Role of reputation cues in trust formation for a developer’s decision to join Open Source Software projects

Completed Research

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Abstract

Level of contributors' activity around an Open Source Software (OSS) project is one of the key factors in terms of its survival and success. There are several factors that affect a developer's decision to join an OSS project, yet little research examined the influence of third-party assessments on a developer's intention to join a project. Drawing on signaling theory, this manuscript explores how third-party assessment can influence a developers’ decision to join an OSS project. In order to test it, vignette survey study was conducted manipulating reputation, development experience, and a number of current OSS projects of existing developers in the OSS project. The findings suggest that all three signals have a positive influence on developer's decision to join the OSS project. This suggests that projects seeking to expand the number of contributing developers should consider offering information about its "star developers".

Keywords

Open source software, signaling theory, reputation, trust, developer’s decision-making.

Introduction

In this study, we investigate the influence of reputation cues on a developer’s decision to join an Open Source Software (OSS) project. In general, Open Source Software is an umbrella term covering different kinds of software product and development methods. As commonly suggested, we refer to OSS as “software released under a license that permits the inspection, use, modification, and redistribution of the software code (Crowston et al. 2012, p. 71). As developers usually bear no financial benefits from the OSS project participation, the main source of manpower in the project comes from voluntary participation. A study by Howison et al. (2006) showed that the average length of a developer's participation is approximately one month. Therefore, attracting and sustaining an active developer base poses a significant challenge for many OSS projects.

There are several things that may influence a potential developer's decision to join an OSS project: shared norms and values, foundation of effective communication (incl. networks structure), and presence of trust among community members (Crowston et al. 2006; Fang and Neufeld 2009; Lane et al. 2004; Roberts et al. 2006; Singh et al. 2011; Temizkan and Kumar 2015). The literature regarding trust in virtual communities mainly focused on three contexts: e-commerce (e.g., Lim et al. 2012), virtual collaboration (e.g., Ou et al. 2013), and social media (e.g., Cheng et al. 2017). However, thus far, to the best of our knowledge, no one has studied the role of reputation cues from an existing OSS project as a way to attract new developers. While Banerjee et al. (2017) discovered similar trustworthiness antecedents in case of Yelp reviewers, we theorize they could have a different extent of influence in the context of OSS community. An active OSS developer dedicates 5-14 hours per week of his/her spare time on average (Luthiger Stoll 2005) without receiving any financial benefits so they are risking more compared to people using Yelp reviews to, for example, choose a movie or restaurant. In this study we investigate the extent of the influence of reputation cues on a developer's decision to join an OSS project. By showing which reputation cues have stronger effects on a developer's decision to join an OSS project, this study extends theoretical understanding about how reputation based on third-party evaluations of existing OSS project developers...
signals trustworthiness to potential developers. Further, practitioners may benefit from understanding which reputation cues can be applied to attract more developers to their projects.

Reputation cues are indicators of status and the reputation of existing developers of a project. Hu et al. (2012) argue that a large number of positive peer evaluations may enhance overall positive project reputation and might attract the attention of potential collaborators. Thus, OSS projects with many well-known developers might be more attractive to other developers. As a result, we assume that a similar effect is true when a new developer chooses to join the OSS project. The role of reputation systems in virtual communities, such as the OSS development communities, is also becoming more relevant as the habit of using web searches or social media screening is growing to be a normal practice nowadays (e.g., Ou et al. 2013). Therefore, we examine the following two research questions:

**RQ 1: Does reputation affects a developer’s trustworthiness assessment before joining an OSS project?**

**RQ 2: What are the influence of third-party online profiles and peer recognition platforms (e.g., Advogato, OpenHub) on a developer’s trustworthiness assessment before joining an OSS project?**

Our paper is organized as follows: first, we present our research model and the logic behind it. Second, we present hypotheses and the reasoning behind them. Third, we provide the research methodology including sampling, measures and analysis. Finally, we offer results, discussion, implications for practice, future research directions and conclusions.

