that a for-profit firm might release its code to gain market share over the competition, particularly when this leads to greater profit in a complimentary market, such as hardware or support. In addition to research regarding firms, there is also an assortment of literature describing the role of hobbyists in open-source collaborations. While the role hobbyists should play is heavily debated, Shah (2006) found that they can be an important component in collaborative efforts, as they accumulate knowledge and can understand a variety of issues (Shah, 2006).

Collaborative Governance

While there is a lack of literature in regard to open-source project governance in the public sector, there is a growing body of literature related to open-source software and government collaboration generally. The governance structure of a collaborative effort can greatly impact the level of participation (Shah, 2006). Recruiting participants is crucial and often difficult in collaborative efforts, as is the ability to meet the expectations of participants and achieve buy-in. Research also shows that it is important to show potential participants that the

benefits of participation will outweigh the cost and risk (Fedorowicz, Gogan, & Williams, 2006).

Looking at cultural change and open-source methods, Neus and Scherf (2005) conclude that having passionate people, a simple structure, and a plan to start small and grow fast are important factors in successful open-source collaboration.

The literature also suggests that leadership is an important component in an open-source collaboration. In looking at successful open-source projects, Howison, Inoue, and Crowston (2003) found that the majority of projects large and small retained a single leader for long periods of time. Fedorowicz *et al.* (2006) find that it is important that there be champions from all participating organizations, not just one lead champion. The literature also shows that leadership is important in creating an agenda, developing goals, and ensuring that the project continues to move forward without splintering (Lerner & Tirole, 2005). Although leadership appears to be an important component, a high degree of coordination and structure has been shown to impede open-source software efforts by creating unwanted barriers to participation (Schweik & English, 2007). At the same time, Crowston and Howison find that centralization in open-source projects varies widely, but seems to be more centralized than previously thought (Crowston & Howison, 2006).

Community-based efforts, or what Raymond (1998) would refer to as the bazaar model, is what we typically envision when we think about open-source software development. Under this model, there is an expectation that many users of the code will make improvements, which will then be offered back to the community. In community-based efforts participants typically stick around for short periods, until their needs are met (Howison, Inoue, & Crowston, 2003). This approach has worked very well in a number of cases; however, there can be a great deal of ambiguity involved and questions surrounding viability. While these difficulties often lead to

early failure in community based efforts (O'Mahony & West, 2005), it is important to note that most of the major open source success stories today were developed using this or a similar model.

In recent years, there have been new approaches to open-source software development; such as hybrid and firm-based collaborative efforts, which typically include private interests. The private interests are commonly involvement in code development, and in some cases release code that was once proprietary. Yuwei Lin (2006), in her research on hybrid innovation, suggests that there is often more flexibility and resource availability when the commercial sector becomes involved in open-source projects. These efforts also tend to benefit from better marketing (O'Mahony & West, 2005) and a tighter community of local developers (Lin, 2006), but they can be difficult to initiate. The communities must find a way to comply with open-source norms and licensing, manage resources, align interests, and deal with ownership issues (Dahlander & Magnusson 2005). Further, volunteers might be less likely to participate if they believe it will be difficult to gain recognition or if they sense a lack of community (see Appendix A for a breakdown of community initiated versus privately sponsored developments) (O'Mahony & West, 2005).

Methodology

This paper is based on a comparative case study analysis of two open-source collaborations in the public sector, the GOCC and the OSS. For this research I sought to look at open-source “consortiums” that are working on or with a variety of projects and clients to make open-source solutions in government more viable. In the United States the population of these organizations focusing specifically on public sector needs is extremely small, and while there are efforts to research, share and develop software for government; many of these groups, such as

Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens (IDABC), a European Union effort, and the Component Organization and Registration Environment (CORE), a United States federal government effort, do not focus primarily on open-source software.

The case of the GOCC was identified through a colleague's connection to the group, and the OSSI case was identified while researching the population of collaborative efforts. These cases are an interesting comparison as they take very different approaches (Shah, 2006) to bringing open-source software to the public sector. The case study approach is optimal for understanding how these collaborations begin and how they are governed, and although another approach, such as a survey, might have been ideal in gaining an understanding of the factors leading to success and failure, the current population is far too small for a survey to be a viable alternative (Yin, 1984).

The research consisted of eight interviews, seven of which were conducted over the telephone, ranging from 45 minutes to one hour and 30 minutes; the eighth interview was a typed response to the interview questions, which were sent via email. There were four interviewees from each group. Interviewees were identified through snowball sampling and there was an effort to speak with a combination of participants that would be representative of the collaboration as a whole. All interviews were tape-recorded and transcribed using a combination of F4 and Transana software packages. Prior to analyzing the collected data, categories based on the interview questions and responses were developed (Yin, 1984). The data went through three levels of coding, open coding to identify categories, axial coding to find interconnections (Neuman, 2003; Punch, 2005) and selective coding to illustrate themes (Neuman, 2003). Transana, which is a qualitative research software package, was used in the coding and analysis

of the data collected. The interview questions centered around (1) personal involvement; (2) the history of the project; (3) the software developed, promoted or held by the organization; (4) factors leading to success and failure; (5) community attributes; (6) and the governance and infrastructure of the effort. The interview protocol was largely based on Schweik and English (2007).

