The Value of Engaging with Open Source Communities

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ABSTRACT

Organizational engagement with open source communities has become increasingly common. Open source is becoming a widely accepted and utilized form of innovation and product development. The fact that organizations extend their development efforts to open source communities not only demonstrates that open source meets the needs of organizations but also that it is perceived as the best solution among alternatives. In this research, I take a value perspective for understanding how organizations evaluate their engagement with open source communities. I build on signaling theory to understand how organizations perceive open source communities and make value judgments about their engagement. This research contributes to the growing evidence of how open source integrates with business strategy. Open source office managers in organizations can use the results of this research to better articulate open source engagement and open source communities benefit from the results by learning how to best attract organizational members and maintain valuable engagements with them.

Author Keywords

Open Source, Value, Signaling Theory, Organizational-communal engagement.

ACM Classification Keywords

D.2.9 Management: Programming teams, Productivity; H.5.3 Group and Organization Interfaces: Collaborative computing; K.6.1 Project and People Management: Systems analysis and design; K.6.3 Software Management: Software selection; K.7.2 Organizations.

INTRODUCTION

Organizations are engaging with open source communities to speed innovation, share development costs, develop communal standards, and spread the risk of vendor failure. The increasing organizational-communal engagements shape open source communities with regards to their strategic focus, professional coding practices, license compliance practices, and long-term stability [14]. This was a necessary pre-requisite for organizational adoption because

integrating open source software in internal innovation streams creates a long-term dependency where the organization can face major risks from community failures. Communities might fail to attract a consistent stream of new contributors, respond quickly to vulnerability issues, or adapt to new technological challenges. The fact that organizations engage with open source indicates that they perceive value that outweighs those risks. Poba-Zaou, Raymond, and Fabi [36] reported a case where an organization was more interested in the business value of an open source software than the technology and consequently exhibited higher risk-propensity when adopting it. Fitzgerald [14] posited the "need to perceive value" in open source. How organizations evaluate their open source engagements and justify them over alternatives is not yet well understood in the literature. This leads to my research question:

> How do organizations perceive value in their engagement with open source communities?

STAGE OF RESEARCH

I am starting my third year in the Ph.D. program and will take the comprehensive exam and defend my dissertation proposal by the end of 2017. Since I joined the program, I had the opportunity to present my ideas and work at several conferences, including INFORMS Annual Meeting 2015, BIG XII+ MIS Research Symposium 2016, OpenSym 2016, SIGOPEN ICIS Workshop 2016, MWAIS 2017, and AMCIS 2017.

The thread that runs through my research is that open source communities exhibit dynamics that are actively shaped by members, foundations, and organizations [29]. I view open source communities as an environment for innovation that enables business and can benefit all people [31]. I conceptualized the level of open source engagement at the organizational level and developed a survey instrument which I want to advance as a tool to contribute to our understanding of open source adoption in relation to factors such as organizational culture [30].

Currently, I am writing up my dissertation proposal. I use what I learned in my previous research and focus on the interplay between organizations and open source communities. This paper presents an early plan for my dissertation project

STATEMENT OF RESEARCH PROBLEM/OBJECTIVE

Organizations aim to generate value and in the strictest economic sense, value is profit that exceeds cost [3]. Value is created through business processes where input resources

are combined and altered to become products or services. The input resource labor is the work that people do on the input resources and the root of all value creation [3]. I focus on the value that employees in organizational-communal engagements perceive from their interactions with open source communities.

Modern organizations use software extensively as an input resource to their operations in one of two ways. First, business processes can be enhanced and automated with software, which makes the labor more effective and efficient. Second, software can be the product or service and as such embodies the created value. In either case, there are two ways for an organization to obtain software: develop it or source it. Developing software requires labor in the form of developers, software architects, software engineers, and other specialists. An organization can develop software itself or contract the development out. In comparison, sourcing software is about finding software that fulfills the needs of the organization. Software companies offer commodity software for common processes and problems, sell licenses to use the software, and provide complimentary services and products. An alternative sourcing option to such proprietary software is open source software [27]. An open source license allows anyone to use, modify and share the software without restrictions. Open source software can be used as an ingredient to other software development projects [16] and organizations can contribute their changes back to the community, thereby engaging in developing and sourcing activities simultaneously [8]. Regardless of how software is obtained and appropriated in organizational value creation, software is an element in the value creation process and organizations evaluate alternative sourcing solutions [19].

Organizations ask questions of open source software before deciding to use it. The most common questions include [19,23]: What are the license obligations? How can rapid technical help be obtained? How much longer does an open source project sustain? How can bugs be fixed and new features be added? The essence of these questions is to compare open source software to other possible solutions, such as proprietary software or developing software. The organization uses signals from the open source community, such as the level of activity, descriptions of how to contribute, or number of downloads, to judge the potential value to the organization [19]. Perceived value is difficult to evaluate [3], heavily depends on the local context, and is not well understood in the context of engaging with open source communities.