**Theoretical development**

Trust formation is characterized by a dynamic process based on prior interaction experience and knowledge (Cheng et al. 2016). According to the cognitive model of trust formation of virtual teams by Rusman et al. (2010, p. 838) the process of interpersonal trust formation goes through three stages: input, cognitive processing (assessment of trustworthiness) and output. Authors characterize input to the trustworthiness assessment as signals and signs. While Rusman et al.’s (2010) model closely reflects Mayer et al.’s (1995) integrated model of organizational trust, Rusman et al. (2010) focus specifically on the trust formation process in virtual teams. Thus, the authors distinguish between different routes through which reputation cues can be received: direct and indirect. Direct interaction experience represents the direct route. The indirect route is an acquisition of information via a third-party who has had direct interaction experience. Hence, the cognitive process consists of information collection and the assessment of trustworthiness, potentially leading to the trusting behavior. Trusting behavior is a manifestation of trust as the trustor acts upon their willingness to be vulnerable by engaging in trusting action.

Similarly, Achrol (1997) suggests that some decisions made upon a basis of trust might be actually based on someone’s reputation. Wilson (1995) argues that “reputation for performance becomes a measure of trust when the partner is an untested commodity” (p. 340). Moorman et al. (1992) suggests that reputation might be an indicator of reliability. Similarly, Cheng and Macaulay (2014) found that reputation consists of sub-factors such as positive interaction experience, skill diversity, and task reliability.

In general, the literature on initial trust formation identifies five streams of research: (1) knowledge based, (2) calculative based, (3) personality based, (4) institution based, and (5) cognition based trust. Knowledge based knowledge is formed over relatively long periods of time relying on extended experience with the other party (Holmes 1991; Lewicki and Bunker 1995). Calculative based trust is based on rational analysis of costs and benefits (Lewicki and Bunker 1995; Shapiro et al. 1992). Personality based trust is formed during childhood and leads to general predisposition to trust others (Rotter 1967). Institution based trust reflects the trust into institutional structures (e.g., guarantees). Cognition based trust is based on cognitive cues or initial impressions preceding close personal interactions (Brewer 1981; Lewis and Weigert 1985; Meyerson et al. 1996).

We argue that in the context of our OSS study only two types of trust will be applicable: cognition based trust (used when evaluating trustworthiness of the existing project developers), and knowledge based trust (applied when a potential developer reviews available third-party knowledge based information such as reputation cues, etc.). The calculation, personality, and institution based research streams might not be applicable to the context of initial trust formation in OSS communities because, while it is reasonable to assume that an OSS community could attract developers with a high disposition to trust, the community cannot solely rely on developers with high disposition to trust. Similarly, there is no guarantee that an OSS
project will survive or that a new developer will be treated fairly simply based on the fact that it is an OSS project. Finally, in the context of OSS development, calculation based trust would not be applicable as participation in an OSS project brings no monetary benefit and there is a significant opportunity cost to the participation. While all three types of trust are alternative views to the cognition based and knowledge based trust, they appear to have limited relevance in the context of initial trust formation because of the lack of direct experience with the existing OSS developers; hence, we focus on cognition based and knowledge based trust.

Due to the lack of opportunities for direct (i.e., face-to-face) assessment of trustworthiness in OSS projects, a new developer is typically limited to relying on third-party assessments, some of which are done by those who have direct interaction experience with the developer or extended experience of working on the same project. Therefore, third-party assessment may serve as an indirect input to trustworthiness assessment. As a result, we propose that third-party assessment has an effect on trustworthiness assessment. Figure 1 extends Rusman et al.’s (2010) model to include reputation cues and includes trusting behavior as a result of the cognitive process described by McKnight et al. (1998).

<table>
<thead>
<tr>
<th>Reputation cues (3rd party assessment)</th>
<th>Assessment of trustworthiness (Cognitive process)</th>
<th>Trust behavior (Intention to join OSS project)</th>
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<tbody>
<tr>
<td></td>
<td>H1+</td>
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<td>H2+</td>
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**Figure 1. Research model adopted from Rusman et al. (2010)**

Signaling theory explains the effects of signals in the state of information asymmetry between concerned parties (Connelly, Certo, Ireland, & Reutzel, 2011) and can help us understand the potential role of reputation cues. Stiglitz (2000) distinguishes between information asymmetries concerned with information quality and information related to future intentions. In other words, a developer dedicating several years and contribution to a particular type of OSS project signals his/her relevant skills, experience, and his/her intention to continue to contribute to the OSS project.

