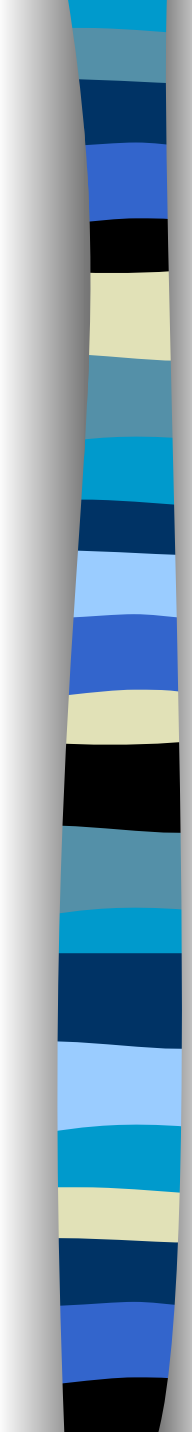


ELISS

European Libre Software Survey



An analysis of Open Source
production in Italy



Andrea Bonaccorsi (bonaccorsi@sssup.it)

Cristina Rossi (cristina.rossi@iit.cnr.it)

Alessandro Scateni

Scuola Superiore Sant'Anna, Pisa

Copyright (C) 2003 Scuola Superiore Sant'Anna

Piazza Martiri della Libertà 33, 56127 Pisa

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.1 or any later version published by the Free Software Foundation; with no Invariant Sections, with no Front-Cover Texts, with no Back-Cover Texts.



The ELISS research: Key findings

- In Italy there is a large sector of production of Open Source software (OSS). This sector is composed mainly by firms that are born in the last three years just for the exploitation of this new paradigm of production
- Open Source software sector is formed mainly by small enterprises
- The sector is experiencing a sustained rate of growth of +121% in the last three years, +90% if we take into account only the turnover generated by OSS. Also taking into account the starting point, this growth looks impressive
- Firms have favourable expectations: they forecast that in 2005 more than 50% of the server market and about 25% of the client market will be dominated by OSS solutions

The ELISS research: Key findings^(cont)

- Firms' customers are not prejudicially hostile to Open Source solutions. 37.2% of them are favourable while 46.7% are indifferent
- The main obstacles to the diffusion of Open Source are the lack of support and the incompatibility with proprietary solutions
- Around 50% of firms supply both proprietary and Open Source solutions. This highlights the leading role played by hybrid business models
- Only 14% adopt a *pure* Open Source business model and supply only OSS solutions
- 21% of firms use only copyleft licenses while 59,4% of them rely both on copyleft and non copyleft distribution schemes

The ELISS research: Key findings^(cont)

- The main incentive that lay at the basis of the firms' decision to supply Open Source solutions is that the new paradigm allows small firms to afford innovation.
- In general the firms that entered the market after 1999 have been adopting an Open Source business model since their foundation.
- Firms do not contribute very much to Open Source projects. In the last years they joined on average 1,2 projects. Taking into account their cumulated activity they have been participating on average to 2,8 projects.
- Two different business models emerge. On one side there are firms that work only with Open Source software and use copyleft licenses. On the other side there are firms that adopt a hybrid business model with respect both to products and licenses.



The ELISS research: Methodology

- The ELISS research has been coordinated by Andrea Bonaccorsi, professor of Economics and Management at Sant'Anna School of Advanced Studies and by Cristina Rossi, Ph.D student. A Free Software company, Icube, actively took part in the study.
- Alessandro Scateni, research assistant, built up the database together with Icube.
- We gratefully acknowledge Icube, Guido Scorza (University of Rome and Bologna), Francesco D'Orazio e Francesco Zuliani (Nergal), and Francesco Ciriaci for their invaluable advices about the questionnaire structure.

The ELISS research: Methodology^(cont)

- The sample is composed by 146 firms
- The firms were selected according to a snowball procedure. We approached a initial short list of firms and asked their collaboration in referring to other firms active in Open Source. We stopped when no new referral was originated
- In this way we succeeded in contacting 275 firms that represent a reasonable cross-section of the Italian firms operating in the supply-side of the Open Source market
- A first call took place from October to December 2002 and was carried out by e-mail using a questionnaire on line. A second call was carried out through phone interviews from January to March 2003
- The database was built on April 2003; we analysed the data for this report on July 2003

The ELISS research: Methodology^(cont)

- We have to underline that there is no national directory of the ICT firms in general and of the software companies that do business with the Open Source in particular
- As a consequence no sample selection procedure would have allowed to obtain a statistically representative sample
- This study gives up-to-date information on a new and fast growing phenomenon
- For the first time an European research does not focus on individuals that write Open Source code but addresses the firms that adopt business models based on Open Source products and services

The ELISS research: Methodology^(cont)

Using the data gathered by the survey, Andrea Bonaccorsi and Cristina Rossi have written some academic papers

- *Contributing to common pool resources. Comparing firms and individuals in the production of Open Source software*
- *Altruistic individuals, selfish firms? The structure of motivation in Open Source software*
- *Licensing schemes in the production and distribution of Open Source software. An empirical investigation*
- *Heterogeneity in business models in Open Source software*

If you are interested, please contact the authors

The ELISS sample: Descriptive statistics

<i>Variable</i>	<i>Symbol</i>	<i>Unit of Measurement</i>	<i>Min.</i>	<i>Max.</i>	<i>Mean</i>	<i>St. Dev.</i>
<i>Year of foundation</i>	YF	Unit	1957	2003	1996	6.4
<i>Promoting partners at date of foundation</i>	PP	Unit	1	90	3.7	7.5
<i>Promoting partners still working in the company</i>	PPW	Unit	0	63	2.9	5.4
<i>Year of Open Source adoption</i>	YOSSA	Unit	1986	2003	1999	2.6
<i>Year of Open Source first offering</i>	YOSSO	Unit	1986	2003	1999	2.6
<i>Staff</i>	E	Unit	1	320	17.3	36.6
<i>Female staff</i>	FP	%	0	100	21.5	20.5
<i>Graduate staff</i>	DG	Unit	0	73	6.7	12.0
<i>Ph. D. staff</i>	PHD	Unit	0	8	0.4	1.0
<i>Average age of partners</i>	AAP	Unit	22	58	36.1	7.5
<i>Average age of employees</i>	AAE	Unit	20	43	29.8	4.1
<i>Average age of freelances</i>	AAF	Unit	20	58	30.2	5.9
<i>Open Source turnover in 1998</i>	OSST98	%	0	100	35.7	36.5
<i>Open Source turnover in 2001¹</i>	OSST01	%	0	100	46.5	37.0
<i>Change in turnover (in the last 3 years)</i>	TC	%	-25	600	121.3	155.1
<i>Change in Open Source turnover (in the last 3 years)</i>	OSSTC	%	-10	700	91.4	138.5
<i>Customers</i>	NC	Unit	1	2,500	123.5	376.6

In general the firms of the ELISS sample

- Were born after 1999.

- Have adopted OSS only recently

- Are small

- No. of promoting partners

- Turnover

- Staff

- Customers

- Their turnover grows very fast.

- Their OSS turnover grows very fast.

The ELISS sample: Descriptive statistics (cont)

<i>Variable</i>	<i>Acronym</i>	<i>Values</i>	<i>%</i>
<i>Legal status</i> <i>N = 146</i>	<i>LS</i>	Independent	84.9
		Part of a group of companies	15.1
		Total	100.0
<i>Year of foundation</i> <i>N = 146</i>	<i>AGE</i>	Untill 1999	59.6
		After 1999	40.4
		Total	100.0
<i>Open Source adoption</i> <i>N = 141</i>	<i>ADOPTION</i>	Since the foundation	64.5
		After the foundation	35.5
		Total	100.0
<i>Promoting partners: competences</i> <i>N = 146</i>	<i>PPC</i>	Mixed	65.1
		Technical	28.8
		Economic	4.8
		Other	1.4
		Total	100.0
<i>Promoting partners: technical vs. non technical competences</i> <i>N = 141</i>	<i>PPTNT</i>	Non technical	70.2
		Technical	29.8
		Total	100.0
<i>Risk profile</i> <i>N = 141</i>	<i>RISK</i>	Ex-employees	35.5
		Entrepreneurs and profesionels	51.1
		Start up	13.5
		Total	100.0
<i>Origin: sector</i> <i>N = 141</i>	<i>OSEX</i>	Same sector	78.0
		Different sector	22.0
		Total	100.0
<i>Origin of the organisation</i> <i>N = 141</i>	<i>OORG</i>	Non-firm	51.8
		Firm	48.2
		Total	100.0
<i>Origin of the activity with the OSS</i> <i>N = 142</i>	<i>OAOSS</i>	Conversion from proprietary software	40.1
		Firms born to work with the Free Software	29.6
		Spin off of a University	9.9
		Spin off of another firm	7.0
		Other	13.4
		Total	100.0

In general the firms of the ELISS sample

- Do not belong to groups of companies
- Their promoting partners have both economic and technical skills

The ELISS sample: Descriptive statistics^(cont)

