

Study on the
**Economic impact of open source software on
innovation and the competitiveness of the
Information and Communication Technologies
(ICT) sector in the EU**

Draft final report

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1. Executive summary: Key findings

The information economy is a large market. Including the provision of infrastructure and services for the creation, exchange and processing of information and communication services as well as the sales of information itself, this market is now in the range of 10% of GDP in most developed countries, and accounts for more than half of their economic growth. Software is one of the key elements driving ICT's role in the economy, and the structure, competitiveness, performance of the ICT industry has potential to be strongly affected by Free/Libre/Open Source Software (FLOSS¹). Financed by the European Commission's Directorate General for Enterprise and Industry, a study has been carried out by a team led by UNU-MERIT, the Netherlands, to identify the role of FLOSS in the economy, its direct impact on the ICT sector, its indirect impact on ICT-related sectors and to recommend policies based on forecasted scenarios.

This three-page executive summary highlights the key findings and recommendations, according to these four categories.

FLOSS role in the economy: market share and geography

- FLOSS applications are first, second or third-rung products in terms of market share in several markets, including web servers, server operating systems, desktop operating systems, web browsers, databases, e-mail and other ICT infrastructure systems. FLOSS market share is often higher in Europe than in the US, followed by Asia. These market shares have seen considerable growth in the past five years.
- FLOSS market penetration is also high – a large share of private and public organisations report some use of FLOSS in most application domains. In the public sector, Europe has particularly high penetration, perhaps soon to be overtaken by Asia and Latin America. In the private sector, FLOSS adoption is driven by medium and large firms.
- Almost two-thirds of FLOSS software is still written by individuals; firms contribute about 15% and other institutions another 20%.
- Europe is the leading region in terms of *globally collaborating* FLOSS software developers, and leads in terms of global project leaders, followed closely by North America (interestingly, more in the East Coast than the West). Asia and Latin America face disadvantages at least partly due to language barriers, but may have an increasing share of developers active in local communities.
- Weighted by regional PC penetration, central Europe and Scandinavia provide disproportionately high numbers of developers; weighted by average income, India is the leading provider of FLOSS developers by far, followed by China.
- While the US has the edge in terms of large FLOSS-related businesses, the greater individual contribution from Europe has led to an increasing number of globally successful European FLOSS SMEs.

1 In this report we refer to the single phenomenon known by the various terms "libre software", "free software" and "open source software" as Free/Libre/Open Source Software (or FLOSS). We note that the EU/FP5 FLOSS developer survey of over 2800 respondents showed that a majority of developers themselves identify with the term "free software", while Libre software (logiciel libre, software libre, software libero) is the favoured term in southern Europe and Latin America.

Direct economic impact of FLOSS

- The existing base of quality FLOSS applications with reasonable quality control and distribution would cost firms almost Euro 12 billion to reproduce internally.
- This existing base of FLOSS software represents a lower bound of about 131 000 real person-years of effort that has been devoted exclusively by programmers. As this is mostly by individuals not directly paid for development, it represents a significant gap in national accounts of productivity. Annualised and adjusted for growth this represents at least Euro 800 million in voluntary contribution from programmers alone each year, of which nearly half are based in Europe.
- Firms have invested an estimated Euro 1.2 billion in developing FLOSS software that is made freely available. Such firms represent in total at least 565 000 jobs and Euro 263 billion in annual revenue. Contributing firms are from several non-IT (but often ICT intensive) sectors, and tend to have much higher revenues than non-contributing firms.
- Defined broadly, FLOSS-related services could reach a 35% share of all IT services by 2010, and the FLOSS-related share of the economy could reach 5% of European GDP by 2000. FLOSS directly supports the 29% share of software that is developed in-house in the EU (43% in the US), and provides the natural model for software development for the secondary software sector.
- By providing a skills development environment valued by employers and retaining a greater share of value addition locally, FLOSS can encourage the creation of SMEs and jobs. Given Europe's historically lower ability to create new software businesses compared to the US, due to restricted venture capital and risk tolerance, the high share of European FLOSS developers provides a unique opportunity to create new software businesses and reach towards the Lisbon goals of making Europe the most competitive knowledge economy by 2010.

Indirect economic impact: FLOSS, innovation and growth

- Limited competition reduces innovation and FLOSS provides a boost to competition in the ICT economy through an emphasis on open standards and interoperability.
- FLOSS potentially saves industry over 36% in software R&D investment that can result in increased profits or be more usefully spent in further innovation.
- ICT infrastructure has a 10% share of the European economy, providing a basis for a further 2.5% share of the information content industry. However, a large and increasing share of user-generated content is not accounted for and needs to be addressed by policy makers; FLOSS increases the value of the ICT infrastructure, supporting this wider information ecosystem.
- Increased FLOSS use may provide a way for Europe to compensate for a low GDP share of ICT investment relative to the US. A growth and innovation simulation model shows that increasing the FLOSS share of software investment from 20% to 40% would lead to a 0.1% increase in annual EU GDP growth excluding benefits within the ICT industry itself – i.e. over Euro 10 billion annually.

Trends, scenarios and policy strategies

- Equitably valuing the use of FLOSS, the "true" share of software investment rises from 2% to 2.4% of GDP in the US by 2010, and from 1.2% to 1.7% of GDP in Europe. Doubling the rate of FLOSS take-up in Europe would result in a software share of investment at 2% of GDP,

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reducing but not closing this investment gap with the US.

- The notional value of Europe's investment in FLOSS software today is Euro 21.8 billion
- Europe's strengths regarding FLOSS are its strong community of active developers, small firms and secondary software industry; weaknesses include Europe's generally low level of ICT investment and low rate of FLOSS adoption by large industry compared to the US
- FLOSS provides opportunities in Europe for new businesses, a greater role in the wider information society and a business model that suits European SMEs; FLOSS in Europe is threatened by increasing moves in some policy circles to support regulation entrenching previous business models for creative industries at the cost of allowing for new businesses and new business models.
- Europe faces three scenarios: CLOSED, where existing business models are entrenched through legal and technical regulation, favouring a passive consumer model over new businesses supporting active participation in an information society of "prosumers"; GENERIC, where current mixed policies lead to a gradual growth of FLOSS while many of the opportunities it presents are missed; VOLUNTARY, where policies and the market develop to recognise and utilise the potential of FLOSS and similar collaborative models of creativity to harness the full power of active citizens in the information society.
- Policy recommendations, based on detailed policy strategies described:
 - Avoid penalising FLOSS in innovation and R&D incentives, public R&D funding and public software procurement that is currently often anti-competitive
 - Support FLOSS in pre-competitive research and standardisation
 - Avoid lifelong vendor lock-in in educational systems by teaching students skills, not specific applications; encourage participation in FLOSS-like communities
 - Encourage partnerships between large firms, SMEs and the FLOSS community
 - Provide equitable tax treatment for FLOSS creators: FLOSS software contributions can be treated as charitable donations for tax purposes. Where this is already possible, spread awareness among firms, contributors and authorities.