Signaling costs are considered to be relatively high if it takes one a significant amount of time and effort to possess reputation/rank/degree that identifies with a particular signal. In the case of a project’s developers, costs associated with receiving positive third-party evaluations can be significant. While the costs of making a third-party evaluation readily available are negligible, the amount of effort and time required to obtaining several years of development experience, participating in several OSS projects, and obtaining positive peer evaluations on Advogato.org or OpenHub.net are high, even in comparison to an undergraduate degree.

Limited interaction history, lack of opportunity to make a direct assessment and the highly interdependent nature of OSS development are mostly true for the initial stage of a developer’s participation in OSS development. Therefore, we suggest that an OSS developer is more likely to form trust using third-party assessment signals due to limited opportunities for direct trustworthiness assessment. Hypotheses are developed next, based on this logic. We also suggest that signaling theory helps to convey the logic behind the reputation cues having a rather pronounced impact on the assessment of trustworthiness.

**Hypothesis development**

**Trustworthiness assessment of OSS teams**

Trust in OSS teams is important for OSS teams as they are geographically dispersed and work together interdependently via various forms of communication technology (Maznevski & Chudoba, 2000). Trust has been found to be linked to team effectiveness (Crowston et al. 2012) and the performance and success of OSS projects (Gallivan 2001; Stewart and Gosain 2006). One way to convey trustworthiness in OSS projects is through the accreditation process. Accreditation itself is a relatively common practice to verify developer’s qualifications. A candidate developer works under careful assessment during a probation period, and upon completion, a vote of core developers take place. However, many OSS projects impose minimal...
accreditation standards (Sharma et al. 2002). As a result, accreditation mechanism substitutes have developed to fill the need for peer evaluations. Two examples of peer certification systems are 'Web of Trust' on Advogato.org and the OpenHub social evaluation network, where a developer’s status is reviewed by his/her peers. Supporting the potential value of these evaluations, reputation has been found to be a major motivations for developers to participate in OSS projects (Crowston et al. 2006; Fang and Neufeld 2009).

Before joining an OSS project, a developer may face the situation of asymmetric information if he/she has no prior interaction experience with developers from the project (unless he/she has worked with the same developers previously on other projects). In this setting, developers would need information that would assist their assessment of the project’s developers. One alternative is a third-party assessment in the form of peer evaluation systems (e.g., Advogato trust rating, OpenHub’s KudoRank, etc.). Signaling theory posits that in the situation of asymmetric information, party A conveys its credibility in the form of signal to party B (Spence 1973). Therefore, as indicated in Figure 1, we propose that:

**Hypothesis 1:** Positive evaluations (overall status as a reputation cue) will have a positive influence on trustworthiness assessment.

**Reputation**

Researchers discovered that in virtual teams individuals tend to use personal knowledge and available background information when assessing trustworthiness of their teammates (Hung et al. 2004; Kanawattanachai and Yoo 2002; Olson and Olson 2000). The role of the developer status portals may fulfill a purpose similar to the background and personal information exchange found by Jarvenpaa and Leidner (1998). For instance, while users on Advogato.org are only required to provide a username, most of them offer links to their personal Web site containing an email address with a description of themselves and their work in OSS projects (Stewart & Gosain, 2006). A potential developer could review many profiles of existing developers and base their decision on the overall level of reputation cues such as overall status, year of development experience and number of projects currently involved in.

For instance, in the situation of information scarcity, independent exploration may be problematic, and social networks will tend to play a significant role in the search for information (Rangan 2000). Thus, the underlying mechanisms of uncertainty reduction and information gathering through community-level social cues appear to fit quite well to the study of reputation. As social status is a product of third-party subjective evaluations of an individual, public evaluations regarding a focal individual’s status may be considered to be primary elements of the individual’s status (Goode 1978). Thus, we suggest that:

**Hypothesis 2:** Outstanding reputation cues will have a positive influence on intention to join an OSS project.

Once a new developer finishes his/her trustworthiness assessment of existing project developers, he/she will evaluate the feasibility of trust-related behavior (intention to join the OSS project in our case). A developer considering joining an OSS project assesses potential benefits and costs of participation. Potential benefits include a chance to expand their knowledge base, demonstrate their capability and skillfulness in programming and obtain peer recognition in the OSS community. However, development participation is a significant time and effort commitment, and project failure could have a negative influence on a developer’s reputation hindering both peer recognition and potential employment perspectives.

**Hypothesis 3:** Positive trustworthiness assessment of existing project developers will have a positive influence on intention to join an OSS project.

