The Promise of Research on Open Source Software

Georg von Krogh
Eric von Hippel

Presented by Jingyue Li
Outline

• Three categories of OSS research
  – Motivations of open source software contributors
  – Governance, organization, and process of innovation in OSS projects
  – Competitive dynamic enforced by OSS
Why OSS is important to be studied?

- Research on OSS is helping to define an entirely new model of innovation of relevance to many fields beyond OSS.

- This model helps us understand how private needs and wants can create public good innovations of major importance to the society and the economy.
The OSS innovation

• User-oriented incentives
• Community that creates and keeps innovation in common
• Low cost project coordination mechanisms
• Negligible out-of-pocket expenses in diffusing the innovation
• Can apply beyond software development
  – Art
  – Biomedical and life science
Motivations for contributors

• Individual incentives
  – Fun, enjoyment, reputation building, learning, and the private use value of the software being developed
  – Signaling to prospective employers about their programming skills
  – Private-collective model of innovation incentives
    • Private investment on innovation to get profit vs. Publish innovation into a common pool
    • Software users rather than the manufacturer are typical innovators
    • Innovators freely reveal the software developed at their private expense
Motivations for contributors

• Impact of firm’s participation on individual motives
  – Developers’ motives are related in complex ways
  – Paid developers are motivated more strongly by status in the project than by the pure use value of the software
Motivations for contributors

• Impact of community participation on individual motives
  – Linux contributors are motivated by:
    • pragmatic wishes to improve their own software
    • group-related factors, e.g. their perceived indispensability for the team which they are working
  – A combination of social and psychological variables explain Linux User Group member participation
Motivations for contributions

- Relationship between incentives and technical design
  - Developers who were capable of changing the technical characteristics of the software were significantly more satisfied than noninnovating software users
Governance, organization and innovation process

• Reconciliation of diverse and distributed contributor interests
  – Investors (expect to receive rewards from contributions)
  – Donators (who do not expect rewards)
  – OSS projects have succeeded at creating a new governance structure that reconciles the interests of people in both groups
Governance, organization and innovation process

- OSS project organization
  - A striking feature is the pronounced difference in roles taken by contributors
  - Active participants, passive and peripheral listeners, and observers
Governance, organization and innovation process

- Coordination of innovation
  - Very lean coordination tools, e.g. mailing lists and CVS, enabled highly effective development and maintenance
  - The evolutionary design of the OSS hinged on the process by which developers joined the OSS project.
    - Follow the social "joining script" by making considerable contributions (technical advices and high-quality code)
Governance, organization and innovation process

- Project governance related to the process of innovation
  - User’s urgent needs for software are the typical cause for code contributor’s initial participation
  - Once the needs are satisfied, most users leave the communities
Governance, organization and innovation process

- Project governance in gated project vs. in non-gated project
  - Gated project (firm involved)
    - Code contributors tend to not take on project support roles, instead leaving those tasks and costs to firm sponsoring and profiting from the project
  - Non-gated project
    - A small subset of participants remain engaged with the project and undertake various necessary administrative tasks within it
Governance, organization and innovation process

• How network embeddedness of projects and project leaders influences a project success
  – Most behavior of individuals is closely embedded in networks of interpersonal relations
  – Network embeddedness impacts more strongly for technical success (cvs commit) than commercial success (number of download)
  – Project with more developers are more technical successful in the later stages of the project development
Governance, organization and innovation process

- Knowledge sharing
  - Participants interact strategically in order to expand knowledge sharing, but that extreme concentration of development could reduce knowledge sharing
Governance, organization and innovation process

• Software design and OSS organization
  – Different modes of organizing development relate to different product designs
  – Linux possesses a more “modular” architecture than the commercial counterpart
  – Mozilla made a major “re-design” after its release as an open source product
Competitive dynamics

• How do firms seeking to sell products compete with free?
  – OSS and commercial software are likely to coexist, even in limit
  – The commercial software firm must take into account the scarcity in labor due to OSS alternatives
  – When pricing the products, the cost for consumer of implementing the ”free” OSS alternative must be considered
Competitive dynamics

• Hybrid strategies for melding commercial and open source platforms
  – Increased "public" investment can lead to great "private" benefits for the open source oriented firms
  – Even under adverse competitive conditions, there may be practical reasons for innovators to freely reveal information
Competitive dynamics

• When the proprietary applications are based on an open source platform
  – The applications sector of the industry may be more profitable than the total profits of a proprietary platform industry
Competitive dynamics

• Collaboration between firms and the OSS movement
  – Majority of firms entering the OSS industry adapted to that environment, dominated by incumbent standards, via hybrid offerings of proprietary and OSS