

The Economics of Free Software

CARNET Users Conference

Zagreb, September 27, 2004

Rishab Aiyer Ghosh

rishab@dxm.org

MERIT/Infonomics, University of Maastricht

Research from the CALIBRE project, supported by the EU's 6th Framework IST Programme – www.calibre.ie

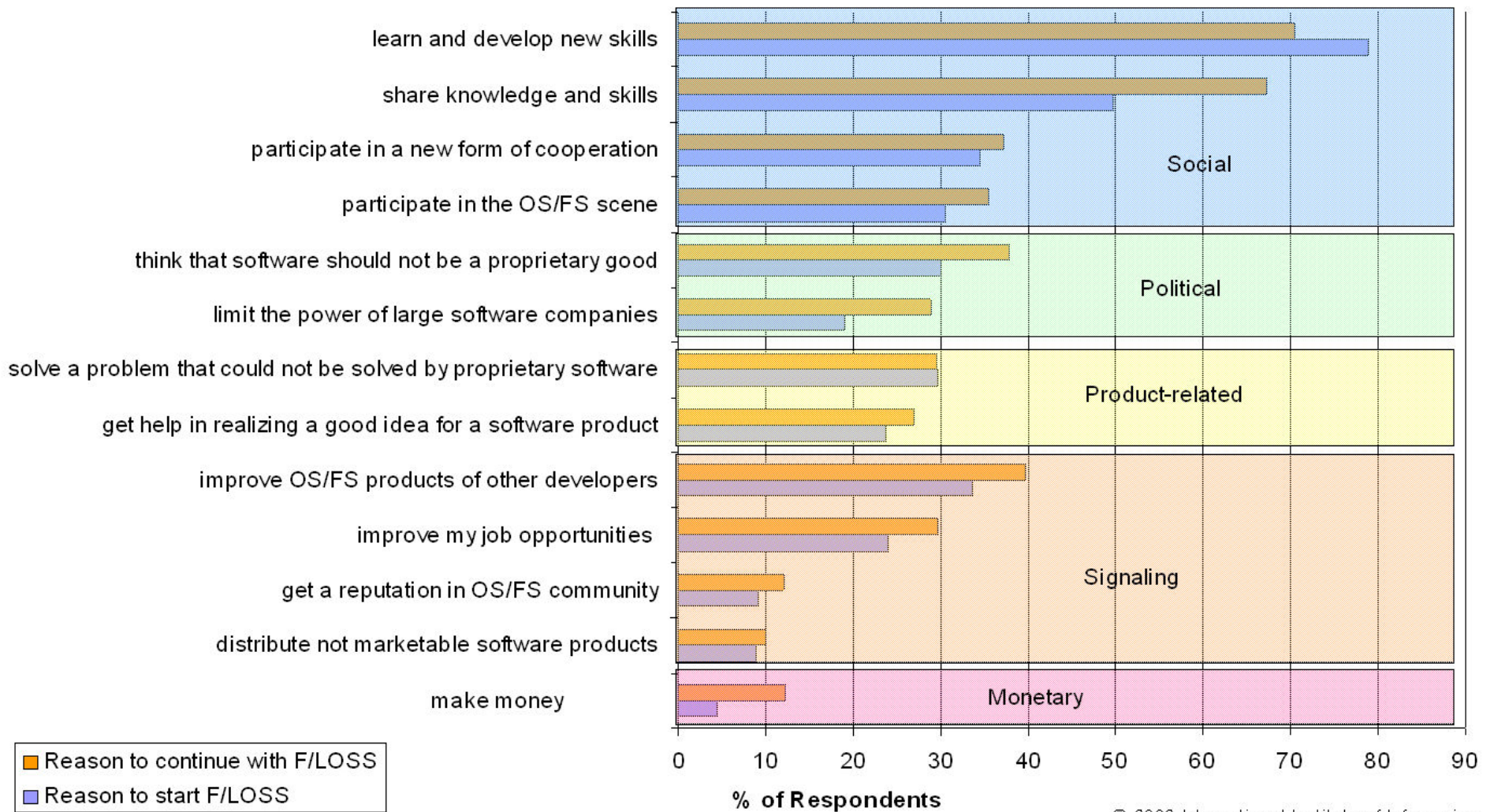
The FLOSS survey

- **FLOSS project: Free/Libre/Open Source Software Study, supported by the European Commission**
- **Largest, most comprehensive survey of developers worldwide (2002-2004)**
 - ~2800 responses to original EU-funded survey
 - ~1500 responses to FLOSS-US survey (Stanford/SIEPR)
 - ~650 responses to FLOSS-JP/FLOSS-Asia (Mitsubishi Research)