In general the firms of the ELISS sample

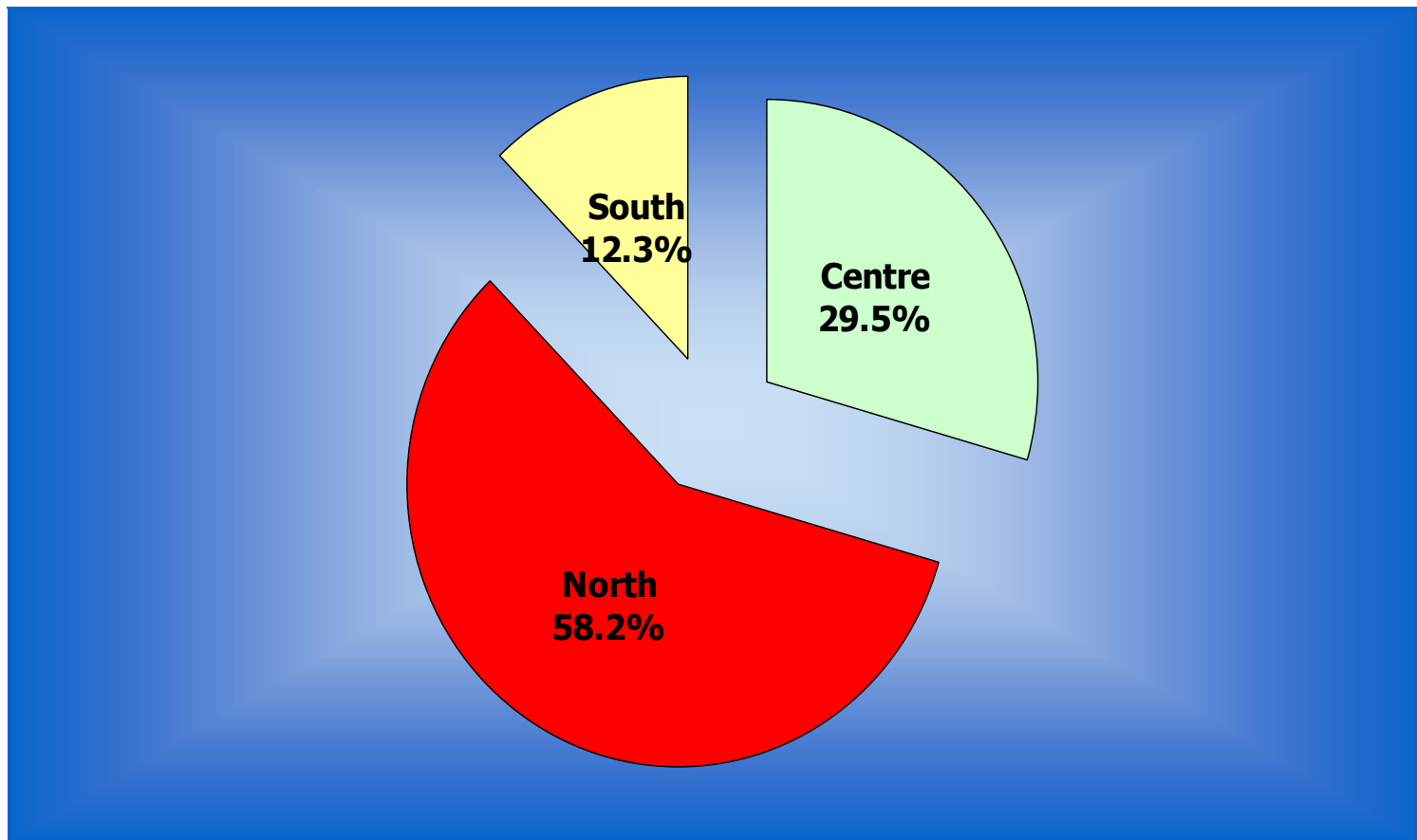
- Were established by entrepreneurs or professionals
 - Nevertheless several promoting partners are ex-employees.
- Come from the software sector both in all cases in which:
 - They were established by entrepreneurs and professionals and when:
 - They are spin-off.
- Worked with proprietary software and afterwards switched to Open Source (40,1%)
 - Nevertheless firms that were born just to work with the OSS are 30% of the sample. 17% of the firms learned to work with OSS in the Universities or during previous entrepreneurial experience.
- There are few spin offs of Universities and Research Centres
 - This is in countertendency with respect to the emphasis on the *hacker culture*

The ELISS sample: Location

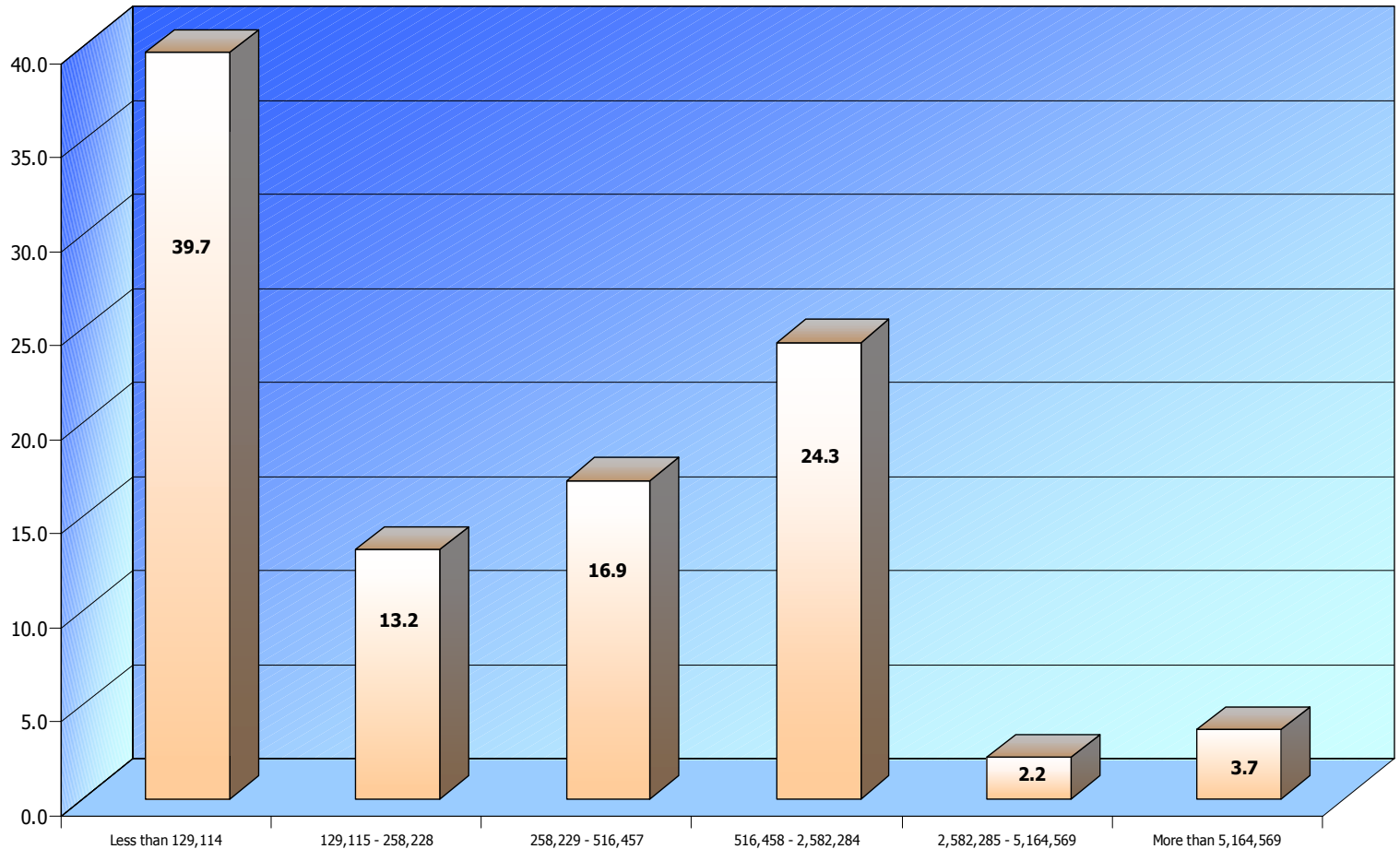


- Most of the firms of the ELISS sample have localized in the North
 - North: 58.2%
 - Centre: 29.4%
 - South: 12.3%

The ELISS sample: Location^(cont)



The ELISS sample: Turnover classes (in €)



In general the firms of the ELISS sample

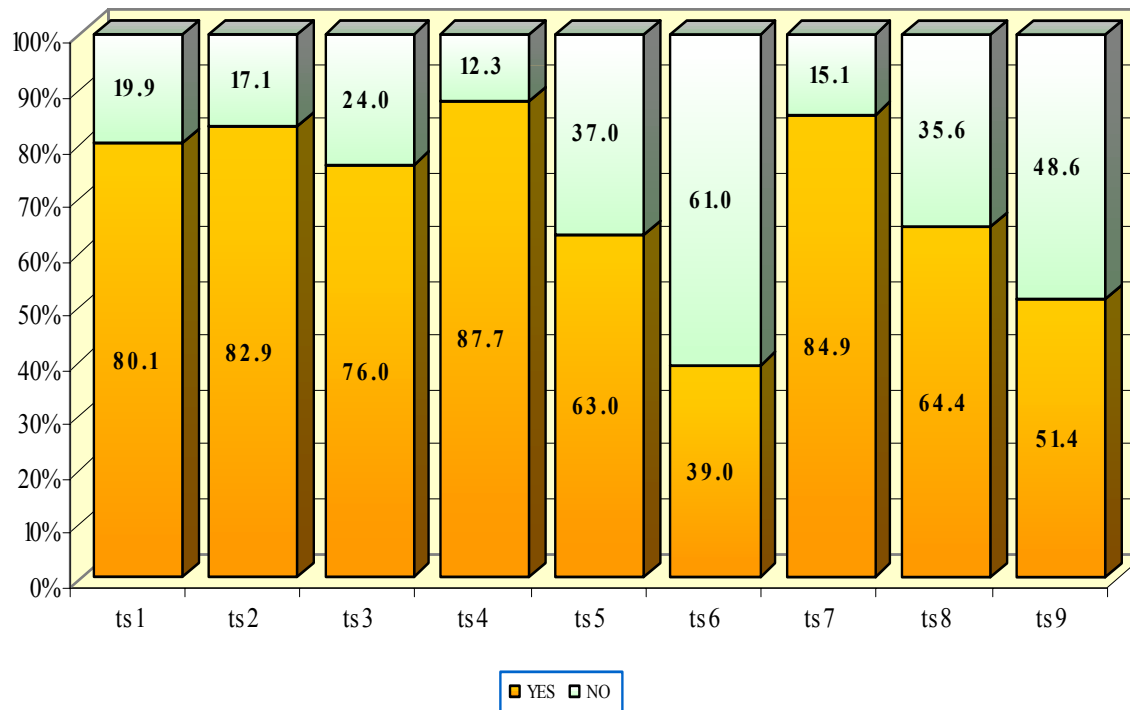
- Belong to the three lowest turnover classes (69.9%)

The ELISS sample: Services supplied by the firms

Multiple-choice question.