The Cases

Government Open Code Collaborative (GOCC)

The GOCC, which began in 2003 and was officially launched in 2004, is a “voluntary collaboration between public sector entities and non-profit academic institutions created for the purposes of encouraging the sharing, at no cost, of computer code developed for and by government entities...” (Welcome, 2005). The GOCC focuses on collaboration between state and local level government organizations, and allows limited access to academic institutions.

The GOCC is generally seen as a repository for open-source code to be reused by government entities, but the collaboration also sees itself as a place for government entities to share best practices and collaborate on code development. The hope is that the collaboration will help to reduce the cost of information technology within government and promote innovation through the sharing of investments and improvements to a large network of like agencies (GOCC is Launched, 2004). As one GOCC participant put it, “we have very similar problems, why don’t we solve them once and share them?”

How it Began

The story of the GOCC really begins before the organization was established, with a few interested parties in government and academia. Public officials, like Patrick McCormick, who was the Chief Information Officer for the City of Somerville, Massachusetts, had been working with open-source software to create high quality services on a budget. As McCormick observed,

at the same time, then-Governor Mitt Romney brought in a secretary of administration and finance and a chief information officer who believed in the advantages of open source. Soon after, the Office of Administration and Finance came out with a policy directive saying that state agencies should be considering open-source software when making large purchases. Finally, in December of 2003, the Commonwealth of Massachusetts, along with Harvard University and the Massachusetts Institute of Technology, sponsored an event, which would lead to the governance structure, rules, and licensing approaches the collaboration would follow.

The Community

The GOCC has about twenty member organizations. The majority are state agencies and municipal governments, plus one academic institution. Of the twenty member organizations, very few have played an active role; the States of Massachusetts, Rhode Island and Texas, and the City of Newport News, Virginia seem to have carried the weight of the organization. Beyond memberships, there are an estimated 100 observers. Those involved with the GOCC effort tend to come to the organization “already using [open-source software] and enthusiastic,” as one participant put it. While participants are typically from state and local governments, there are very broad interests among the members; however, membership numbers to date have not been strong enough to develop specialized sub-groups based on the wants and needs of participants.

Motivations

Members of the GOCC effort believe they have a remarkable opportunity to cut the cost of information technology in their organizations. There is a very strong belief held by the members that “government should only pay once.” There is also a sense that investments in open-source development can really pay off in the government context. If one organization develops a useful and transferable piece of code, other organizations are bound to pick up that code and make improvements along the way that the original organization can then use.

One local government participant went as far as saying that, “if it’s better value, longer lasting, and a more open standard—it might even be a part of our responsibility [to use open-source solutions].” Another participant said, “there’s a word I don’t usually use, and that’s the word empowered, and that’s generally how our small group of geeks feel when we get to use SourceForge, or something in the GOCC repository. There’s a human factor there, we believe in it.” Another participant noted that government organizations have pretty complicated demands, work with a software market that is limited, and have meager resources. Given the market situation, he believes it is no surprise that some of the proprietary software is not very good, making open-source software a more viable option.

Governance & Memberships

The GOCC has a fairly well defined operating agreement and an extensive terms of use agreement. At the top of the GOCC’s structure is a chairperson, elected by the members, and serving a one year term. The chairperson is responsible for making the executive decisions for the organization. Officers are also elected annually; these positions include a municipal representative, technical lead, and policy lead (GOCC is Launched). A program coordinator and a repository administrator voluntarily (not elected) hold administrative roles in the organization (GOCC Operating Agreement; personal communication, April 26, 2007). It is important to note that the GOCC is a virtual collaboration, and the organization has no physical presence.

There is no fee to become a member of the GOCC, however, membership is only open to “federal, state or local government, an authority or other sub-national public sector entity of the United States,” (GOCC is Launched). To become a signatory of the organization, authorization is required at the highest level of the organization. Interested parties that do not belong to an organization that has signed the operating agreement can be involved in the collaboration as observers; however, these observers are required to be sponsored by an active member. The

major differences between the two classifications are that members can upload and download all code, and have voting rights, while observers can only download select code and have no voting privileges (GOCC is Launched). These two levels of participation are meant to address the legal concerns outlined below.

While there is some disagreement over how well defined the rules of the organization are, particularly whether the rules are well documented, or simply understood, all participants interviewed believe that the legal framework developed by the GOCC was its strongest point. Unlike typical open-source collaborations, government organizations have to deal with a variety of laws that differ from state to state. As one participant put it:

while it wouldn't matter much at lower levels of participation, we wanted GOCC members...to have the authority to develop software, to be involved in the development of software that could be given away to other members...some state laws say that it's okay if you share it with other government agencies, the idea being that the private sector doesn't directly benefit from it. The laws are probably structured to avoid somebody giving away desks from a school to their cousin who has a real estate company; you can see where it comes from...