Software as society

- **What FLOSS developers expect of each other:**
 - “share their knowledge”: 78%
 - “respect my contribution”: 32%
 - “write beautiful and aesthetic programs”: 24%
- **Why they participate in the FLOSS community:**
 - “learn new skills”: 70%
 - “share their knowledge and skills with others”: 67%
 - “improve the products of others”: 40%
 - “improve job opportunities”: 30%
 - “make money”: 12%

What motivates FLOSS developers?



Software in society

“Access [to ICTs] is not enough, it is the ability to create, to add value, that is important”

Felipe Gonzalez
former Spanish Prime Minister,
Speaking at Open Source conference in Málaga, Spain, 18/2/04

Why Free/Libre/Open (FLOSS)?

- **Cost – *Total Cost of Ownership!***
The broad, socio-economic change long promised by ICTs would be limited to a tiny elite without FLOSS
- **Performance, flexibility, localisation**
Many FLOSS applications provide superior performance & security; adaptation is permitted, e.g. for local languages
- **Skills development**
FLOSS is a training environment that increases the earning capacity of community participants without any explicit investment in training: a novel form of technology transfer?

Why Free/Libre/Open (FLOSS)?

- **Cost – *Total Cost of Ownership!***
The broad, socio-economic change long promised by ICTs would be limited to a tiny elite without FLOSS
- **Performance, flexibility, localisation**
Many FLOSS applications provide superior performance & security; adaptation is permitted, e.g. for local languages
- **Skills development**
FLOSS is a training environment that increases the earning capacity of community participants without any explicit investment in training: a novel form of technology transfer?

The TCO bogeyman?

Software Total Cost of Ownership:

- Licence fees
- Associated hardware costs
- Associated software costs
- Maintenance
- Integration
- Support
- Training

The TCO bogeyman?

Software Total Cost of Ownership:

15-40%
60-85%

- Licence fees
- Associated hardware costs
- Associated software costs
- **Maintenance**
- **Integration**
- **Support**
- **Training**

The TCO bogeyman?

Software Total Cost of Ownership:

15-40%
60-85%

- Licence fees: 5-10% (proprietary)
- Associated hardware costs
- Associated software costs
- **Maintenance**
- **Integration**
- **Support**
- **Training**

The TCO bogeyman?

Software Total Cost of Ownership:

**Labour
costs**

60-85%

15-40%

- Licence fees: 5-10% (proprietary)
- Associated hardware costs
- Associated software costs
- **Maintenance**
- **Integration**
- **Support**
- **Training**

The TCO bogeyman!

Software Total Cost of Ownership:

- The share of licence fees in TCO is small...
...when the share of labour costs is high (as in the countries or social domains where TCO studies are normally conducted)

The TCO bogeyman!

Software Total Cost of Ownership:

- The share of licence fees in TCO is small...
...when the share of labour costs is high (as in the countries or social domains where TCO studies are normally conducted)
- If labour costs (average incomes) are low, their share in TCO is lower, with the result that **the share of licence fees is considerably higher**

Licence costs seem low...*

Licensing Cost of Windows XP + Office (USA):
\$560**

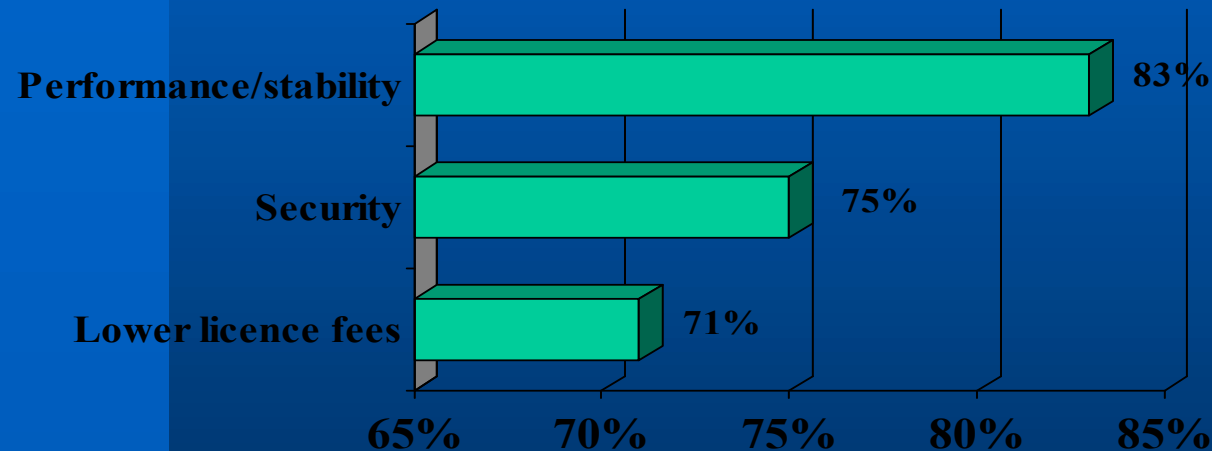
***Standard Edition, price from Amazon.com,*