In general the firms of the ELISS sample

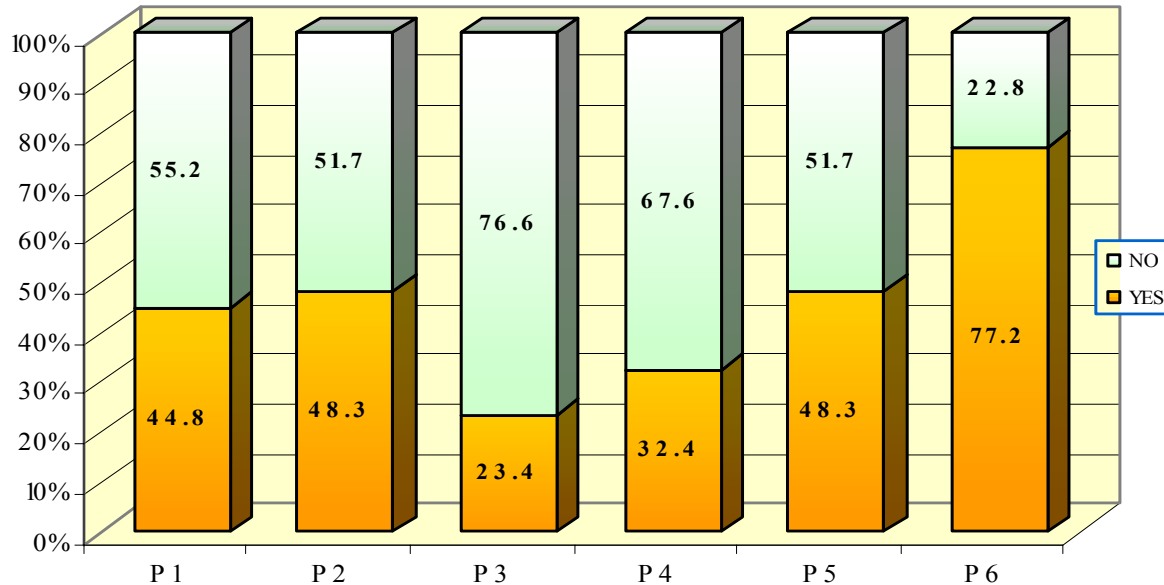
- Supply the services that the economic literature numbers among the ones that the Open Source firms typically supply



LEGEND	
ts1	Installation
ts2	Support
ts3	Maintenance
ts4	Development of ad hoc solutions
ts5	Distribution
ts6	Marketing of software produced by other companies
ts7	Consulting
ts8	Training
ts9	R&D

The ELISS sample: Products supplied by firms

Multiple-choice question.



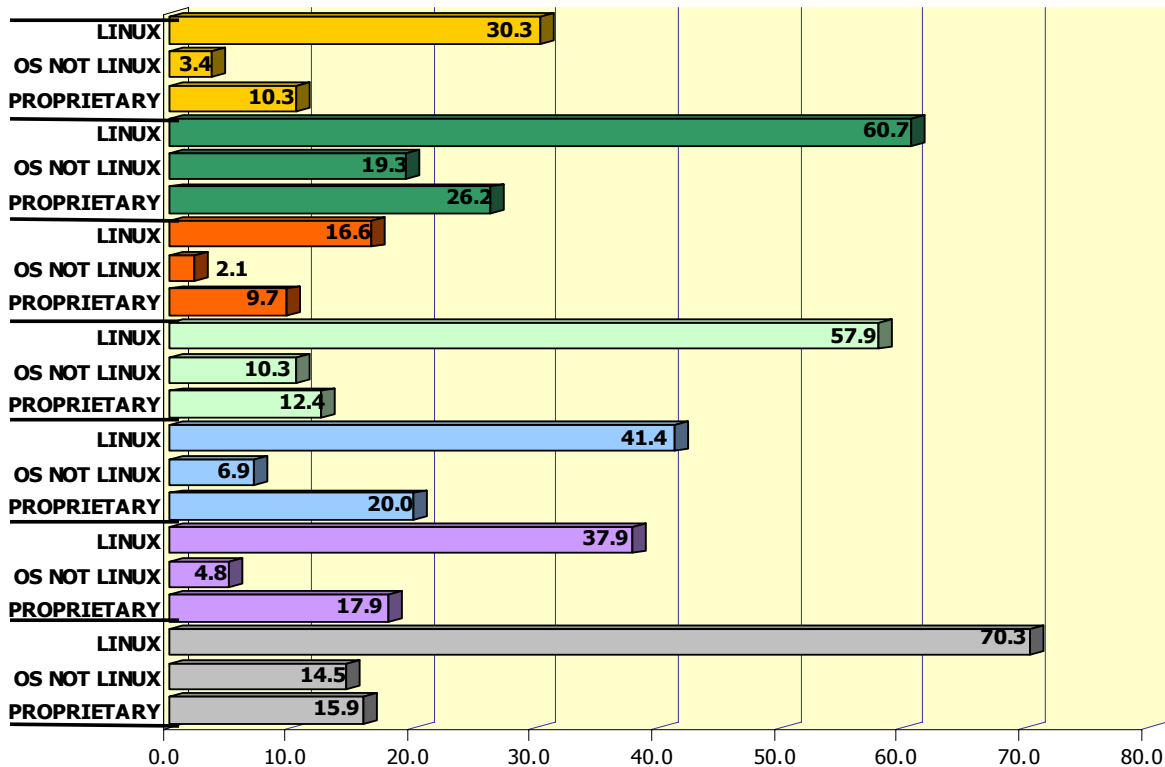
LEGEND	
P1	E-commerce solutions
P2	Management applications
P3	Software for office automation
P4	Multimedia
P5	Content Management System
P6	Web sites, portals, hosting

In general the firms of the ELISS sample diversify their offering

- They supply Internet based products. In particular firms
 - Build up Web site and portals
 - Supply hosting services
- This witnesses the Open Source success in this segment of the software market

The ELISS sample: Products supplied by firms(cont)

Multiple-choice question.



LEGEND	
■	CLUSTERING
■	DATABASE
■	DRIVER
■	FIREWALL
■	GENERAL PURPOSE SERVER
■	ROUTER
■	WEB SERVER

In general the firms of the ELISS sample

- Supply Linux based products (in particular Web servers)
- This witnesses
 - The success of Linux in the OSS market
 - The success of the pair Linux – Apache in the server market

The customers: OSS Advantages

Multiple choice—open ended question.

<i>Advantages (as indicated by the customers)</i>	<i>%</i>
<i>Total Cost of Ownership - TCO</i>	51.7%
<i>Personalization</i>	30.7%
<i>Reliability</i>	28.1%
<i>Independence from suppliers</i>	20.2%
<i>No license fees</i>	13.2%
<i>Stability</i>	12.3%
<i>Security</i>	11.4%
<i>Source code availability</i>	11.4%
<i>Support</i>	5.2%
<i>Quality</i>	4.4%
<i>Updating</i>	3.5%
<i>Competences</i>	3.5%
<i>Debugging</i>	3.5%
<i>Quality/Price</i>	3.5%
<i>Technological control</i>	2.6%
<i>Computational power</i>	2.6%
<i>None</i>	2.6%
<i>Other advantages</i>	30.7%

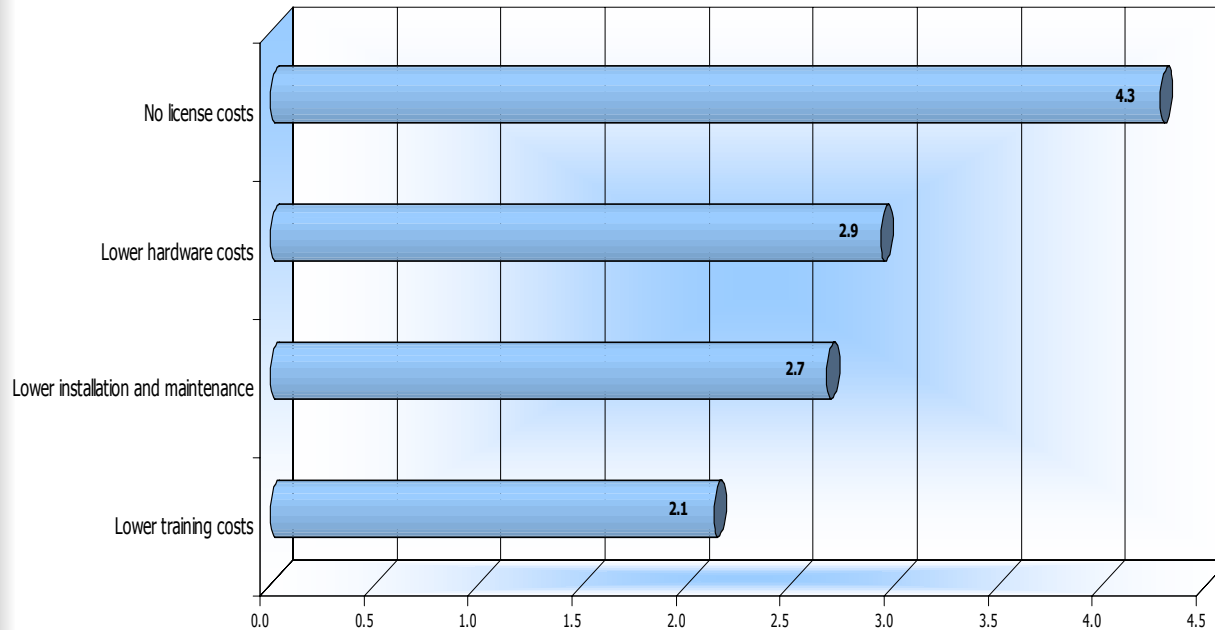
In general the firms of the ELISS sample

- Number
 - TCO
 - Personalization
 - Reliability

Among the main advantages that their customers ascribe to the OSS

- This get into line with the findings of other surveys.
- The absence of license costs ranks 5th

The customers: OSS Advantages (cont)



Close-ended question.
Likert scale
1 = I totally disagree
5 = I totally agree

In general the customers of the firms

- Think that having no license costs is the main advantage of the Open Source software

The customers: OSS Disadvantages

Multiple choice–open ended question.