Although all of the participants interviewed thought this legal framework was necessary, this particular interviewee questioned whether having a semi-gated community created other problems, such as blocking potential volunteers from improving code.

Communications and Collaborative Infrastructure

The GOCC uses a website with a built in blog, relevant news stories and a software repository. The website also contains all governance documentation and membership lists. While participants are generally happy with the organization's infrastructure, one participant believes that a way to create and document sub-versions for the developed code would be helpful. Another believes that the lack of infrastructure to collaborate on code creation itself is a

major shortcoming. Early on, the group had regularly scheduled conference calls, and usually three or four organizations participated in each session; however, these calls have now ceased. Website activity has also declined, and the organization has become more reliant on their list-serve. Although there is still some activity, it is minimal today; one participant noted that it is to the point where months will go by without activity. In addition to virtual collaboration there have been face-to-face meetings, typically taking place at conferences of mutual interest. Participants believe that this face-to-face contact is helpful when possible. In general, participants believe that the communication and collaboration approaches of the effort are appropriate.

The Software

The GOCC repository only holds about five pieces of software. Participants find that the software currently held in the repository is of little value (value meaning an end product that is appropriate and effective at addressing the wants and needs of members); in fact, the participants that I have spoken to are not even sure if there have been any downloads from the repository. The software held in the repository typically comes from successful open-source collaborations in the open-source community at large; so while participants were not using it, they generally believe the quality of the software is good. The GOCC envisions itself as a keeper of the code, which government entities can download and improve, rather than a support and publishing entity. In addition, all participants interviewed believe that continuity, in terms of an assurance that development and support of the software will continue, was important, although level of importance varied. One municipal government participant said:

oh it's critical...if that's not addressed, no matter how good the software is, nobody will use it, nobody will want to risk their business on something that might function very well, but once it breaks you can't fix it."

Another participant echoed this and noted that government organizations tend to be short-staffed, so they need to rely on external support. On the other hand, one more participant stated that continuity should not be a major issue to organizations because you can try it out, and if you like it, even if it is dropped, you will still be able to get your data out, and “if you like it that damn much, hire a programmer to work on it, keep it running for you...I know how inexpensive that can be.”

Current State

While early indications showed that the effort was dying a slow death, I recently received word that there is an effort to revive the project. Three of the four participants I spoke with believe the GOCC *was* a failed effort, while another still very much believes in the organization and intents to upload new code in the future. Andy Stein, Director of Information Technology in Newport News, VA, and one of the most active members in the collaboration said:

I stayed with it until it was clear that it was not going to move anymore, actually I was the last one to leave it, and I’m still thinking about revitalizing it if there would be some way to do it, but I’m not sure anymore that there is.

Interestingly, since our interview, Andy has indicated that he will be taking control of the project in hopes of rejuvenating the effort. Participants I spoke with noted that being an all volunteer effort, the GOCC was not the primary concern of any of the members, and as other projects and responsibilities arose, it was not uncommon for a participant to drop off of the map for some period of time.

The primary insights from the GOCC case are that in voluntary efforts a loss of leadership can be devastating, and a lack of products valued by members can create high barriers to maintaining a vibrant community. Secondarily, this case shows that a lack of focus on

specific projects and barriers to participation can lead to difficulty in creating and maintaining products of value for participants.

Open Source Software Institute (OSSI)

The OSSI, which began in 2001, is a non-profit organization whose mission is to “promote the development and implementation of open source software solutions within Federal, state, and municipal government agencies and academic entities” (Weathersby, 2007). The organization acts as a facilitator, between government entities and private organizations, aiding in the process of adoption, development, and implementation of open-source solutions. While the group has a strong affiliation with the U.S. Department of Defense (DOD), they are interested in all levels of government where opportunities exist (Weathersby, 2007).

The OSSI sees itself as having three major roles: policy advocate, research and development facilitator and policy consortium. While the mission of the OSSI has not evolved much over time, the work of the organization has. Participants note that the group has gone from working on small and limited research and development requests, to working on multiple projects and more mission-critical government requirements.

Participants openly acknowledge that there is an “entrepreneurial perspective in the project,” and although their objective is to promote open-source software, they do not oppose the use of proprietary software; in fact, some of the major players in the group develop and market proprietary software packages. Participants generally do not see the collaboration as one that develops software (although they do on occasion) but rather as a trade association. John Weathersby, the Executive Director of the OSSI, put it this way: “we want to help drive business opportunities to our members, but what we really try to focus on is helping to create a receptive business environment.”

How it Began

The OSSI began its operation because individuals who would later be involved in the effort saw a need and an opportunity. While government organizations were “reinventing the wheel” and getting tied down with proprietary data forms and forced migrations, the private sector was watching large open-source projects succeed, and trying to find a way to tap into this new market. These private organizations wanted to be involved, but did not necessarily have the appropriate government contacts. Weathersby had the government contacts, and was able to connect the appropriate players in the public sector with the appropriate players in the private sector. With this vision of facilitating the move toward open-source software in government, the OSSI was born.