**The view from the rich world!*

...and not the #1 reason for FLOSS

(even in rich countries: UK, Germany, Sweden)

Benefits from using F/OSS



Source: FLOSS survey of user organisations, FLOSS final report, www.flossproject.org/report/

But in Croatia...

Licensing Cost of Windows XP + Office* in the US:
\$560

In Croatia:

GDP/capita (average annual income) \$4625

Effective cost of Windows XP + Office (per capita)

1.5 months' GDP

(I.e. the cost of a single copy is 1.5 months of average income)

*Standard Edition

...Cost really DOES matter

Licensing Cost of Windows XP + Office in the US

\$560

Croatia: GDP/capita \$4625

Effective cost of Windows XP + Office (per capita)

1.5 months' GDP

Comparing with US GDP/capita: \$35 277 p.a...

**Effective cost in \$ equivalent for a *single copy* of
Windows XP + Office in Croatia: \$4 272**

...Cost really DOES matter

Country	GDP/cap	PCs ('000s)	Piracy	WinXP Cost*	cost in GDP months
Croatia	4625	376	67%	4272	1.5
Albania	1300	24	0%	15196	5.2
Romania	1728	801	75%	11433	3.9
European Union	19926	87764	n.a.	991	0.3
Ukraine	766	898	86%	25802	8.8
China	911	24222	92%	21678	7.4
United States	35277	178326	25%	560	0.2
Nigeria	319	889	71%	62014	21.1

GDP/capita in US\$, WinXP cost in \$ equivalent; * Asia (incl Japan, Korea); LatAm incl Mexico, Caribbean

**Windows + Office XP effective \$ cost calculation = \$560 * (US GDP per capita / GDP per capita)

Source: World Bank World Development Indicators Database, (2001 data); Business Software Alliance

Why Free/Libre/Open (FLOSS)?

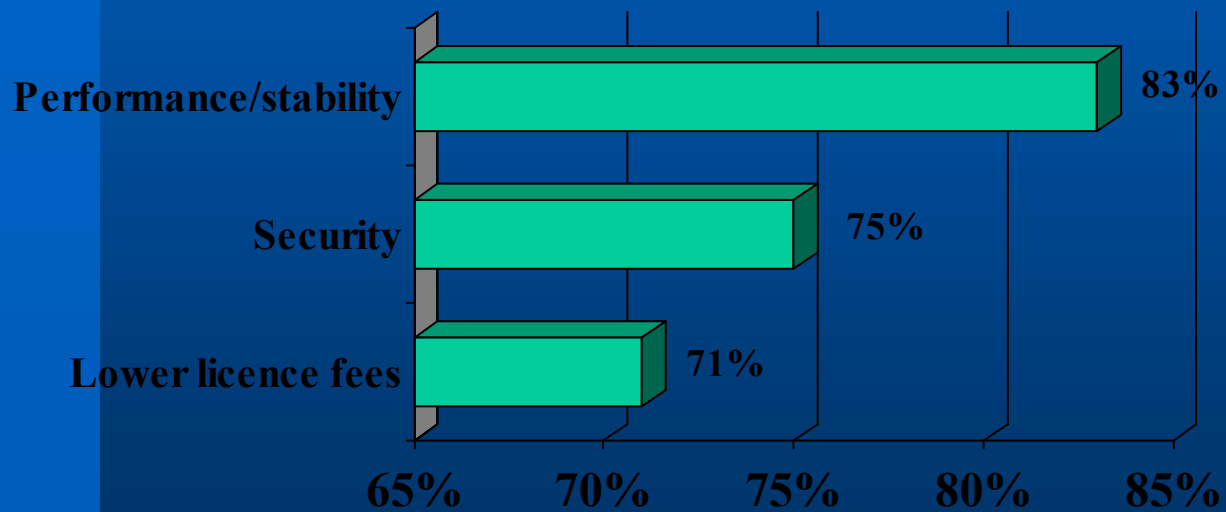
- **Cost – *Total Cost of Ownership!***
The broad, socio-economic change long promised by ICTs would be limited to a tiny elite without FLOSS. Although other barriers exist (hardware, bandwidth) software licence fees are yet another additional barrier, but can be avoided.
- **Performance, flexibility, localisation**
Many FLOSS applications provide superior performance & security; adaptation is permitted, e.g. for local languages
- **Skills development**
FLOSS is a training environment that increases the earning capacity of community participants without any explicit investment in training: a novel form of technology transfer?