<i>Disadvantages (as indicated by the customers)</i>	<i>%</i>
<i>Support</i>	30.9%
<i>Compatibility</i>	16.8%
<i>Difficulty of use</i>	15.9%
<i>Lack of knowledge</i>	10.3%
<i>Lack of a strong trademark</i>	10.3%
<i>Lack of legal protection</i>	6.5%
<i>Difficulty in finding experts</i>	6.5%
<i>No disadvantages</i>	6.5%
<i>Training</i>	6.5%
<i>Total cost of ownership</i>	5.6%
<i>Limited diffusion</i>	5.6%
<i>Forking</i>	4.7%
<i>Difficulty in following the OSS market tendency</i>	3.7%
<i>Reliability</i>	2.8%
<i>Technological control</i>	2.8%
<i>Documentation</i>	2.8%
<i>Maintenance</i>	2.8%
<i>Other disadvantages</i>	36.4%

In general the firms of the ELISS sample number

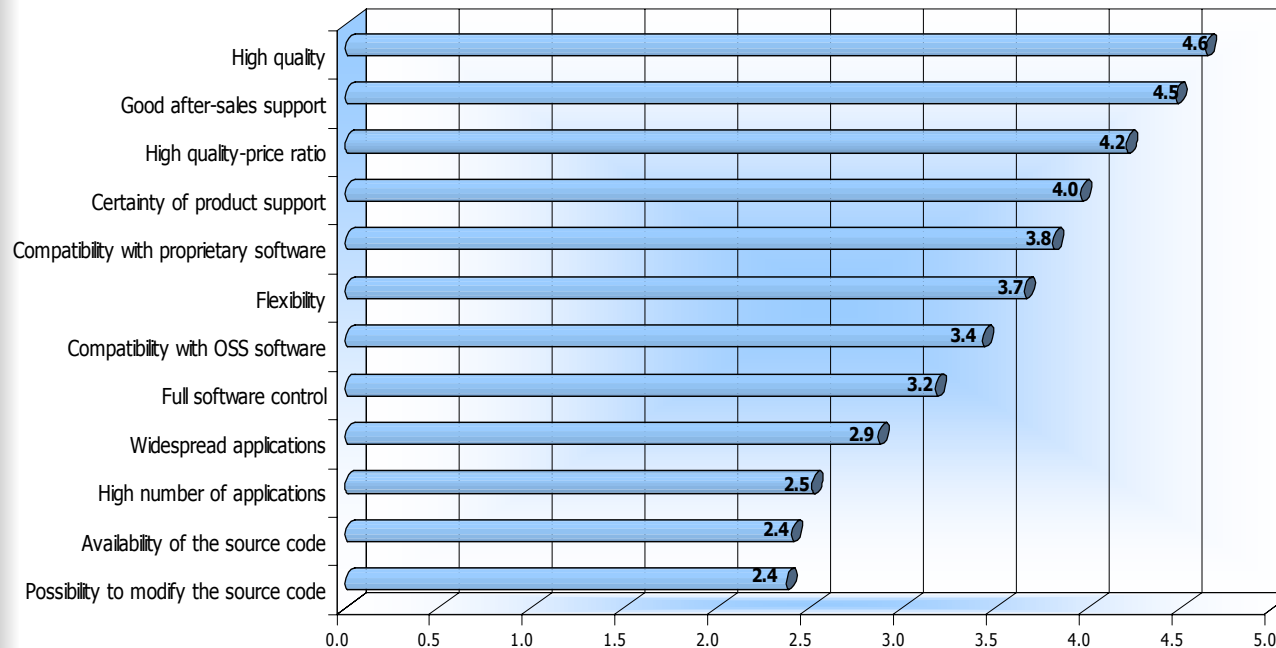
- Support
- Compatibility
- Difficulty of use

Among the main disadvantages that their customers ascribe to the OSS

It is worth to notice that

- Our findings resemble other surveys
- The most important obstacles spring from direct (compatibility) or indirect (availability of complementary support services) network externality effects

The customers: Importance attached to software characteristics in general



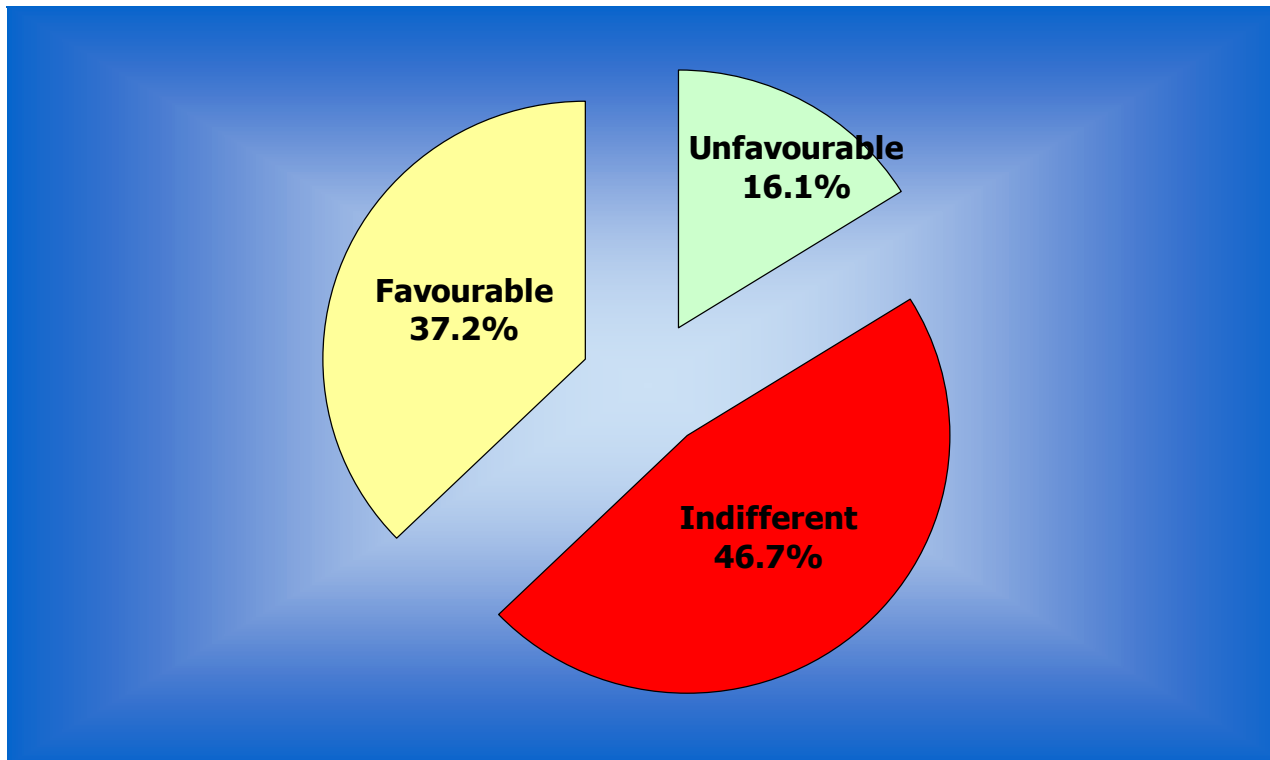
Close-ended question.
Likert scale
1 = I totally disagree
5 = I totally agree

In general the customers of the ELISS firms attach much importance in evaluating software to:

- Software quality
- After-sales support

They attach little importance to the availability of source code

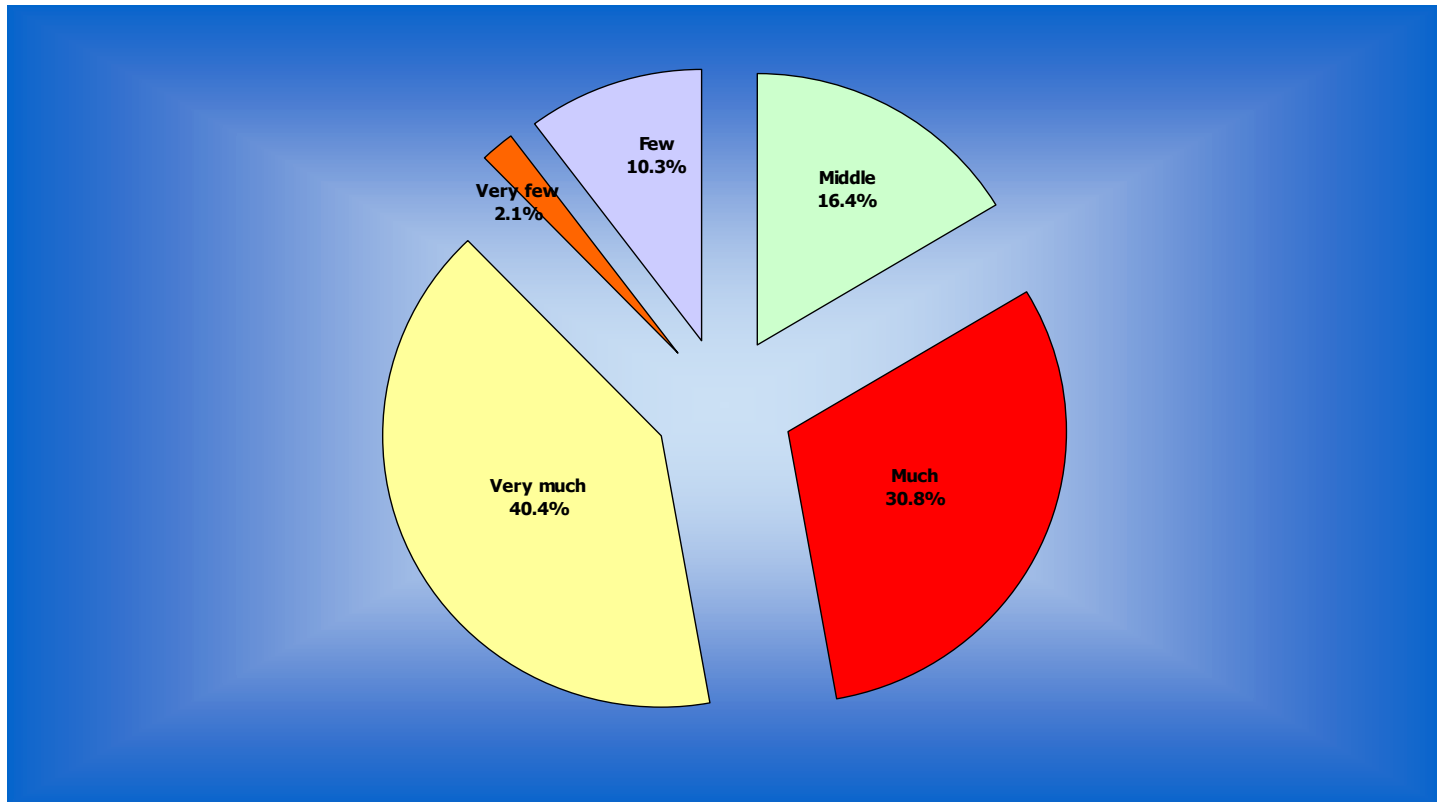
The customers: Attitudes towards OSS



In general the customers of the firms in the sample

- Are indifferent between OS and proprietary solutions
 - The most important factor is that the software should meet their requirements