The Community

The OSSI community is diverse, but its membership is primarily made up of private open-source interests. The organization also has a strong following, with over 1000 people on their mailing list. While the group tries to remain focused on specific areas—for instance, they are now primarily focused on defense—the group’s base has a broad range of interests, all of which the organization considers pursuing as opportunities present themselves. While there are both public and private entities involved in the effort, the public sector interests are most often contracting or creating agreements with the OSSI to help study open-source solutions and possibilities or find the appropriate mix of talents to develop software.

Motivations

While the OSSI participants seem to genuinely believe in the benefits of open source, it is clear that business is the primary driver. As one participant put it, “we expect to make a living doing this, but we truly believe it’s better for the government... [the OSSI] helps gain access to those people in government that are thinking of the same thing.” Participants underscored the

fact that the software industry is changing, and many companies that traditionally market proprietary software understand that. Often companies are willing to invest in open source because they are able to tap into the support and hardware markets, rather than focusing on profits from the software market. As one interviewee put it, “if you’re saving money on the software, you have more to spend on hardware and support services.”

Although selling hardware and support services are a highly motivating factor for some members, others are willing to provide volunteer or cheap services to create brand awareness. By volunteering resources to the OSS, they have been able to point to a concrete product, working with a respected organization and government agencies. While the general body of open-source literature abounds with arguments for and against the idea that recognition is an important factor in participation, it seems likely that it is more pronounced when working with government. This is because government organizations typically have very high standards, are often apprehensive about open-source software, and may have the financial resources participants are looking for.

Government officials are motivated to be involved with the OSS because the organization has experience and knowledge of the major players in open source. The organization’s history of working on cooperative research and development agreements (CRADA’s) with the federal government lend credibility and an assurance that the organization knows how to work within the framework of government.

Governance & Memberships

The OSS is governed by a comprehensive set of bylaws. At the top of the organization is the president, or executive director. The executive director is responsible for the day to day operations of the organization. There is also a board of directors and an advisory board. The board of directors deals with the strategic decisions facing the organization, and has voting

privileges, while the advisory board simply advises the organization on “strategic and tactical topics and issues” (Weathersby, 2007).

The OSSI has a complex membership structure, composed of organization, rather than individuals, which has evolved over time. Although the membership schedule found within the bylaws shows three types of membership, corporate, government agency and academic institution, there are now five levels, including graduated fees for corporate membership (see Appendix B). The executive director of the program notes that “you've got to continually tweak the value proposition so that it's worth the sponsorship to all involved.” The OSSI currently has eleven corporate, three government, one academic and a number of associate and community members. As stated earlier, the organization also has over 1000 interested parties that subscribe to the mailing list.

While the organization does have a formal governance structure and membership schedule in place, participants say that the rules of the organization tend to be unwritten, but understood. Participants are quick to point out that the organization is flexible and tries to adapt to the market, clients and members.

Communications and Collaborative Infrastructure

Although the OSSI does have physical offices, most of the work is done virtually. The organization has a website and wiki for collaboration. Most communication is done through email and instant messaging, but some members, including the executive director, travel to Washington, DC regularly to meet with partners. Members typically frequent the same events, such as Linux World, and believe these events are ideal for bringing members together for face-to-face interaction, which they consider to be an important factor in virtual collaboration. One participant noted that the organization is very project-oriented, and at one point there was an effort to schedule regular meetings, but participants were not interested—anyone interested in

the project was likely already involved. These scheduled meetings evolved into a general communication sent out to all participants, and anyone interested can get involved. The group does employ more sophisticated collaboration tools, such as version control systems when needed, on a case-by-case project basis. Participants believe that this mixture of communication tools and approaches has been appropriate and works well.

The Software

The software resulting from the OSSSI's efforts is generally facilitated, rather than developed, by the OSSSI. Although members note that being open-source does not mean that it is high quality, they believe the software developed through their effort is of the highest quality. The software produced is typically mission-critical, and often developed for organizations such as the DOD. Participants believe that their government partners find a great deal of value in the software. The software that comes out of OSSSI collaborations is under an open-source license, but some of the software may not be put out on the web for reuse. For instance, a piece of software made for the DOD may be used within the DOD but not made available to the public. The OSSSI is currently working to develop a repository that will hold open-source code for broad government reuse.

Current State

Participants in the OSSSI give the impression that the organization is doing well, and slowly expanding in terms of the number and importance of the projects it is involved with. The number of memberships and list-serve subscribers continues to rise as well. There is a feeling among the participants that the organization will continue to do well as long as it is creating value and evolving to meet the needs of member organizations and government entities seeking services.

The primary insight from the case of the OSSI is that in an effort with multiple interests, knowing participant motivations and how to create value for all parties involved is critical to success. Equally important is having a leader who can devote a great deal of time and energy to the effort and keep members engaged.