**Research methodology**

We applied a vignette survey technique as it allowed us to test our theory with various reputational cues manipulated and a relatively small participant sample (Atzmüller and Steiner 2010). We asked participants to answer the questions by imagining themselves in the offered scenarios/situations. Each participant was presented with eight different vignettes. We used two designs where we manipulated three elements within each vignette: 1) developer status on Advogato.org or KudoRank on OpenHub.net, 2) number of years of software development experience, and 3) number of OSS projects a developer is currently engaged in. We developed each vignette variable with two levels (See Table 1).
Manipulated variable (reputation cues) | High                                                                 | Low                                                                 |
<table>
<thead>
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<tbody>
<tr>
<td>Overall rank (status)</td>
<td>Master status on Advogato.org (OR KudoRank 8-10 out of 10)</td>
<td>Apprentice on Advogato.org (OR KudoRank 1-4 out of 10)</td>
</tr>
<tr>
<td>Software development experience (years)</td>
<td>&gt;10</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Current OSS projects involved in (number of projects)</td>
<td>&gt;10</td>
<td>&lt;5</td>
</tr>
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Table 1: Vignette manipulated variable matrix

Study sample

Participants were recruited from two sources. First, we recruited participants from the SourceForge OSS community. We invited 4,801 Source Forge registered developers to participate. However, we experienced a very low response rate (0.87%). We obtained the Source Forge usernames via NotreDame University’s most recent database update (dated September of 2014) and this may have contributed to the low response. Due to the very low response rate from Source Forge, we then recruited open source software (OSS) developers via Amazon Mechanical Turk (MTurk) by posting a link to our survey and collected 203 responses. Therefore, all the quantitative analysis and related results are based on the sample of data collected from MTurk. We did use the SourceForge data to further support the validity of the MTurk findings via post-hoc analysis reported below.

We consider active OSS developers to be most appropriate and acceptable participants for the study as they usually have direct experiences of deciding whether to join an OSS project. Consequently, we used a pre-screening question at the beginning of the MTurk survey to filter out workers without any previous OSS development experience and the experience of joining an OSS project (i.e., asking whether a potential participant had any previous development experience). The total number of MTurk responses was 203 (57 women; 143 men; 3 missing values). Most of the participants (96.8%) had joined their most recent OSS project in the last five years or earlier. Therefore, their ability to recall factors that guided them in deciding to join their most recent OSS project was not too distant. Most respondents were in their late 20s or early 30s (59.1%) and had undergraduate or higher degrees (84.2%).

Construct measurement

All measures used in this study were previously developed instruments from the research literature with reliable and valid psychometric properties. Two trust-related measures were used. The reputation component of virtual team trust (Sarker et al. 2003) is a 4-item scale that measures the “reputation categorization” process of “developing trusting beliefs”. Sarker et al. (2003) argue that the categorization process consists of information collection about others and the cognitive processing of the information to make the decision whether to trust others. More specifically, reputation categorization implies that good reputation encourages trust (McKnight et al. 1998). Ratings are given on a 1-5 Likert-type response scale where 1=”Not at all important” and 5=”Extremely important” and the scale score is simply the sum of the 4 items. Cronbach alpha of this construct measure in our sample was strong at 0.90.

The willingness to transact component of individual trust in online firms (Bhattacherjee 2002) is a 3-item scale that measures “willingness to transact as a consequence of user trust”. Bhattacherjee (2002) argues that intention to trust embodies one’s willingness to engage in a transaction with an entity. Therefore, it was our measure of intention to join a project. Ratings are given on a 0-to-5 Likert-type response scale where 0=”very unlikely” and 5=”very likely”. The scale score is a sum of 3 items (Cronbach’s alpha = 0.89). Further, we discovered adequate discriminant validity.

Analytical techniques

As each participant evaluated the eight vignettes by providing multiple measurements for each participant, repeated measures ANOVA was used for data analysis because it allows us to conduct linear analyses despite violations of independence of measures. First, we checked the data for outliers, normality and homogeneity. Then we corrected outlier and normality issues. Second, we ran repeated measures ANOVA using IBM SPSS.
Statistics 23 software. Finally, we calculated effect sizes. The analysis was conducted according to the methodology suggested by Field (2013).