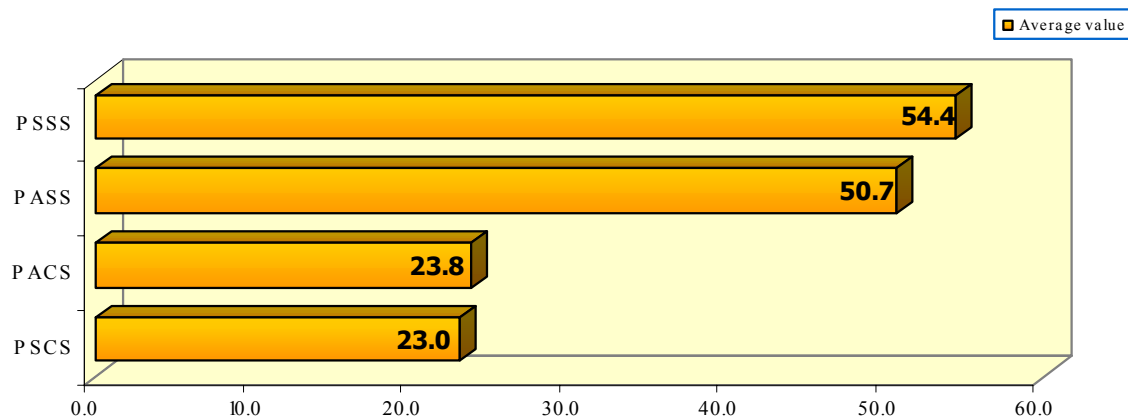
Attitudes towards the OSS: Strategic importance



In general the firms of the ELISS sample attach

- Much strategic importance to the Open Source software

Attitudes towards the OSS: Expectations about market tendencies



LEGEND	
PACS	Open Source software market share: PA - Client side
PASS	Open Source software market share: PA - Server side
PSCS	Open Source software market share: private sector - Client side
PSSS	Open Source software market share: private sector - Server side

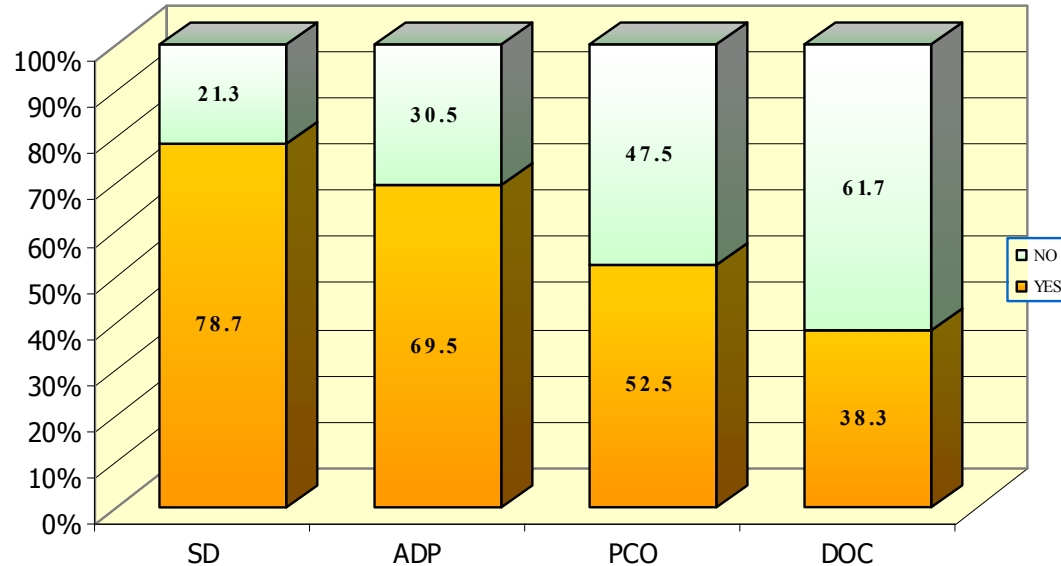
The firms of the ELISS sample forecast that in 2005 OSS

- Will have gained 50% of the server market and 25% of the client market
 - At present the market share of the Open Source software is higher in the server than in the client side of the market: the firms forecast that this tendency will keep longer
- Public Administration will play a crucial role in the establishment of the new open standards.

Attitudes towards the OSS: Activities

Multiple-choice question.

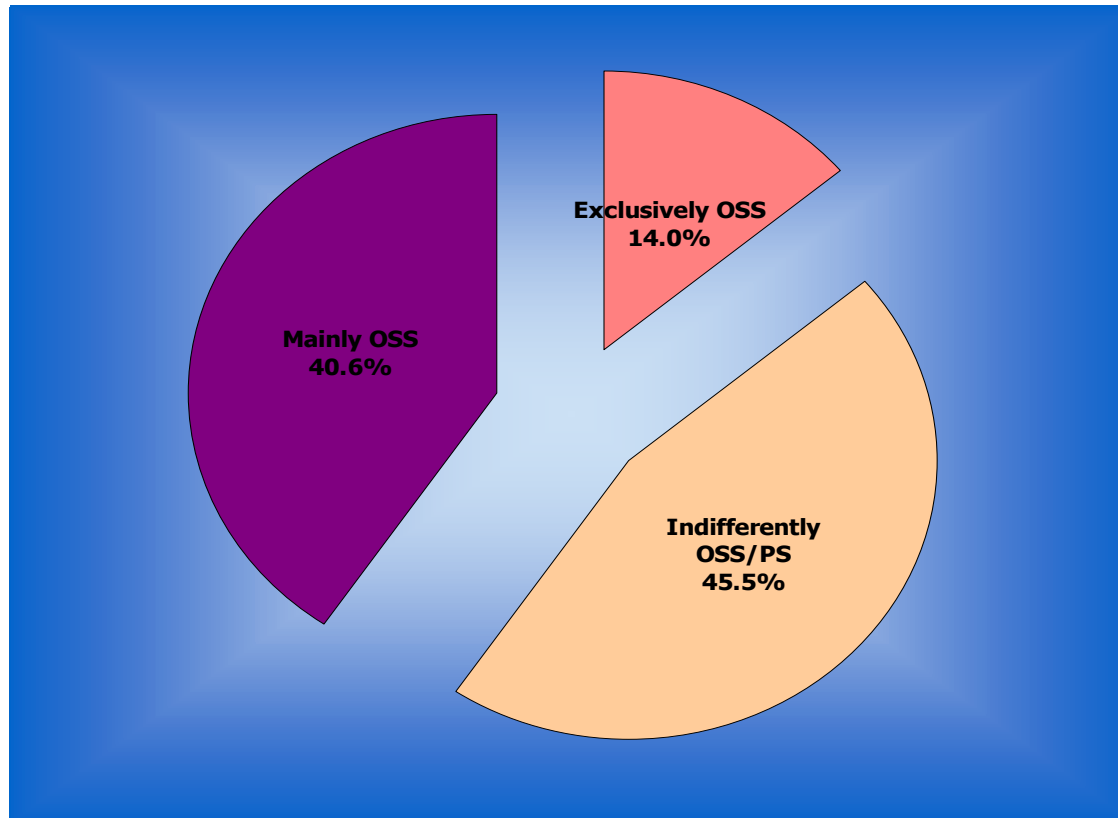
LEGEND	
SD	Software development
ADP	Software adaptation
PCO	Project coordination
DOC	Documentation



In general the firms of the ELISS sample

- Carry out Open Source software development and adaptation activities
 - Adaptation activity meets personalisation requirement numbered by the customers among the main advantages of Open Source software. Less than 40% of the firms make documentation
 - Firms are likely to work with well documented Open Source projects (such as Apache)

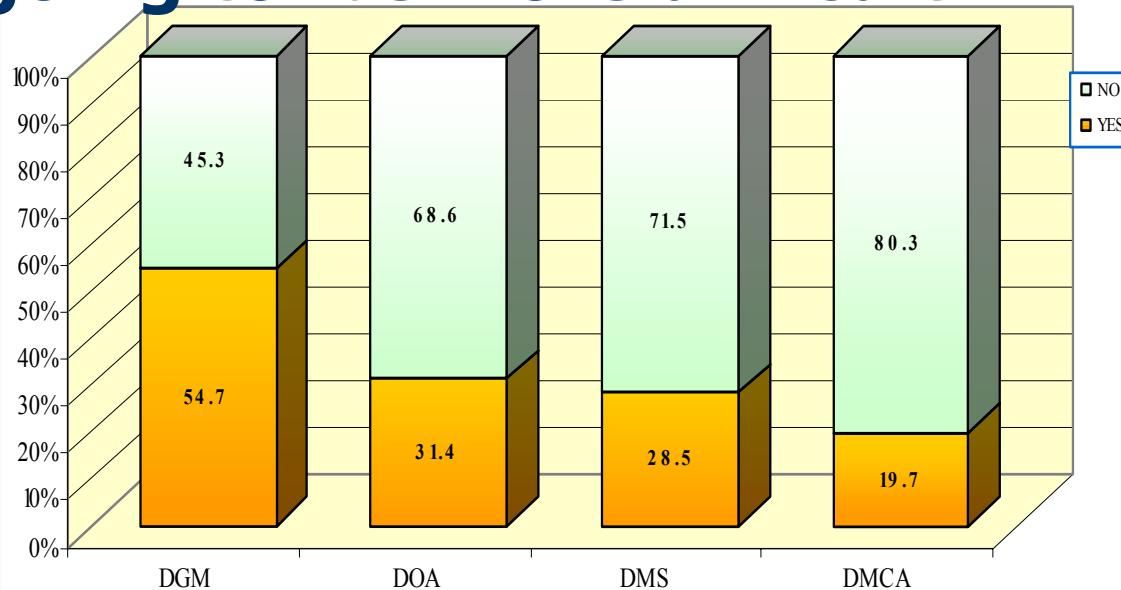
Attitudes towards the OSS: Solutions proposed to the customers



In general the firms of the ELISS sample

- Offer to their customers both Open Source and proprietary solutions
- This witnesses the success of hybrid models

Attitudes towards the OSS: Areas in which Open Source diffusion is going to be more difficult



