The Impact of Open Source Software on Competition on Software Markets

Jens Mundhenke
Kiel Institute for World Economics

IDABC @ LinuxTag 2005
"Working with the Community: OSS in Public Administrations"
Karlsruhe, June 23, 2005

Outline

- The Empirical Picture
- Economic Properties of Software
- Characteristics of Open Source Software and Implications for Competition and Innovation
- Supply- and Demand-Side Challenges
- Legal Aspects
- Conclusion
Worldwide and European ICT Markets 2003, Million €

Total: € 2,017 billion

Source: European Information Technology Observatory 2004, Tables 7, 11.

Western European ICT Market Proportions and Market Growth

Total Value 2004: € 611 billion  Expected Market Growth in % (2003-05)

Source: European Information Technology Observatory 2004, Figure 12; Update Oct. 2004, Figure 1.
IT Services in Germany: Distribution of Firms and Revenue According to Firm Size


<table>
<thead>
<tr>
<th>Product market</th>
<th>Geographic market</th>
<th>Leading firm</th>
<th>Market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrowband internet access</td>
<td>U.S.</td>
<td>AOL</td>
<td>50%</td>
</tr>
<tr>
<td>Internet routers</td>
<td>Worldwide</td>
<td>Cisco</td>
<td>80%</td>
</tr>
<tr>
<td>Online auctions</td>
<td>Worldwide</td>
<td>eBay</td>
<td>80%</td>
</tr>
<tr>
<td>PC microprocessors</td>
<td>Worldwide</td>
<td>Intel</td>
<td>82%</td>
</tr>
<tr>
<td>PC operating systems</td>
<td>Worldwide</td>
<td>Microsoft</td>
<td>94%</td>
</tr>
<tr>
<td>Relational database management (UNIX)</td>
<td>Worldwide</td>
<td>Oracle</td>
<td>63%</td>
</tr>
<tr>
<td>Traditional workstations</td>
<td>U.S.</td>
<td>Sun</td>
<td>66%</td>
</tr>
</tbody>
</table>

Software is a Special Good

- High first copy costs, low marginal costs
  - Supply-side economies of scale
  - Instant scalability
  - Non-rivalry in consumption
- Network effects
  - Economies of scale in consumption
  - Path dependencies
- No technical deterioration

Characteristics of Software Markets

- Basic requirement:
  Excludability of consumers
- Market structure:
  - Tendency towards concentration
  - Advantages for established firms
- Market dynamics: Innovation is imperative
What is Open Source Software?

- Access to the source code \textit{and}
- A free license
  - Unrestricted usage
  - Modifications are allowed
  - Software can be copied and distributed without license fees

\Rightarrow Open Source Software makes special use of the characteristics of digital goods

Implications for Innovation and Competition

- Low market barriers:
  - Code can be re-used
  - Competition is intensified
  - Technical platform for new products
- Accumulation of human capital
- Open interfaces/ open standards
  - Use of existing networks
  - No supplier-specific lock-in
Challenges for OSS: Supply

- Is there a broad choice of software?
- Individual contributors
  - Motivation?
  - Preferences of work areas?
- Firms’ activities
  - Balance: Community — Business
  - Viability of business models

OSS by Topic on SourceForge.Net

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>18.9%</td>
</tr>
<tr>
<td>System</td>
<td>15.2%</td>
</tr>
<tr>
<td>Software Development</td>
<td>14.1%</td>
</tr>
<tr>
<td>Communications</td>
<td>11.5%</td>
</tr>
<tr>
<td>Games/Entertainment</td>
<td>10.8%</td>
</tr>
<tr>
<td>Multimedia</td>
<td>9.7%</td>
</tr>
<tr>
<td>Scientific/Engineering</td>
<td>7.9%</td>
</tr>
<tr>
<td>Database</td>
<td>4.7%</td>
</tr>
<tr>
<td>Office/Business</td>
<td>4.3%</td>
</tr>
<tr>
<td>Education</td>
<td>2.6%</td>
</tr>
<tr>
<td>Desktop Environment</td>
<td>2.8%</td>
</tr>
<tr>
<td>Text Editors</td>
<td>2.1%</td>
</tr>
<tr>
<td>Security</td>
<td>2.1%</td>
</tr>
<tr>
<td>Other/Nonlisted Topic</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

Source: http://sourceforge.net/softwaremap/trove_list.php (June 15, 2005)
Community vs. Business

„Software wants to be free.“
- Worldwide co-operation via Internet
- Free participation
- Motivation: fun, skills, technical challenges

However: increasing commercialization
- Rules of the Game?
- Governance Structures?

Open Source Business Strategies

- The Optimization/ Consulting Strategy
- The Subscription Strategy
- The Dual License Strategy
- The Patronage Strategy
- The Hosted Strategy
- The Embedded Strategy

Source: Koenig, http://management.itmanagersjournal.com/article.php?id=04/05/10/2052218
The Use of Open Source Software

- Open Source Software is regarded as a realistic option
- Application areas:
  - Server, Internet services, development, data bases
- Economic criteria:
  - Stability, security, costs

Challenges for OSS: Demand

- Low market penetration:
  - Missing applications, low end-user orientation, compatibility with established standards
- Scepticism on decentralized development:
  - Support, market fragmentation, binding roadmaps
- Lack of knowledge, uncertainty:
  - Legal implications of OS-licenses, reference implementations, user acceptance
Recommendations

- Increase market transparency: create awareness, disseminate information
- Public Sector: non-discriminatory use of Open Source Software
- Support interoperability, promote open standards
- Adapt the legal framework

The Public Sector as a Role Model for the Private Sector

- Public sector share of IT-market: 
  ~ 15 - 20%
- Large and homogeneous user bases
- Use of public funds (taxpayers' money):
  - Public decision-making processes
  - Extensive media coverage
  - Political Influence
Starting Points for a Fair Use of Proprietary and Open Source Software

- Find adequate functional requirements
- Define cost effectiveness properly
  - Continuous evaluation and development of cost criteria
  - Appropriate inclusion of soft factors
- Promote and use open standards

The Legal Framework

- Conformity with existing laws?
  - Copyright
  - Contract law

- Software Patents
  - EU-“Directive on the Patentability of Computer-Implemented Inventions”
Problems of Software Patents

- Monopolization of Ideas
- High transaction costs
- Specific disadvantages for Open Source Software
- Strategic use of patents
- Availability of alternative mechanisms of protection

Recommendations on Patents

- Strong and clearly defined requirements needed
- Increase efficiency of patent system
- Attenuate negative effects of patents
- Specific rules for software?
Conclusion

- Open Source Software increases (potential) competition.
- However:
  - Successful business models?
  - Awareness and information?
  - Fair competition?
  - Adequate laws?

Thank you!

Jens Mundhenke
Kiel Institute for World Economics
Düsternbrooker Weg 120
24105 Kiel, Germany

mundhenke@ifw-kiel.de