Case Comparison

While both the GOCC and the OSSI work to help government take advantage of the benefits of open-source software, they have taken very different approaches. The GOCC acts as a repository for the sharing of code, and the OSSI acts as a trade association and organizer of projects. Participants in both groups seem to believe that their collaboration is well structured; however, members of the GOCC believe that there are some key components missing. While the OSSI has an intricate framework, participants have indicated that the organization is relatively flexible, and willing to change and evolve to better fit the needs of members and clients.

The Communities & Their Motivations

The communities in these two efforts differ greatly. While the GOCC allows membership to public actors only, and full membership requires approval at the highest level of the organization, the OSSI focuses primarily on private actors and does not restrict access to their list-serve. Both efforts include members with a broad range of interest, and both efforts are interested in supporting a variety of open-source needs, but the OSSI tends to focus on particular projects or areas and there is currently an emphasis on collaboration with the DOD. Beyond the code itself, the OSSI has a major emphasis on research and policy advocacy, allowing the group to take advantage of a variety of opportunities. Although some participants in the GOCC envision a time when there will be specialized sub-groups for different interest areas, to date the focus of the organization has been very broad. In fact, one participant said, “there was a

conscious effort not to steer it... [that] meant it was sometimes sort of adrift, waiting to catch the right wave or wind at sea."

While the GOCC has a large number of participants, primarily observers, the OSSi has a much larger audience, most of which could also be considered observers. The smaller fully privileged membership base is similar in the two organizations, in that both require permission from upper management. For the GOCC this is a legal issue, for the OSSi, this is because a substantial membership fee is required (see Appendix B). Although the membership base of the two organizations is very different, members in both groups tend to be enthusiastic about the possibilities that open-source software brings when used in government.

Motivations differ somewhat between these two groups. Members of the GOCC are motivated by the belief that "government should only pay once." They also desire software with open and transferable standards and customizable options. The OSSi is motivated by these beliefs, but members also have an interest in paid software development and hardware and support sales.

Members of both collaborations believe that open-source solutions can fill gaps left by proprietary software, and believe that open source should be considered as an alternative when considering software purchases in the public sector. Neither organization is necessarily against the use of proprietary software, and participants from both efforts were quick to point out that support and hardware expenses should be a part of any software consideration.

Governance

Both the GOCC and the OSSi have strong documentation on governance, and both organizations have a top-level manager position. While the GOCC has officer positions, the OSSi has a board of directors, and an advisory board. Participants in both groups believe that having strong leadership is a key to success in open-source collaborations working with

government entities. In fact, interviewees from both organizations believe that having one strong champion who can spend a great deal of time working with the organization is critical; one participant said, “the key is a passionate director.” While both organizations had strong leadership, the GOCC lost its initial leader. One participant noted, “[with his] departure, some of the vision and the executive support for the project dissipated.” The executive director of the OSSI effort, John Weathersby, remains at the helm and members feel strongly that his energy has led the project to success, one participants said “[you need someone who can] show each of these communities how they can benefit by contributing something. It’s not easy, it takes persistence, it takes passion, and it takes an understanding of the interdynamics.” Another participant said, “you really need someone where their sole mission in life is to push this agenda forward and move the organization forward, otherwise it’s just a club that gets together. You really need dedicated resources if you’re going to be successful.”

Membership is the major difference between the two organizations. While membership is free in the GOCC (as long as there is written approval by high-level management of the member organization), the OSSI requires a membership fee to gain full privileges. These fees are used to compensate the small staff, and are used to support their projects. Participants in the OSSI effort tend to think that funding is an important factor, primarily because “for something like this you need to have somebody dedicated full-time.” GOCC participants on the other hand generally believe that having a paid staff is not necessary, however, most believe it could help. Participants also note that there is some funding involved, even if that is just the cost of code development incurred by a member organization.

Legal issues seem to be a much greater concern to members of the GOCC effort. The OSSI’s tendency to focus on a single client and deal with legal issues on a case by case basis

might explain this. Concurrent cooperation between organizations that have conflicting legal environments sets the GOCC apart from the OSS. GOCC members tend to be proud of the legal framework they have developed and believe that it has brought with it a higher level of trust, which gives them a level of comfort that is often difficult to attain in government.

Communication & Collaborative Infrastructure

Both the GOCC and the OSS have a similar communication structure in place. Members of the organizations collaborate virtually using websites, wikis, blogs, email and listserves and conference calls. Participants from both collaborations are used to working in this type of environment, and believe that it is an appropriate approach. A concern of GOCC members is the lack of infrastructure for versioning, collaborative development, and documentation of code. The OSS also lacks a central development approach, however, these needs are addressed on a project-by-project basis and participants believe this approach has worked well. To compliment online interactions, both projects attempted scheduled organization-wide conference calls, but in both cases there was very limited interest among participants.

Participants from both organizations believe that virtual collaboration works well, but they also believe that face-to-face contact is very important. Meeting in person appears to build trust within the collaboration, which participants tend to see as a requirement for success, a theme also found in the literature. Although face-to-face contact is limited in both groups, they take a similar approach, which is meeting at events of mutual interest, such as Linux World.

