Open source influences on technology innovation

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Speed of Sound

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Subsonic Speeds
Sonic Speeds

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Sound Barrier

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Supersonic Speeds
Supersonic Speeds
First Age of Software

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First Age of Software

- 1940s-1970s
- Slow pace of innovation
- Low value, $0 asset
- No software copyright¹

First Age of Software

leading edge

subsonic

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First Age of Software

• 1970s
• Signs of things to come
• Commission on New Technological Uses of Copyrighted Works\(^1\)
• Berkeley Software Distribution (BSD)
• Stallman’s printer\(^2\)

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\(^2\) Richard Stallman (2010) *Free as in Freedom (2.0)*, Free Software Foundation. (p. 4)
Middle Age of Software

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Middle Age of Software

- 1980s
- Software subject to copyright law\(^1\)
- Apple, Microsoft, Oracle...
- Free Software Foundation\(^2\)
- Equal & opposite reaction
- Myth of proprietary innovation

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\(^2\) Richard Stallman (2010) *Free as in Freedom (2.0)*, Free Software Foundation. (p. 9)
Middle Age of Software

- 1990s
- Linux, Apache, MySQL…
- Amazon, Google, Netscape…
- Persistent myth
- Name “open source”
Modern Age of Software

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Modern Age of Software

- 2000s
- Corporate adoption of open source
- Economic necessity (dot-com bubble)
- Leading innovation (Web 2.0)
- Growing body of open source
- Proprietary hinders innovation
- We won?
Modern Age of Software

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Modern Age of Software

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Modern Age of Software

• 2010s
• Use is merely table stakes
• Participation is competitive advantage
  – Needs understood (bugs & features)
  – Reduced cost of maintenance
• Snowball effect
• Combined efforts accelerate innovation
2010, 2015, 2018 Surveys

- Use: 42% → 78%\(^1\) → 92%\(^2\)
- Participation: 64%\(^1\)
- Expect to contribute more: 88%\(^1\)

2017 Survey

- Successful open source participation
- Theoretical background
Open Source & Innovation

• What makes companies successful?
  – at open source
  – at technology innovation

• The two have a lot in common
Open Source & Innovation

• Organizational capabilities¹
  - knowledge of individuals
  - business process and model
  - can be learned, over time
  - impacts likelihood of success

Open Source & Innovation

• Open Innovation\(^1\)
  - share ideas externally
  - assimilate external ideas inward
  - (open source: share and assimilate code)
  - create and capture value for customers
  - co-develop across company boundaries

Open Source & Innovation

• Levels of Engagement\textsuperscript{1,2}
  1. InnerSource
  2. Use
  3. Product integration
  4. Single company project
  5. Participate in external project
  6. Co-lead external project

• More investment, more effective, more value


Open Source & Innovation

• Across company boundaries
  – strategic alliances
  – standards bodies with patent pools
  – internal and outsourced R&D
  – licensing as acquisition
Open Source & Innovation

- Economics/business of software
- Customer value
- Proprietary model
  - Depends on scarcity
  - Fails on commodity
- Open source model
  - Freely available resource
  - forest → firewood → lumber → house → furniture
Software Business Models

- Hardware
- Software integration
- Software as a Service
- Support/Services
- Content
- Software license
## Shared Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Technology Innovation</th>
<th>Open Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>collaboration in external communities (knowledge and resources)</td>
<td>2, 3, 17, 26, 27, 30</td>
<td>8, 11, 14, 16, 19, 21, 28</td>
</tr>
<tr>
<td>access to external innovation (source code)</td>
<td>3, 5, 17, 29</td>
<td>8, 16, 19, 24</td>
</tr>
<tr>
<td>share ideas outward</td>
<td>3, 4, 26, 27</td>
<td>8, 11, 19</td>
</tr>
<tr>
<td>organizational learning, assimilate ideas inward</td>
<td>3, 5, 6, 7, 17, 23, 27, 29, 30</td>
<td>8, 10, 19</td>
</tr>
<tr>
<td>efficiency of reuse/Modification</td>
<td>3, 5, 17, 27, 30</td>
<td>8, 9, 16, 18, 19, 21</td>
</tr>
<tr>
<td>strategic approach to customer value</td>
<td>3, 25, 26, 27</td>
<td>1, 12, 13, 19, 22, 24</td>
</tr>
<tr>
<td>low barrier to entry</td>
<td>20</td>
<td>16, 19, 24</td>
</tr>
</tbody>
</table>

2017 Survey

- Successful open source collaboration
- Companies involved in OpenStack
- Range: small startups to Fortune 50 (>300k employees)
- Active investment in open source
Styles of Engagement

Styles of Engagement

- **Most common:**
  - contribute to community, 93%
  - participate as co-leaders, 91%
  - research predicts these would be less common

- **Least common:** open source with no community, 34%

- **Integrating open source,** 82%, more common than proprietary, 64%
Areas of Business Value

Areas of Business Value

• Most common:
  – support, 86%
  – software integration, 79%

• Correlations:
  – integration with distribution
  – contributing with support
  – active community with domain expertise
  – no community with SaaS
Participation Practices

Randal, A. (2017) Capabilities for open source technology innovation: a study of collaboration characteristics across OpenStack project participants, Master’s Thesis.
Participation Practices

• Most common:
  – regard open source as strategic component of competitive advantage, 90%
  – track open source trends for impact on business strategy, 86%
  – sharing and assimilating knowledge, 75%
What Works (and What Doesn’t)

- More than a name
- More than a license
- Avoid “faux-pen” source
  - Open Core
  - Commons Clause license condition
  - New Year’s resolution?
- No guarantee
- Best practices

Open Collaboration

- Open source
- Open development
- Open design
- Open community
Open Collaboration

- Co-leadership (strongest)
- Contribution
- Active community
- Some community
- No community (weakest)
Open Governance

● Developers and users have a voice
● Adapt over time
● Respond to opportunities and problems
Open Integration

• Internally
  − Strong integration points
  − Well tested, work well together

• Cross-project
  − Independently consumable
  − Users combine technologies
  − >50k projects in Debian
  − Opportunities for collaboration
Technical Best Practices

- Documentation
- Code review
- CI/CD
- Bug handling
- Security
What’s Next?

• Unlikely to disappear
• Commoditization happens
• Growing body of open source
• Increasing participation, sustainability
• Proprietary niches of scarcity
• Business as usual
Questions?