Why Free/Libre/Open (FLOSS)?

- **Cost – *Total Cost of Ownership!***
The broad, socio-economic change long promised by ICTs would be limited to a tiny elite without FLOSS
- **Performance, flexibility, localisation**
Many FLOSS applications provide superior performance & security; adaptation is permitted, e.g. for local languages
- **Skills development**
FLOSS is a training environment that increases the earning capacity of community participants without any explicit investment in training: a novel form of technology transfer?

FLOSS can mean better security...

Benefits from using F/OSS



Source: FLOSS survey of EU user organisations

FLOSS helps localisation

- Proprietary vendors are motivated by global profit-maximisation strategies
- They often don't care about local issues and user needs – unless they matter in “a global context”!
- Many FLOSS developers may have absolutely no interest in software usability for Xhosa speakers
- But FLOSS developers allow and encourage those *with* locally relevant motives to adapt their software
- This allows projects such as translate.org.za, LinEx, adapting software to local needs, culture

Why Free/Libre/Open (FLOSS)?

- **Cost – *Total Cost of Ownership!***
The broad, socio-economic change long promised by ICTs would be limited to a tiny elite without FLOSS
- **Performance, flexibility, localisation**
Many FLOSS applications provide superior performance & security; adaptation is permitted, e.g. for local languages
- **Skills development**
FLOSS is a training environment that increases the earning capacity of community participants without any explicit investment in training: a novel form of technology transfer?

FLOSS develops local skills

FLOSS is a training environment that enables the ability to create and actively participate rather than passively use ICT.

FLOSS increases the earning capacity of community participants without any explicit investment in training: a novel form of technology transfer.

FLOSS develops local skills

- Not skills *to use* FLOSS applications, but skills *learned from* participating in the FLOSS community
- Skills learnt through participating in the FLOSS community:
 - programming
 - copyright law and licenses
 - teamwork and team management

FLOSS develops local skills

- FLOSS encourages not only passive “use” but active participation in the creative process
- FLOSS provides a very low barrier to entry for creativity – you don’t *have* to be creative but if you want to, you *easily can*

Learning skills – then sharing!

- **78%** of developers *join* the FLOSS community “**to learn and develop new skills**” (70% *continue* for this reason)
- **67%** of developers *continue* their participation in the FLOSS community “**to share ... knowledge and skills**”

Source: Free/Libre/Open Source Software (FLOSS) Study of Developers

These skills have economic value

- **30%** of developers participate in the FLOSS community **“to improve ... job opportunities”**
- **Over 30%** of developers **derive income directly** through their FLOSS work
- **A further 20%** **derive indirect income** as a result of their FLOSS work
- **18%** **got job because of FLOSS experience**

Source: Free/Libre/Open Source Software (FLOSS) Study of Developers

Employers appreciate this...

- **36%** of organisations “totally” or “somewhat” agree that employees can work on FLOSS projects on employer time
- These are not software companies! **16% of low IT-intensity companies** (retail, automobiles, tourism, construction) “totally agree” with this

Source: Free/Libre/Open Source Software (FLOSS) Study of Users

...but don't pay for it.

- **FLOSS communities are like informal apprenticeships – but apprentice/students and master/teachers contribute their own time for free**
- **Nothing in life is free; but this is a social cost borne voluntarily by the participants themselves and not paid for directly by those who benefit (employers, society at large)**

“To each according to need...”

