# Overcoming Barriers to Collaboration in an Open Source Ecosystem

*Derek Smith, Asrar Alshaikh, Rawan Bojan, Anish Kak, and Mohammad Mehdi Gharaei Manesh*

**Table 1.** A summary of open source collaboration literature relevant to open source ecosystems

| Stream | Author (Year) | Source | Open Source Actor(s) | Focus |
|---|---|---|---|---|
| **Governance Actors** | Muegge (2011) timreview.ca/article/495 | *Technology Innovation Management Review (TIM Review)* | Community members, developer, foundation, users, and adopters | A systems perspective on communities, institutions, companies, and individuals |
| | Smith & Milinkovich (2007) timreview.ca/article/94 | *TIM Review* | Foundation | Openness, transparency, and meritocracy with resources and commitment; ability of the ecosystem to create value |
| | O'Mahony & Bechky (2008) tinyurl.com/lothrqs | *Administrative Science Quarterly* | Foundation (boundary organizations) | Managing the boundaries of collaboration where disparate and convergent interests of different actors are present. Recommendations include the need to identify critical differences and establish a governance structure, membership, ownership, and control over the project for enabling collaboration. |
| | Kshetri & Schiopu (2007) tinyurl.com/n74oeem | *Journal of Asia-Pacific Business* | Foundation (government) | Effective international collaborations requirements, including a vision and influence on a technology trajectory, setting standards, and promotion |
| | Skerrett (2009) timreview.ca/article/219 | *TIM Review* | Foundation | Collaborative software development with competitors in a foundation governed open source community |
| **Competitors** | Lindman & Rajala (2012) timreview.ca/article/510 | *TIM Review* | Competitor | Focus interactions with the user to gain user involvement. Ensure access to important external resources rather than assimilate or build new internal resources. Take advantage of open innovation process but think about the purpose of external contributions. Make the goal of collaboration clear so that it becomes easier to collaborate and reveal confidential information where it makes business sense. |
| | Schreuders et al. (2011) timreview.ca/article/413 | *TIM Review* | Competitor | Hybrid business model based upon an open source licensing model, which allows different users different access and collaboration based upon the selected open source licensing model. The hybrid business model removes restrictions and attracts actors to the open source community, building a resource to test and validate products. |
| | Shamsuzzoha et al. (2013) tinyurl.com/nnvmcr2 | *International Journal of Computer Integrated Manufacturing* | Competitor | Building trust and overcoming fears relating to confidentiality and the exchange of information between competitors. This requires common objectives and rules/procedures for exchanging information and foundations for cooperation. Individual objectives must be clear and aligned to the shared objectives |
| | Muegge (2013) timreview.ca/article/655 | *TIM Review* | Complementors, suppliers, customers, competitors, developers, and users | Identifies the actors in the open source ecosystem such as customers, suppliers, competitors, and many other stakeholders. |

***Continued...***

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**Table 1** ***(continued)***. A summary of open source collaboration literature relevant to open source ecosystems

| Stream | Author (Year) | Source | Open Source Actor(s) | Focus |
|---|---|---|---|---|
| **Complementors** | Skerrett (2011) timreview.ca/article/409 | *TIM Review* | Multi-vendor, complementors, users, adopters, and contributors | License strategy is important to engage a larger portion of community. A copyleft license will generate a wider collaboration. License strategy can also earn trust and gain access to a larger portion of community. Use a vendor-neutral governance structure. |
| | Muegge (2013) timreview.ca/article/655 | *TIM Review* | Complementors, suppliers, customers, competitors, developers, and users | Identifies the actors in the open source ecosystem such as customers, suppliers, competitors, and many other stakeholders. |
| **Core Community** | Muegge (2011) timreview.ca/article/495 | *TIM Review* | Community members, developer, foundation, users, and adopters | A systems perspective on the community, institutions, companies, and individuals. Shared governance and participation are important to collaboration in an open source community. |
| | Evans & Wolf (2005) tinyurl.com/l9dgpea | *Harvard Business Review* | Community members, leaders, and competitors | Members belong to different organizations with no defined role or responsibility; a mix of amateurs and professionals with different skills. Competitors collaborate: must think about options and adaptability not integration and static efficiency. Build trust in the community and collaborate freely and productively. Leaders are valuable; they instruct community members, articulate clear goals, and connect people. Trust is currency and reputation is power. |
| | Skerrett (2011) timreview.ca/article/409 | *TIM Review* | Multi-vendor, complementors, users, adopters, and contributors | License strategy is important to engage a larger portion of community. A copyleft license will generate a wider collaboration. License strategy can also earn trust and gain access to larger portion of community. Use a vendor-neutral governance structure. |
| | Sarker et al. (2009) tinyurl.com/l32zjuf | *IEEE Transactions on Professional Communication* | Leaders | Leadership in the community. Leaders are not reassigned; rather, they emerge from the project and are required for effective collaboration. Information systems development ability, greater contributions are identified with leadership. |
| | Nan & Kumar (2013) tinyurl.com/k5a8yt3 | *IEEE Transactions on Engineering Management* | Developers | Size and format of a team of developers in association with the level of structural interdependency are key for effective collaboration. Positive impact on a project with a high level of structural interdependency may be achieved with centralized teams of developers and larger teams. Smaller teams required for positive impact on projects with a low level of structural interdependency; centralized teams can impact project performance on such projects. |
| | Colazo (2010) tinyurl.com/mwuovbm | *International Journal of Innovation Management* | Developers | Developer density is negatively associated with quality and positively associated with productivity. Centralization is positively associated with both quality and productivity. Collaborating beyond boundaries is positively associated with quality but negatively associated with productivity. |
| | Hemetsberger & Reinhardt (2009) tinyurl.com/qz3mszp | *Organization Studies* | Expert Users | Coat tailing is the pursuit of individual and collective needs; it requires achieving the best balance between individual and collective needs. |
| | Muegge (2013) timreview.ca/article/655 | *TIM Review* | Complementors, suppliers, customers, competitors, developers, and users | Identifies the actors in the open source ecosystem such as customers, suppliers, competitors, and many other stakeholders. |