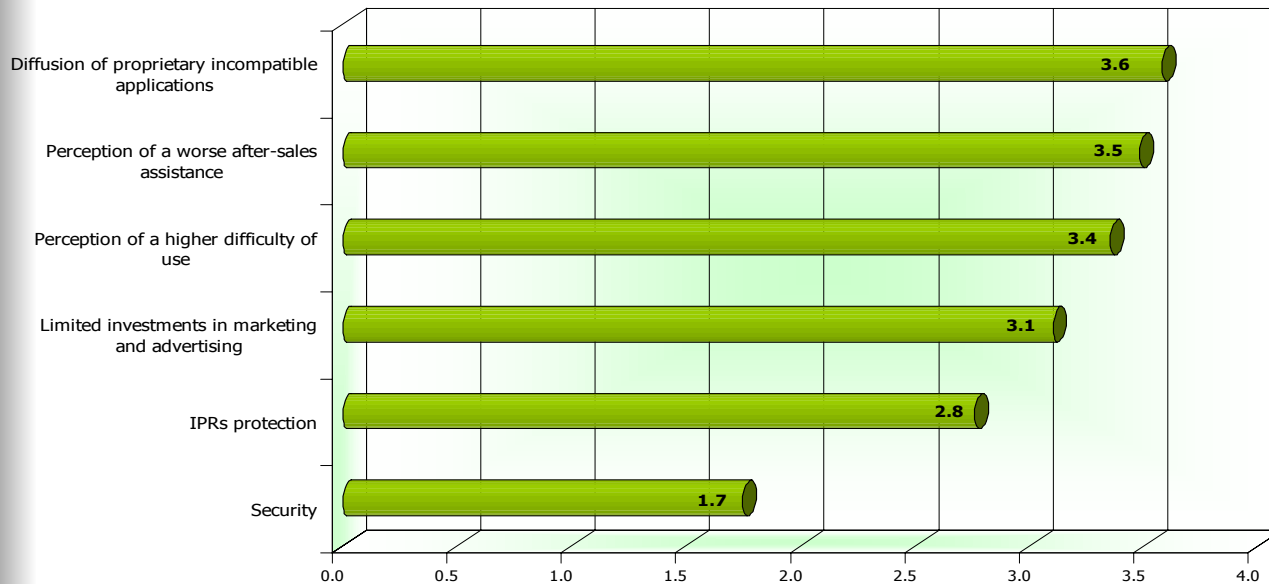
LEGEND	
DGM	Games and Multimedia
DOF	Office automation
DMS	Management applications
DMC	Mission Critical Applications

Multiple-choice question.

In general the firms of the ELISS sample have a clear picture of the tendencies of the software market. They think that

- The OSS applications will experience the most difficult diffusion in game and multimedia areas
- The OSS applications will experience the less difficult diffusion in the *mission critical application* area
 - Nasa is now using the Linux Red Hat distribution in order to have the complete control of the system

Attitudes towards the OSS: Perceived obstacles to the Open Source diffusion



Close-ended question.

Likert scale

1 = I totally disagree

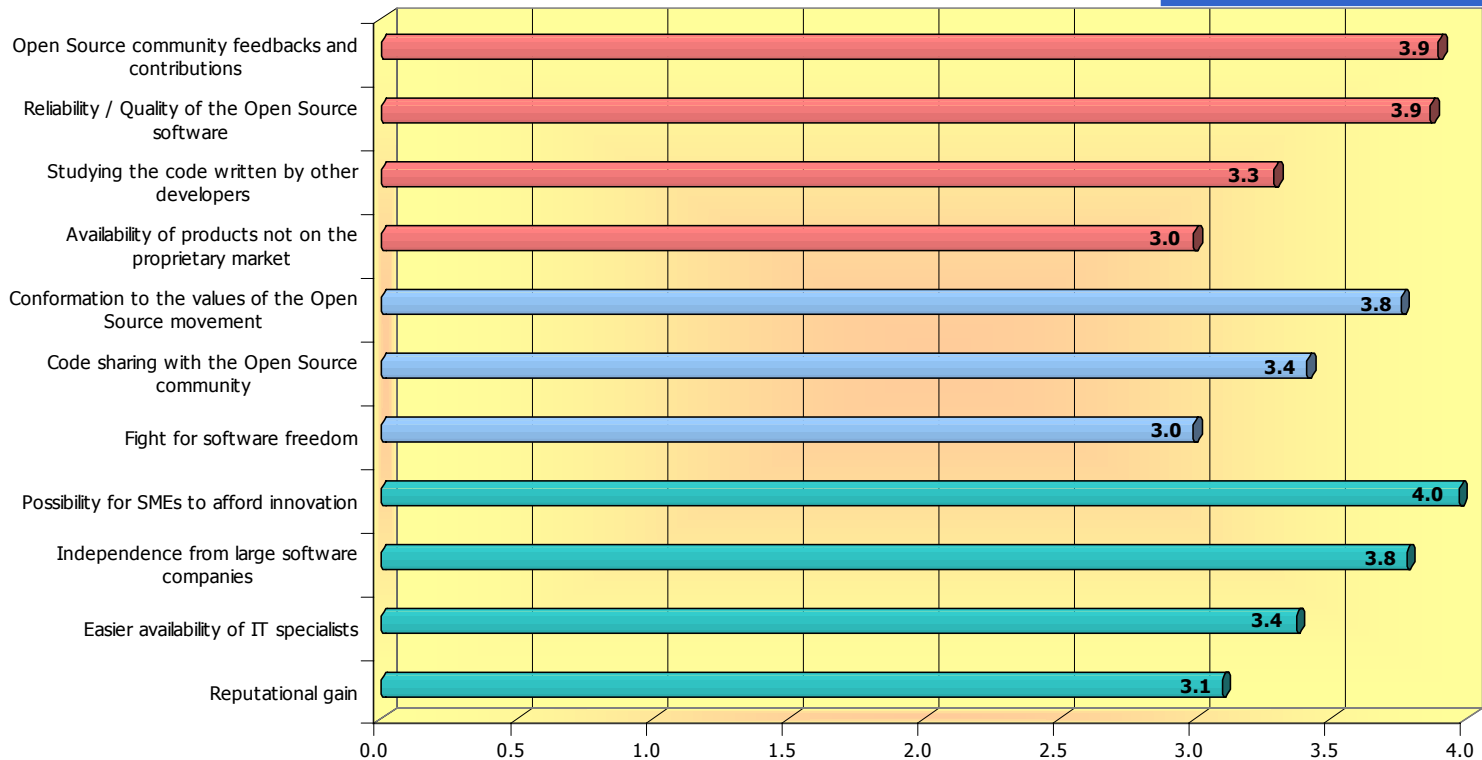
5 = I totally agree

In general the firms of the ELISS sample

- Think that incompatibility with proprietary system is the main obstacle to the diffusion of the Open Source software
 - Compatibility is a crucial factor for firms that adopt hybrid business models
- Security problems are instead considered the less important obstacle

Attitudes towards the OSS: Motivations of commitment to OSS

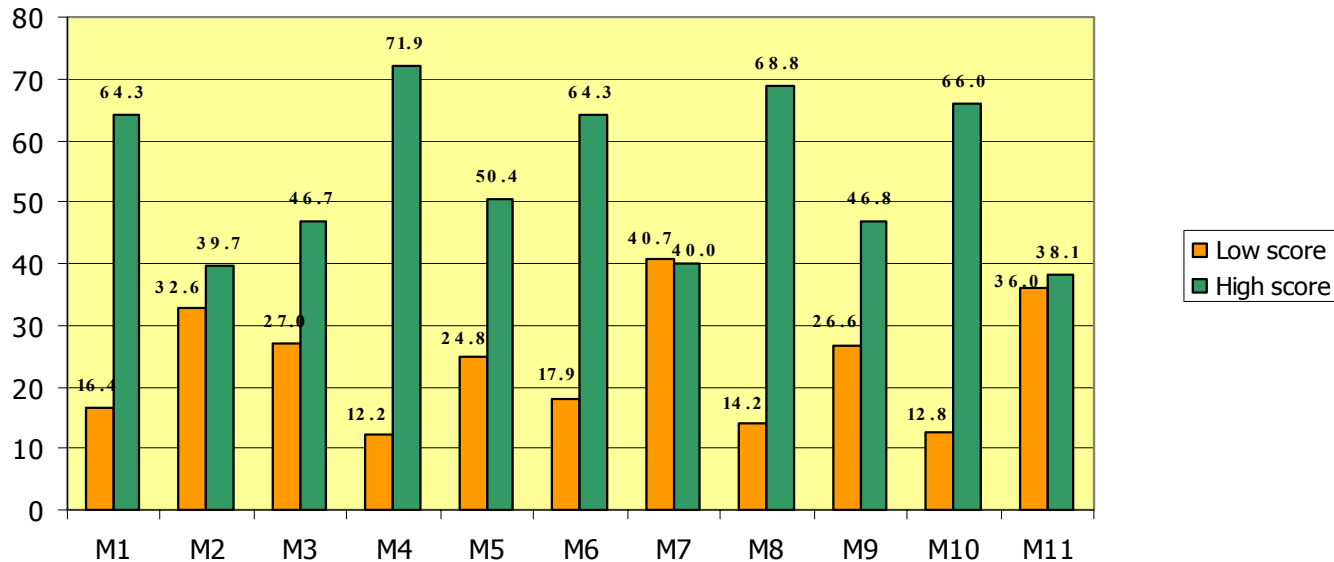
- Economic motivations
- Social motivations
- Technological motivations



Close-ended question.
Likert scale
1 = I totally disagree
5 = I totally agree

Attitudes towards the OSS: Motivations of commitment to OSS^(cont)

Multiple-choice question.