Products

While the GOCC and the OSS both seek to help governments take advantage of open-source solutions, the products of the two organizations differ quite substantially. Participants in the GOCC effort are unaware of any new software that has been developed as a result of their collaboration, and were surprised with the lack of transferable code held by members prior to the

collaboration. What the organization did create was a community of like-minded individuals and the promise of code, which will become more valuable as it is improved over time. The OSSI has also created a community of like-minded individuals, but has aided in the development of “mission critical” software for use in very demanding government situations. However, some of this code is created for specific organizations and may not be readily available to other organizations. Beyond software, the OSSI has been successful in securing research and development projects and helping government agencies to better understand how they might use open-source solutions.

Nearly all of the participants from both efforts mentioned that value is critical in open-source collaboration. One GOCC participant said, “unless it adds value to somebody else, this is going nowhere—it has to add value.” The same participant noted that “if I get no value back for my project from the community, it’s probably because I was not able to deliver value to them.”

John Weathersby, Executive Director of the OSSI, said that:

the project is firmly based on our ability to continue to provide value, whether through development of software resources, continued interaction and promotion of policy issues, encouragement of open-source service adoption by commercial entities or general advocacy within government decision-making bodies...as long as you are providing value, you have a great chance of continued success, but if you become complacent, then your value declines and you will be eliminated.

One participant in the GOCC effort felt that while the group expected the value to come out of reuse and improvement of member provided code, this could be a flaw in the organization’s framework, as the current GOCC membership base may be too small to create the vast improvements in code that we see in the open-source community at large.

While neither organization has a support system in place for the software they hold or produce, participants generally believe that some assurance of continuity of specific pieces of code is important. One GOCC participant said:

it's critical, particularly because government entities do not typically have large staffs, they rely on external support, they're going to look carefully at how the software will be supported and maintained. They look carefully at what the resources are and how they can get training for the software...particularly anything mission critical or deployed on a broad base of users that requires a lot of support.

An OSSSI respondent had this to say, "continuity is critical to the continued long-term success of this project. As with most open-source solutions, your value is based on your ability to provide continual updates..."

Conclusion

As government organizations increasingly look to open-source solutions, public sector collaborations will likely become more prominent. Interviewees in this research note that open-source collaborations in government are still in an infant stage, making the limited data available from this study extremely valuable. They also recognize that a stigma remains, which successful collaborations could alleviate.

The most important finding in this research, confirming a major theme in the literature, is that leadership and value are critical to the success of open-source collaborations in the public sector. Collaborations with a strong leadership structure, and more importantly a single leader who is persistent, passionate and willing to spend a great deal of time maintaining and improving the organization are much more likely to succeed. Value is also a critical component, and requires that efforts meet the wants and needs of members and clients, whether they be in the form of software, documentation, research or even policy advocacy.

Governance structure, another major theme in the literature, is also an important consideration. In a voluntary effort like the GOCC, having a strong governance structure, and particularly a strong legal framework is extremely important in helping participants to feel secure. However, it is possible, as Schweik and English (2007) suggest, that such a framework could be a barrier to developing a large membership base, which might make it difficult to maintain products of value. While fees would likely be an additional barrier to efforts like the GOCC, funding is critical in an OSS style effort, where the membership base consists of firms. The profit motive among participants makes collecting membership fees possible, and these funds help to draw in new clients and ensure that there are high level administrators constantly pushing the effort forward.

Other issues that appear to be very important in these collaborations include support and an assurance of continuity (concerning the software), and face-to-face communication. Public decision makers want to know that projects they endorse will continue to evolve and be supported in the future, this is particularly true when considering open-source software, as it has not yet been widely embraced by the public sector. Face-to-face communication also seems to be an important factor, while a lack of face-to-face contact may not destroy an effort, it seems that it is a major boost, and can be very useful, even if the meetings are infrequent. Taking advantage of venues of mutual interest, such as Linux World, seems to be an effective way to bring members together.

Finally, high quality products, a high level of trust, willingness to evolve and focus on a small number of projects are potentially important factors for successful collaboration. In this research I have found that voluntary efforts with significant barriers to participation might find it difficult to maintain valuable and high quality products, as there are likely to be fewer

participants creating and maintaining code, which is consistent with much of the literature, including Raymond (1998) and Schweik and English (2007). Trust also seems to be an important factor in public sector open-source collaborations, but the primary hurdle appears to be gaining buy-in and once that hurdle is overcome, the effort required to gain trust appears to be minimal. In this research I found that leadership, face-to-face contact, and the legal framework were the primary factors leading to trust. A willingness and ability to evolve, which may be tied to creating products of value to clients and members, might also be an important factor in developing a successful collaboration. Finally, a conscious effort to focus energy on a small number of projects in early stages may be an important component in creating value for members of collaborative efforts. Decisions on the importance of projects will likely differ between volunteer and funded efforts, as funded efforts are likely to focus more energy on projects with a strong financial backing.