- Everyone can benefit equally from this training, though not everyone invests equally in it – many “teachers” may have been formally trained at university or at work (which is explicitly paid for)
- In the larger perspective, this training system represents a subsidy – or technology transfer – from those who pay for formal training to those who don’t (or can’t)

“To each according to need...”

- **Within countries, this represents a technology transfer from big companies to SMEs, who can less afford formal training**
- **Globally, this represents a technology transfer from economies who can afford formal training, to those who cannot**

“To each according to need...”

- **Sectoral benefits: poor countries may have formal computer training during computer science degree courses, but perhaps not in other subjects (biology)**
- **FLOSS usage provides students of other subjects to *informally* learn computer skills, programming skills and enhance their competence in their formal training**

But do we all want to program?

- How will we know, unless we can try?
- HTML is a programming language – the web only took off because it was open, so people could learn to write their own sites just by copying and changing other sites
- “Programming” covers a very broad range of skills from HTML to C; FLOSS allows entry at any degree with little investment in time or effort

But do we all want to program?

- In a proprietary environment, you have to decide to be a programmer, then buy development software, then spend lots of time and effort – all of which is a risk and entry barrier
- With FLOSS, you can *tinker*. You don't need to buy tools. You can use them to the extent you choose.

But do we all want to program?

- Learning skills in FLOSS, you risk losing only your time and effort
- However, since the barrier to entry is low (HTML!) you can control the degree of your investment – paddle at the shallow end or dive in deeper.
- In proprietary environments, the dividing line between user and developer is much sharper – the pool has only a deep end, you have to dive in or stay out altogether.

Building *local* ICT competencies

- Be passive users of “black-box” software or active participants in global ICT?
- Being active requires being able to create, locally – and choose with the least barriers the level of creativity
- Skills development requires access to the ability to create – you don’t have to be a programmer, but you *should* have the choice.
- Relative local value addition is much higher with free software, as compared to proprietary (where the vendor controls and provides the most value)

Extremadura: Free software society

- Poorest region in Spain, one of the poorest in Europe
- Agricultural and remote with limited transport infrastructure
- 1999: EU telecoms liberalisation threatened a digital divide

Extremadura: Free software society

- Decided to “leapfrog” into the information society
- Strong political support at the highest level of government
- Principle of universal access and universal active participation

Extremadura: Free software society

“We could use proprietary software to provide access to all government officials, even all doctors and lawyers, but to provide access to all *citizens* – to *everyone* – we had to use free software”

Extremadura: Free software society

- Public Internet access points in every village, 2mb connectivity
- Public libraries in every village
- A computer for every 2 students in every school
- Free “digital literacy” training for pensioners, unemployed, housewives

“Economically possible only with FLOSS”

Extremadura: Free software society

- **Government-supported gnuLinEx project: Linux distribution adapted to local language *and* culture**
- **Universally adopted by entire public sector**
- **Over 70 000 desktops (running now)**
- **Promoted for private sector too**

Extremadura: Free software society

- 78000 people trained in “digital literacy” programme – Linux is obviously not hard to learn!
- Training is participatory – creation of multimedia “local knowledge” archives, regional Internet radio...
- School students using gnuLinEx
- Teachers trained to use gnuLinEx

Extremadura: Free software society

- **Business incubator provides business plan assistance**
- **Encourages new local startups to provide services and support**
- **Locally developed (private-sector) applications include FactorLinEx, free software invoice/billing system**

Extremadura: Free software society

- From a backward, poor region to a leader in many key indicators of ICT access – in **FOUR YEARS**
- Won the European Regional Innovation Award (April 2004)
- Agreements to share model with Andalusia, Brazil, El Salvador...

Free software's social potential

“Access [to ICTs] is not enough, it is the ability to create, to add value, that is important”

Free software can make practical:

- Access – *for everyone*
- Participation – *active, by everyone*

FLOSS lets developing countries:

- *Rapidly* deploy information technology
- *Affordably* deploy information technology
- *Universally* deploy information technology
- Develop a *local* ICT software and services skills base and foster a *local* ICT software and services economy
- Develop an ICT infrastructure while respecting IPR, limiting “software piracy”

More information...

The FLOSS project pages & final report

<http://flossproject.org>

Licence fees & GDP/capita paper:

http://firstmonday.org/issues/issue8_12/ghosh/

European Union Open Source Observatory

<http://europa.eu.int/ISPO/ida/oso/>

CALIBRE project

www.calibre.ie