LEGEND					
M1	Independence from large software companies	M5	Code sharing with the Open Source community	M9	Studying the code written by other developers
M2	Reputational gain	M6	Conformation to the values of the Open Source	M10	Reliability / Quality of the Open Source software
M3	Easier availability of IT specialists	M7	Fight for software freedom	M11	Availability of products not on the proprietary market
M4	Possibility for the SMEs to afford innovation	M8	Code sharing with the Open Source community		

Attitudes towards the OSS:

Motivations of commitment to OSS^(cont)

In general the firms of the ELISS sample decided to work with the Open Source software because of

- Economic and technological motivations. In particular they use Open Source software because

- It allows also small enterprises to afford innovation*
- It allows to be independent of the price and licence policies of the large software companies*

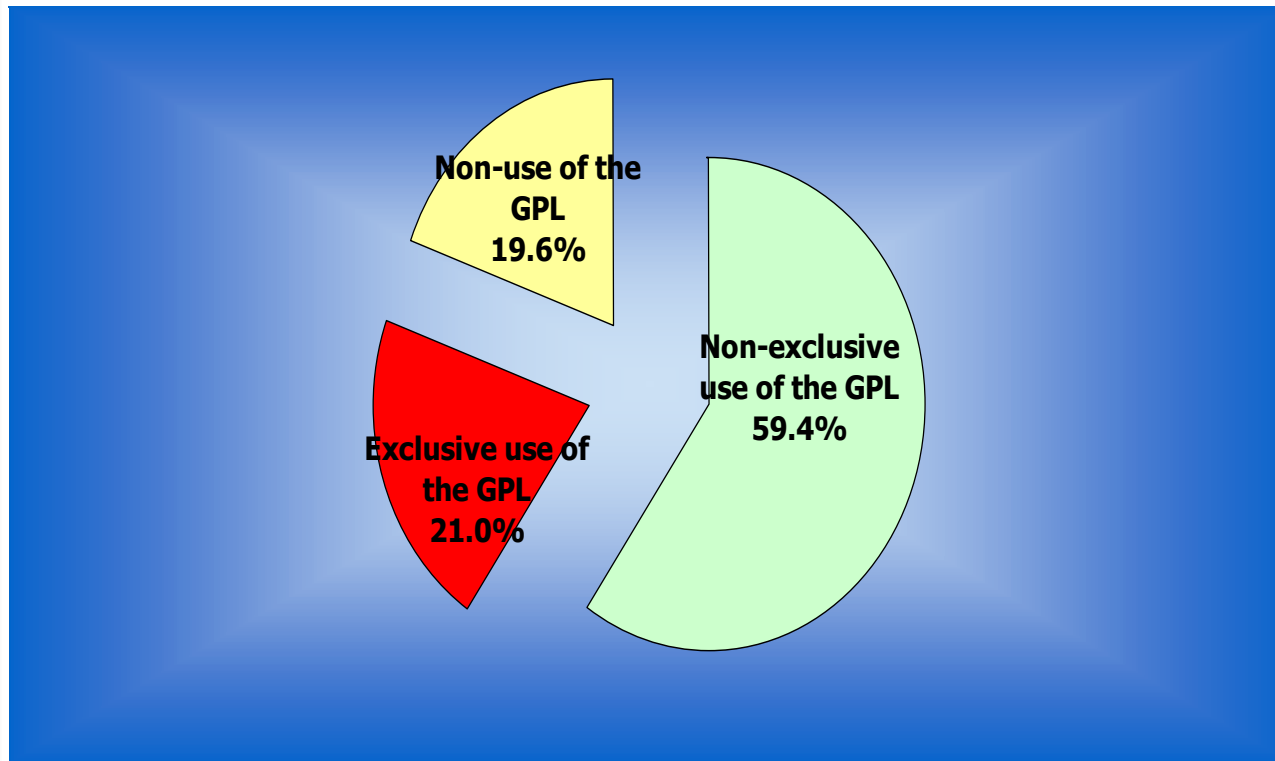
- However they also take into account social motivations. In particular

- They conform to the values of the Open Source community
 - This is because they want to sustain cooperation with individual developers

- They assign lower scores to the motivations that according to the literature are typical of individual developers, that is

- Being able to study the code written by other programmers
- Gain of a reputation among one's peers

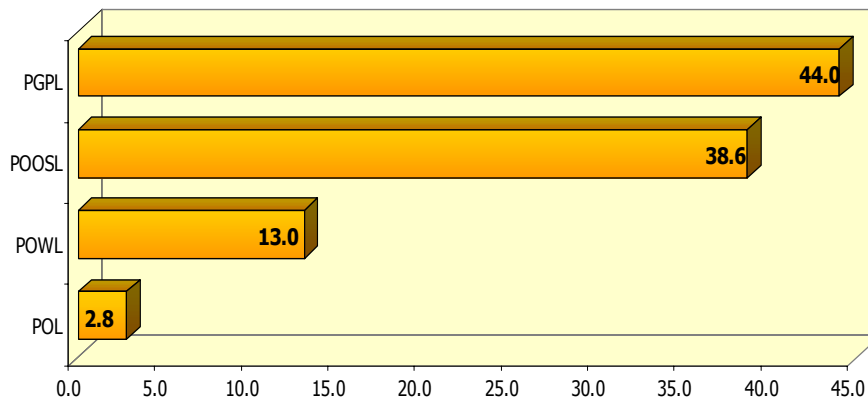
Licenses used by the firms: The GNU General Public License (GPL)



In general the firms of the ELISS sample

- Use the GNU General Public License together with other license schemes
 - We have to take into account the *inheritance property* of the GPL

Licenses used by the firms: % of use of the GPL



LEGEND	
PGPL	% of GPL use
POOSL	% of use of other Open Source licenses
POWL	% of use of one's licenses
POL	% of use of other licenses

We asked the firms for the

- *Open Source licenses with which they work, for the distribution their software as well as for the production process.*

It is worth to notice that:

- The GPL is the most used license

- This gets into line with the empirical studies that use the data collected through Open Source repositories on the Internet in order to study the license schemes that rule Open Source applications

Relationships with the OSS community: Participation to OSS projects

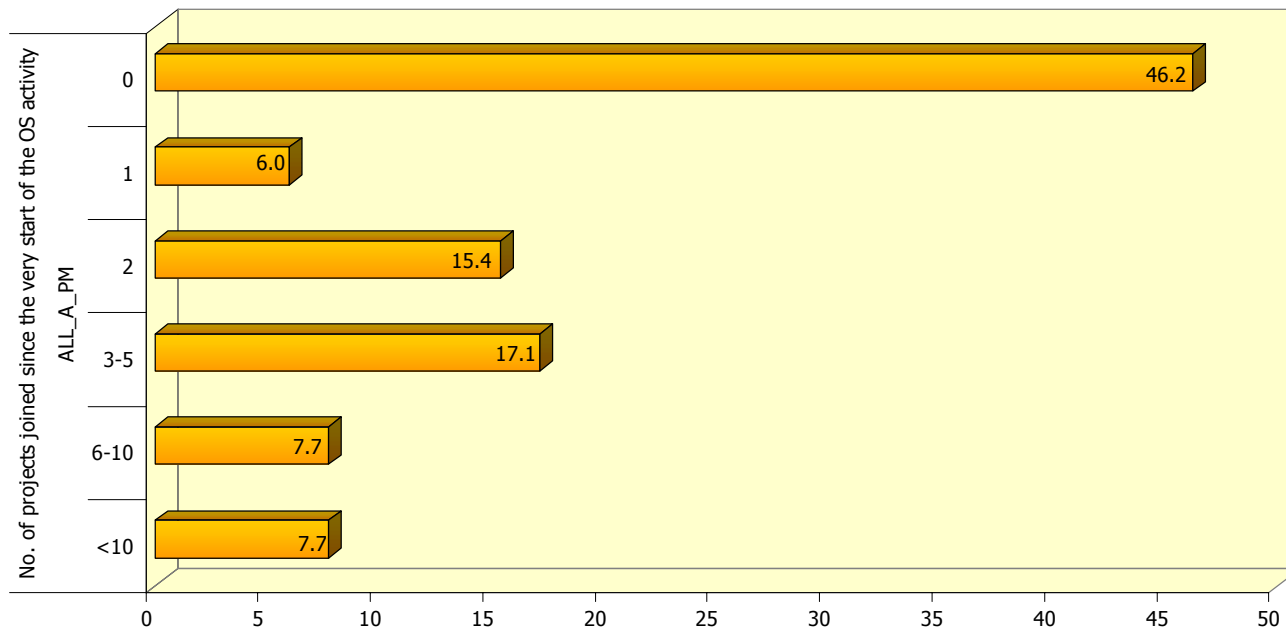
<i>Variable</i>	<i>Acronym</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Median</i>	<i>Skewness</i>
<i>Number of projects joined from the very start of the Open Source activity</i>	<i>ALL_A_PM</i>	0	50	3.8	7.8	1	3.5
<i>Number of projects joined during the last year</i>	<i>C_PM</i>	0	20	1.6	2,8	1	3.7
<i>Number of projects coordinated from the very start of the Open Source activity</i>	<i>ALL_A_CP</i>	0	28	1.1	3.4	0	5.9
<i>Number of projects coordinated during 2002</i>	<i>C_CP</i>	0	7	0.5	1.2	0	3.5
<i>Percentage of LOCs contributed on average to each project</i>	<i>%_LOCs</i>	0	99	10.56	23.5	0	2.5
<i>Firms' contributions (patches, modules) accepted into project official versions</i>	<i>N_C_OV</i>	0	300	6.9	36.9	0	6.7

In general the firms of the ELISS sample

- Take part very little to the projects of the Open Source community
 - If we take into account coordination activities, project membership is even lower
- Moreover taking into account
 - Lines of code (LOCs)
 - Number of contributes accepted into project official versions

firms devote little contribution effort to the project

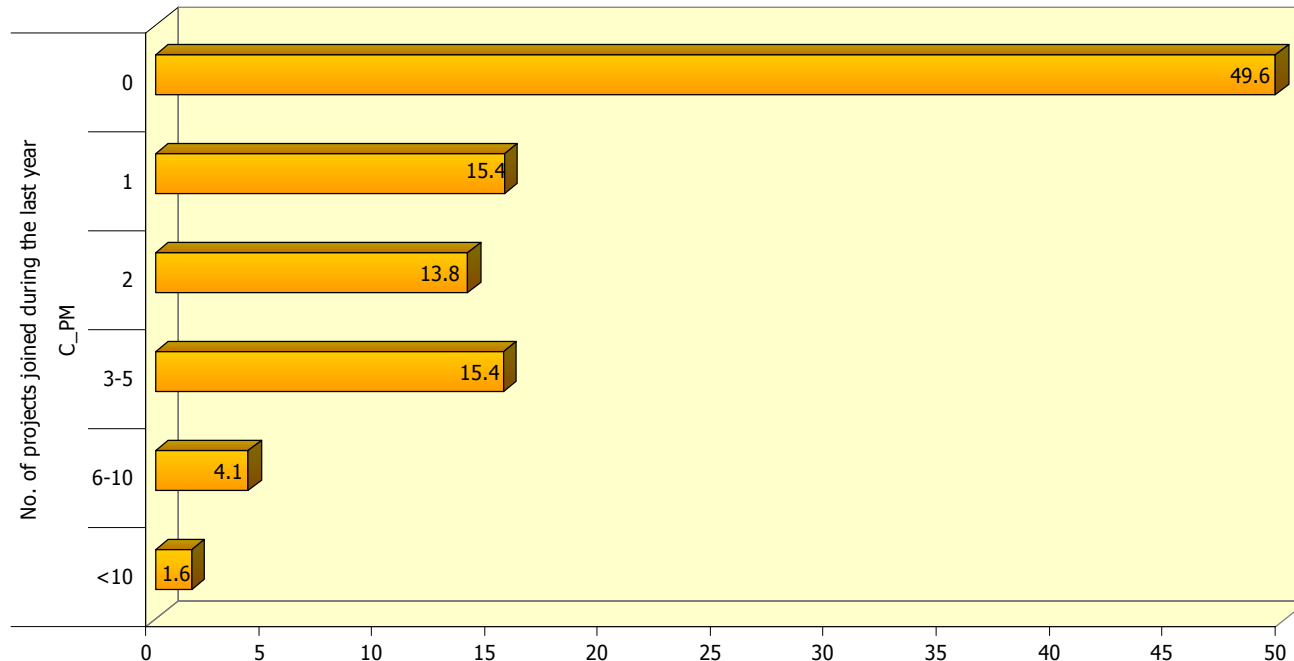
Relationships with the OSS community: Participation to OSS projects^(cont)