Results

SourceForge results

While there were only 41 complete responses (response rate of 0.85%) from SourceForge developers, the data collected allows us to compare some metrics with the data collected from Amazon MTurk to gain insights into the validity of our MTurk respondents. First, the average response time per participant was similar between the two sources of responses (SourceForge with 4 vignettes: Set 1: 8 min 58 sec, Set 2: 8 min 23 sec; MTurk with 8 vignettes: 10 min 33 sec). The similarity of the response time might be an indicator of the amount of effort and consideration applied by participants from both sources. Further, response means demonstrated somewhat similar trends. This lends confidence that we met our goal of reaching experienced OSS developers via MTurk.

Effects of Status, Experience, and Number of OSS projects on Trustworthiness Assessment

Results of a factorial repeated-measures ANOVA demonstrate significant main effects of the status (F(1, 202) = 88.78, p < .001), experience (F(1, 202) = 11.14, p = .001), and number of OSS projects (F(1, 202) = 19.65, p < .001) on trustworthiness assessment. Therefore, Hypothesis 1 is supported.

Effects of Status, Experience, and Number of OSS projects on Intention to Join an OSS project

Similarly, results of a factorial repeated-measures ANOVA found significant main effects of the status (F(1, 202) = 118.57, p < .001), experience (F(1, 202) = 18.51, p = .001), and number of OSS projects (F(1, 202) = 19.24, p < .001) on the intention to join an OSS project. Consequently, Hypothesis 2 is supported too.

Effects of Trustworthiness Assessment on Intention to Join an OSS project

To test H3, a one-way ANOVA was conducted that examined effects of trustworthiness assessment on intention to join an OSS project. The results illustrate a statistically significant effect of trustworthiness assessment on intention to join an OSS project, F(19, 1433) = 35.54, p=.001. Therefore, Hypothesis 3 is also supported.

Actual experience with Advogato and KudoRank ratings

In order to assess the ability of participants to relate to the scenarios, we asked them about their knowledge of the trust rating systems. Most of the developers (i.e., 52.7% KudoRank and 61.5% Advogato) were familiar with either rating systems and the majority of the participants that were familiar with rating systems (71.5% and 77.6% respectively) referred to them before joining an OSS project and think that those ratings affected their decision to join an OSS project. This post-hoc analysis adds more confidence towards the authenticity of our vignettes and our results. The dependent variable for our study was intention to join, and we rely on previous research that has established the relationship between intentions and actual behavior (e.g., the theory of planned behavior). The results suggest that consulting with the ratings did affect decisions to join, supporting our assumed link between intentions and behavior.

Discussion

This vignette survey provides preliminary support for the proposed model and our three hypotheses. That is, information about a project’s team members abilities and experience (i.e., reputation signals) did impact trustworthiness assessments and intentions to join the project. Our study also shows that third-party evaluations (e.g., overall status on Advogato.org or KudoRank on OpenHub.net) have the most influence on trustworthiness assessment and intention to join an OSS project compared to the other factors that we studied (e.g., number of projects, years of coding experience). Our findings are consistent with the impact
of third-party evaluations reported in other contexts. For example, individuals tend to seek third-party evaluations on seller and buyers on eBay, and user product reviews on Amazon or IMDb user ratings, wherever possible (Morgan and Hunt 1994; Zucker 1986).

While status appeared to be the most salient factor influencing reputation assessment, the number of OSS projects seems to have more impact compared to the amount of development experience. A possible explanation for this finding may be related to the fact that software development experience itself is not an indicator of success in OSS development as compared to a high number of current OSS projects. Further, past research demonstrated that individuals tend to trust those similar to themselves more and assess trustworthiness based on third-party evaluations (Morgan and Hunt 1994; Stewart and Gosain 2001). Both Morgan and Hunt (1994, p. 25) and Stewart and Gosain (2001, p. 292) point to similarities based on shared norms and values as indicators of a culture formed within a given community or organization. Therefore, having exposure to an OSS community culture (i.e., via working on a number of OSS projects) could imply more shared understanding as opposed to overall development experience (which may include non-OSS development experience as well).