While the results of this analysis are interesting and important to both academics and public decision makers, because I only looked at two cases (in a very small population of public focused consortiums), the results are not generalizable. However, as new open-source collaborations in the public sector are developed, these findings can provide a strong basis for future research and may be useful in comparing similar efforts in other sectors. These insights will also be valuable to members of current efforts and to those attempting to create new open-source collaborative efforts geared toward government organizations.

Appendix A

Table A-1: Key issues for community-led and sponsored open source projects

	Reason for Initiation	Key issues	Contributor Motivation	Control
Community Initiated	Solve a problem Create a “free software” alternative to proprietary solution	Garnering resources Building healthy community, attracting talented developers Distributing software Gaining ‘mindshare’ with minimal marketing	To make software happen To gain fulfillment To build and learn new skills To solve personal and professional problems	Democratic, transparent, usually meritocracy Some leadership and stratification
Sponsored	Achieve greater adoption of software Get development help on areas that are of low priority for the firm (e.g. special dialects)	Gaining legitimacy Building healthy community, attracting talented contributors Resolving ambiguity about control and ownership	To complete areas that are of high priority for contributors To gain visibility by prospective employers To influence sponsor’s alignment with complementary projects	Varies, but usually sponsor retains direct or indirect control

(Source: O’Mahoney & West (2005) 10)

Appendix B

Table B-1: Open Source Software Institute Membership Schedule

Type of Membership	Current Minimum Annual Dues	Past Minimum Annual Dues
Corporate – Under \$5 million Annual Gross Revenue (AGR)	\$1,000	\$25,000
Corporate – \$5 million to \$15 million AGR	\$3,500	\$25,000
Corporate – \$15 million to \$30 million AGR	\$5,000	\$25,000
Corporate – \$30 million to \$50 million AGR	\$10,000	\$25,000
Corporate – \$50 million to \$100 million AGR	\$25,000	\$25,000
Corporate – Over \$100 million AGR	\$50,000	\$25,000
Government	\$500	\$5,000
Academic	\$250	\$2,500
Associate	Reccomended \$250, reciprocal or in-kind support also accepted	N/A
Community	Reciprocal, in-kind, or monetary contributions accepted	N/A

(Source: Weathersby (2007); Bylaws)

Bibliography

Bonaccorsi, A., & Rossi, C. (2006). Comparing motivations of individual programmers and firms to take part in the open source movement: From community to business *Knowledge technology & policy*, 18(4), 40-64.

Bylaws of the Open Source Software Institute Retrieved April 10, 2007, from http://www.oss-institute.org/media/OSSI_BYLAWS.pdf

Crowston, K. & Howison, J. (2006). Hierarchy and Centralization in Free and Open Source Software Team Communications. *Knowledge, Technology, and Policy*, 18(4), 65-85.

Dahlander, L. & Magnusson, M. (2005). Relationships Between Open Source Software Companies and Communities: Observations from Nordic Firms. *Research Policy*, 34(2005), 481-493.

Defillippi, R. J. (2002). Organizational models for collaboration in the new economy. *Human Resource Planning*, 25(4), 7-19.

Enterprise Technical Reference Model. (2007). Commonwealth of Massachusetts. Retrieved on April 12, 2007 from
[http://www.mass.gov/?pageID=itdsubtopic&L=4&L0=Home&L1=Policies%2c+Standards+%26+Guidance&L2=Enterprise+Architecture&L3=Enterprise+Technical+Reference+Model+-+Service-Oriented+Architecture+\(ETRM+v3.6\)&sid=Aitd](http://www.mass.gov/?pageID=itdsubtopic&L=4&L0=Home&L1=Policies%2c+Standards+%26+Guidance&L2=Enterprise+Architecture&L3=Enterprise+Technical+Reference+Model+-+Service-Oriented+Architecture+(ETRM+v3.6)&sid=Aitd)

Fedorowicz, J, Gogan, J.L., & Williams, C.B. (2006) The E-Government Collaboration Challenge: Lessons from five case studies. *IBM Center for Business for Government*. Retrieved February 13, 2007, from <http://businessofgovernment.org/pdfs/FedorowiczReport.pdf>

Gadman, S., & Cooper, C. (2005). Strategies for collaborating in an interdependent impermanent world. *Leadership & organization development journal*, 26(1), 23-34.

Gallivan, M. J. (2001). Striking a balance between trust and control in a virtual organization: A content analysis of open source software case studies. *Information Systems Journal*, 11(4), 277-304.

German, D. M. (2003). The GNOME project: A case study of open source, global software development. *Software Process Improvement and Practice*, 8(4), 201-215.

Gray, B., & J, W., Donna. (1991). Collaborative alliances: Moving from practice to theory. *Journal of applied behavioral science*, 27(1), 2-22.