The problem is that organizations lack a shared understanding of how to evaluate their engagement with open source communities in terms of signaled value. This makes it difficult for open source program officers to articulate resources and effort for building organizational projects built around open source software. Similarly, open source communities lack the understanding of how to signal their value to organizations with the goal of ensuring future development by attracting organizational contributors.

This study addresses the problem by understanding signals that are created by open source communities and observed by organizations and how signals are related to perceived value. The purpose of the study is to understand how organizations perceive value from their engagement with open source communities.

SUMMARY OF CLOSELY RELATED PRIOR RESEARCH
Organizations use open source software as an input to their innovation processes [7,16,28]. As such, open source communities provide the means to innovate with experts outside of the organization [15], where the shared innovation remains in the public space for everyone to benefit [22]. Organizations can choose to only use open source software without contributing back [7] but engaging in the community and learning through contributing can yield better results [2]. Not only do organizations use existing open source software but they release internally developed software under an open source license to build communities that advance technology in the open [28]. Within open source communities, a network of organizations establishes social mechanisms to safeguard the exchange between members including collective sanctions for violating the norms [13]. Organizations wanting direct involvement send employees to participate [9] and consequently open source communities adopted more strategic planning, more deliberate analysis and design phases, and more rigorous project management [14]. These stabilized processes have made open source communities sustainable and reliable partners for long-term organizational engagement [17]. However, for organizations to engage with open source communities, they have to perceive value from this approach [14].

Companies are organizations that are created with the intent to create value [10] which is often equated with profit. A company creates profit by combining resources to a product or service that a customer is willing to pay a higher price for than the resources cost. Employees tasked with obtaining resources rely on some belief that the procured resources contribute to the profitability of the company [3]. From this perspective, to understand how a company or any organization perceives value from engaging in open source communities, we have to understand how decision-making employees perceive open source engagement as contributing to the profitability of the organization.

Signaling theory [37] provides a lens to understand how signals from an open source community inform the value judgment of organizations. Spence [37] proposed signaling theory and demonstrated it with the job market and how signals from job applicants inform the hiring decision of organizations. Signals are observable characteristics such as an applicant's age, or gender which cannot be changed but signals also include characteristics that can be changed, such as college degrees, or open source participation [20]. In a competitive market, signals are announcements or previews

of potential actions that organizations purposefully send to convey information or obtain information from competitors [21]. Signaling theory has also been used to understand consumers' online purchasing decisions in relation to the information provided by the seller about herself [18] and about the offered product [12].

The commonality between the job market, online marketplaces, and the open source ecosystem is that a decision to hire, purchase, or engage occurs under uncertainty with only signals to inform a value judgment and decision. While signaling theory has not been used in the way I propose, several prevalent signals have been reported to influence organizations' decisions to engage with open source including cost [11,24,34], compatibility [11,24,35,36], trialability [11,36], reliable support option [11,24,34], quality of software and process [25,35], and engagement by other organizations with a community [11,35].

According to signaling theory, signals can come from a trusted third party, such as a college degree from a university or an independent consumer report [12]. This type of signal is also sought for open source communities [35]. For example, the Core Infrastructure Initiative established the Best Practices Badge [4] which provides a credible signal about the quality of an open source community [1]. The Best Practices Badge is a self-certification on 74 criteria in areas such as quality, security, or change control. One such security-related criterion is: "The project MUST have at least one primary developer who knows how to design secure software" [5]. Another example for the need to establish trusted signals about open source communities is the CHAOSS project (Community Health Analytics for Open Source Software), a new initiative by the Linux Foundation. The CHAOSS project formed in 2017 with the goal to formalize signals that organizations can use to perceive value in their open source engagement [32].

RESEARCH METHOD USED OR PLANNED

The unit of analysis in my research project is the organization. Data that can inform the research question will come from organizations that are engaged in open source communities. I have access to organizational members through my involvement as an active and contributing member of the Linux Foundation's CHAOSS project which develops metrics to understand the health of open source communities. Organizational members within the CHAOSS project have an interest in using metrics for evaluating the perceived value of engaging in open source communities. I will gather data over several months through my engaged fieldwork [33]. As a contributing member of the open source community, I have access to members, can observe community processes, and will build a reputation as an engaged researcher [38]. Interviews with community members will be conducted online and over the telephone. Given a chance to meet in person, I will take the opportunity to conduct in-person interviews in an effort to not only

collect additional data but also to build personal relationships with community members. To supplement the interviews, I will analyze communication archives of mailing lists, forums, or issue trackers to enrich the interview material [26]. Further, I will keep field notes. I will qualitatively analyze these data sources to address the aforementioned research questions [6].

EXPECTED CONTRIBUTION OF WORK

This work will advance signaling theory by critiquing it from the perspective of organizational engagement with open source communities.

This work will advance our knowledge about organizational-communal engagements and what role value judgments play in forming, maintaining, and ending these relationships.

I will additionally share what I learn through my work with the Linux Foundation CHAOSS project and thereby contribute to practice in the development of formalized signals. Practitioners, such as open source program officers, can use this work to make better-informed value judgments and communicate them in their organization. Open source communities can build on this knowledge to strategically attract organizational members and build lasting and valuable relationships.

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