While the focus of our study was the effect of reputational cues on decisions to join an OSS project, there are other factors that people could consider when making their decision about which project to join. For example, depending on their motivation, some developers could choose to join larger projects with more exposure and connections with firms, while some could decide to join projects that they find to be a better fit with their own interests and abilities. Supporting the idea that there are multiple factors beyond reputation cues, we presented respondents with a short list of possible factors identified in previous studies and asked them what influenced their past decisions. Our results demonstrate the majority of our respondents indicated they choose to join an OSS project based on: ‘fun’ (39.1%), ‘sharing’ (40%) and ‘learning opportunities’ (67.7%) as opposed to ‘career advancement opportunities’ (35%) and monetary rewards (10%). We also asked our participants an open-ended question about other factors that influenced their decision to join. One of the respondents from the SourceForge wrote: “Perhaps I’m just unusual, but I don’t assess the value of a project or whether or not I should join it based on who is developing it. I find a project that I like or use a lot and take note of the amount of developers, with less making me more likely to join, and what the list of known bugs looks like, with clean-up, unit testing, and long standing bugs being more desirable. Since I think I’m most qualified for such things.”

**Future Research Opportunities and Limitations**

The discussion above highlights the opportunity to study additional factors and examine the interplay among the factors. Future studies could focus on the importance of various motives (e.g., personal needs, reputation, skill gaining and monetary benefits, and fun of coding) for joining an OSS project, and compare this with the impact of reputation of the project members. We also suggest that future studies include measurements of trust propensity (e.g., Schoorman et al. 2007) as this individual trait could moderate the relationship between reputation cues and trustworthiness assessment (e.g., Colquitt et al. 2007).

Signaling observability was defined by Connelly et al. (2011, p. 45) as “extent to which outsiders are able to notice the signal”. They argue that signals would have a limited impact if they are not readily available to signal receivers (Connelly et al. 2011). Our observation of SourceForge.com shows that the typical profile of an OSS project provides little to no information about developers’ peer evaluations and previous development experience. Consequently, signaling observability may moderate the influence of third-party evaluations (reputation signals) on trustworthiness assessment. Therefore, we encourage researchers to investigate the role of signaling observability in the context of OSS communities by possibly varying the way information is presented and perceived.

The use of vignettes in our study is a limitation and creates a future research opportunity. The hypothetical nature of factorial vignette surveys might not lead to similar judgements in real situations (Lewis-Beck et al. 2003) so future studies could apply other methods to enhance the external validity of our findings. For example, longitudinal studies could examine developers intending to join an OSS project with subsequent examination of whether the developer actually joined, study which projects were given consideration, and examine the motivation and factors behind the decision to join a particular project over the other options.
**Contributions**

This research extends existing knowledge of the effects of third-party evaluations and factors influencing a developer’s decision to join an OSS project. Further, it offers a complimentary perspective by integrating antecedents of third-party reputation assessments investigated by Hu (2012) and Bianchi (2012) and integrating outcomes in the form of the intention to join an OSS project (act upon trustworthiness assessment) into an integrated model of organizational trust by Mayer et al. (1995) and trust formation process model by Rusman et al. (2010). Our study contributes to theory by examining how information about reputation and experience affects decisions to join. The effect is partially mediated by influencing assessments of trustworthiness. Signaling theory helps our understanding of the effect and, to the best of our knowledge, our study is the first effort at applying signaling theory to trust antecedents.

The study results also demonstrate the usefulness of factors (reputation cues) beyond overall third-party evaluation. This information would be relevant for a context where there are few chances for a direct trustworthiness assessment. This suggests that existing participants in online communities should make information beyond overall third-party evaluations available on their online profiles in order to signal potentially high trustworthiness of the online community.

This study contributes to practice by highlighting the importance of third-party evaluations in a developer’s assessment of other developers’ reputation and consequent intention to join an OSS project. This research demonstrates that third-party evaluations of developers within the project, amount of development experience and number of OSS projects may affect the project’s ability to attract more developers and other contributors. Therefore, it could be beneficial for a project wishing to attract more developers to be more transparent by providing relevant information about the developers who currently work on the project. For example, OSS projects leaders could make profiles including rating scores such as KudoRank or Advogato trust rating scores, as our results suggest that third-party evaluations have the largest impact.

**Conclusion**

Recruiting and retaining volunteers to OSS projects is a major challenge so this study investigated the influence of reputation and experience signals on trustworthiness assessments and intention to join an OSS project. Positive signals are associated with positive trust assessments and influence the intention to join an OSS project. While our study has contributed to our understanding of what may influence someone looking to join an OSS project and why, much more work remains. We look forward to future research that builds on our findings and extends them.

**References**


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