Government Open Code Collaborative. The Government Open Code Collaborative is Launched. Accessed April 1, 2007, from http://www.gocc.gov/docs/about_GOCC/launchannouncement

Government Open Code Collaborative Operating Agreement. (2004). Retrieved March 28, 2007 from http://www.gocc.gov/docs/about_GOCC/GOCC_Operating_Agreement_6-21-04.rtf

Hahn, R.W.(ed.). (2002). *Government Policy toward Open Source Software*. Washington, D.C.: AEIBrookings Joint Center for Regulatory Studies.

Howison, J., Inoue, K., & Crowston, K. (2003). Social Dynamics of free and open source team communications. Retrieved April 10, 2007 from http://floss.syr.edu/publications/howison_dynamic_sna_intoss_ifip_short.pdf

Joode, R. W., Lin, Y., & David, S. (2006). Rethinking free, libre and open source software. *Knowledge, Technology, and Policy*, 18(4), 5-16.

Krishnamurthy, S. (2006). On the intrinsic and extrinsic motivation of Free/Libre/Open source (FLOSS) developers. *Knowledge technology & policy*, 18(4), 17-39.

Lakhani, K., & von Hippel, Eric. (2003). How Open Source Software Works: ‘Free’ User to User Assistance. *Research Policy*, 32(6), 925-943. Retrieved April 12, 2007 from <http://opensource.mit.edu/papers/lakhanivonhippelusersupport.pdf>

Lanzara, G. F., & Morner, M. (2003). The knowledge ecology of open-source software projects. Retrieved February 15, 2007, from <http://opensource.mit.edu/papers/lanzaramorner.pdf>

Lee, J. (2006). Government policy toward open source software: The puzzles of neutrality and competition. *Knowledge technology & policy*, 18(4), 113-141.

Lerner, J., & Tirole, J. (2005). The Economics of Technology Sharing: Open Source and Beyond. *Journal of Economic Perspectives*, 19(2) 99-120.

Li, ,Mingzhi, Lin, ,Zhangxi, & Xia, ,Mu. (2004). Leveraging the open source software movement for development of china's software industry. *Information technologies and international development*, 2(2), 45-63.

Lin, Y. (2006). Hybrid innovation: The dynamics of collaboration between the FLOSS community and corporations. *Knowledge, Technology, and Policy*, 18(4), 86-100.

Neus, A., & Scherf, P. (2005). Opening minds: Cultural change with the introduction of open-source collaboration methods. *IBM systems journal*, 44(2), 215-225

Neuman, W.L. (2003). *Basics of Social Research: Qualitative and Quantitative Approaches*. Boston.: Pearson Education.

O’Mahony, S. & West, J.(2005). Contrasting Community Building in Sponsored and Community Founded Open Source Projects. Retrieved April 16, 2007 from <http://dissertation.martinaspeli.net/papers/firms/west-and-o-mahony-2005-contrasting->

community-building-in-sponsored-and-community-founded-projects/west-founded-vs-community-sponsored-communities.pdf

Olson, M. (1971). *The logic of collective action; public goods and the theory of groups*. Cambridge, Mass.: Harvard University Press.

Paasivaara, M., & Lassenius, C. (2003). Collaboration practices in global inter-organizational software development projects. *Software Process Improvement and Practice*, 8(4), 183-199.

Punch, K.F. (2005). *Social Research: Quantitative and Qualitative Approaches*. London.: SAGE Publications.

Raymond, E.S. (1998). The Cathedral and the Bazaar. *First Monday*, 3(3). Retrieved April 1, 2007, from http://www.firstmonday.org/issues/issue3_3/raymond

Schmidt, D. C., & Porter, A. Leveraging open-source communities to improve the quality & performance of open-source software. Retrieved February 13, 2007 from <http://www.cs.wustl.edu/~schmidt/PDF/skoll.pdf>

Schmidt, K.M., & Schnitzer, M. (2003). Public Subsidies for Open Source? Some Economic Policy Issues of the Software Market. *Harvard Journal of Law & Technology*, 16(3), 473-505.

Shah, S.K.. (2006). Motivation, governance, and the viability of hybrid forms in open source software. *Management science*, 52(7), 1000-1014.

Schweik, C. M., & English, R. (2007). Tragedy of the FOSS commons? investigating the institutional designs of the free/libre and open source software projects. *First Monday*, 12(2)

Sharma, S., Sugumaran, V., & Rajagopalan, B. (2002). A framework for creating hybrid-open source software communities. *Information Systems Journal*, 12(1), 7-25.

Weathersby, John. (2007). Open Source Software Institute Operational Overview.

Weber, S. (2004). *The success of open source*. Cambridge, Mass.: Harvard University Press.

Welcome to the Government Open Code Collaborative Repository. (2005). Accessed April 11, 2007, from <http://www.gocc.gov>

Wong, Kenneth. (2004). Free/Open Source Software: Government Policy. (Asia-Pacific Development Information Programme: e-Primers on Free/Open Source Software). Retrieved April 9, 2007 from <http://www.iosn.net/government/foss-government-primer>.

Yin, R.K. (1984). *Case Study Research: Design and Methods*. Beverly Hills.:Sage Publications.