Taking into account the projects that the firms have been joining since the very start of their OS activity and the ones that firms joined during last year

- The distribution of firms according to their project membership is very skewed

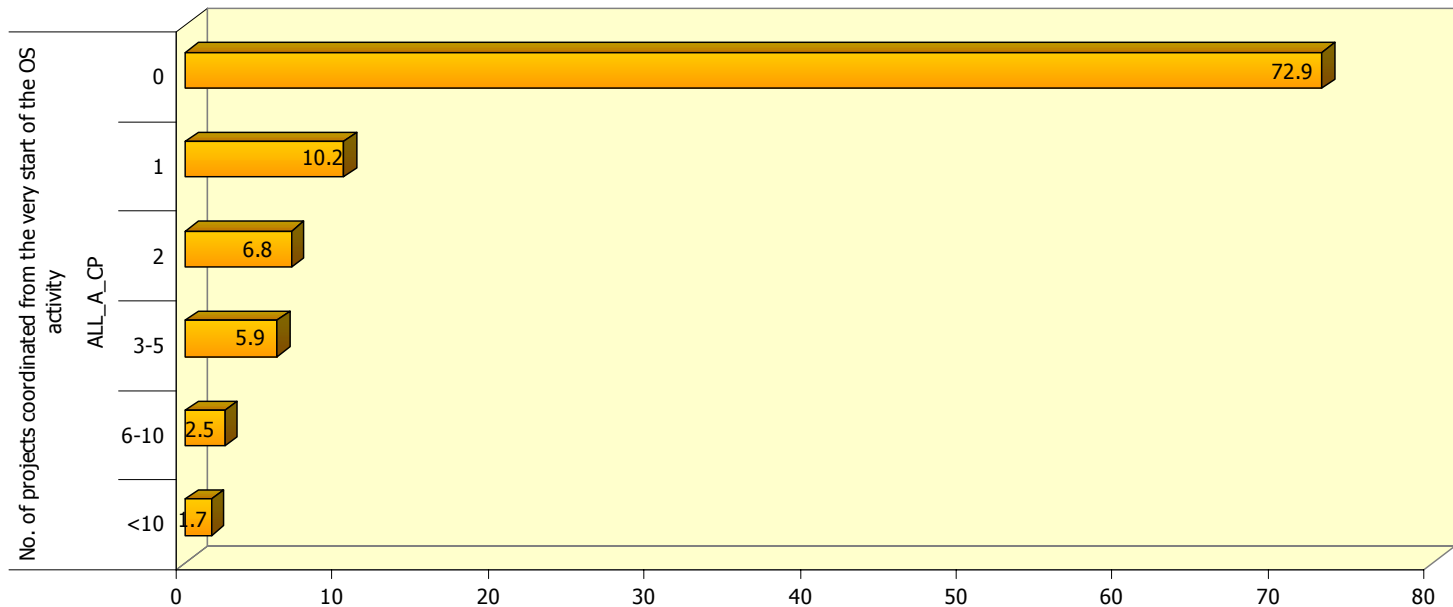
Relationships with the OSS community: Participation to OSS projects^(cont)



The distribution of the firms according to their project membership is very skewed

- This gets in line with the findings of the surveys made on OSS developers

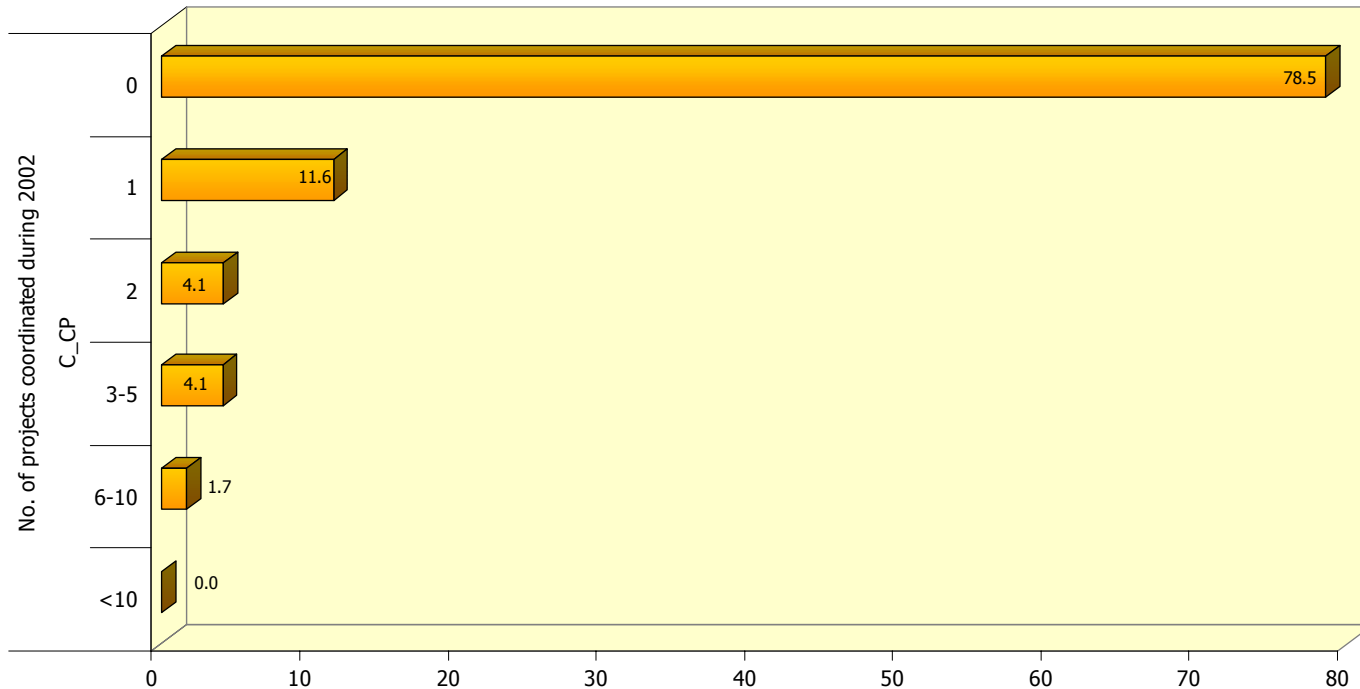
Relationships with the OSS community: Participation to OSS projects^(cont)



Most of the firms of the ELISS sample

- Have never carried out coordination activities within Open Source projects
 - This is consistent with the findings of the surveys made on OSS developers

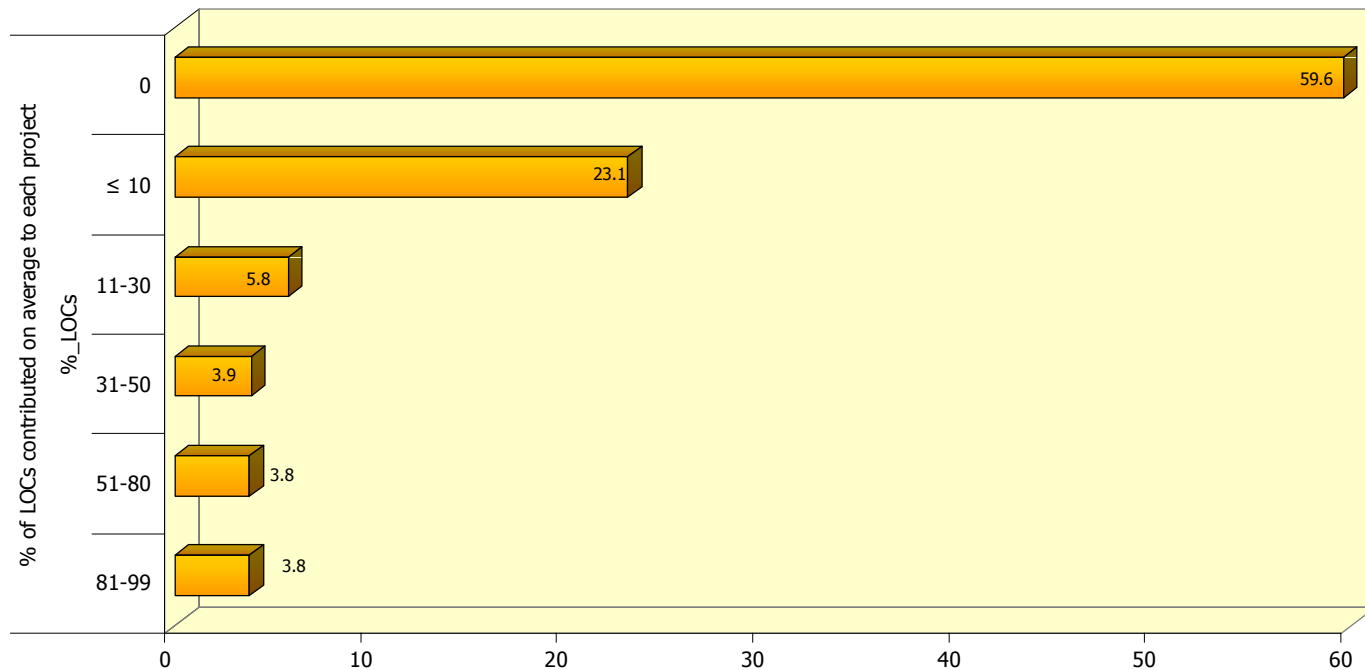
Relationships with the OSS community: Participation to OSS projects^(cont)



At present most of the firms of the ELISS sample

- Do not carry out coordination activities

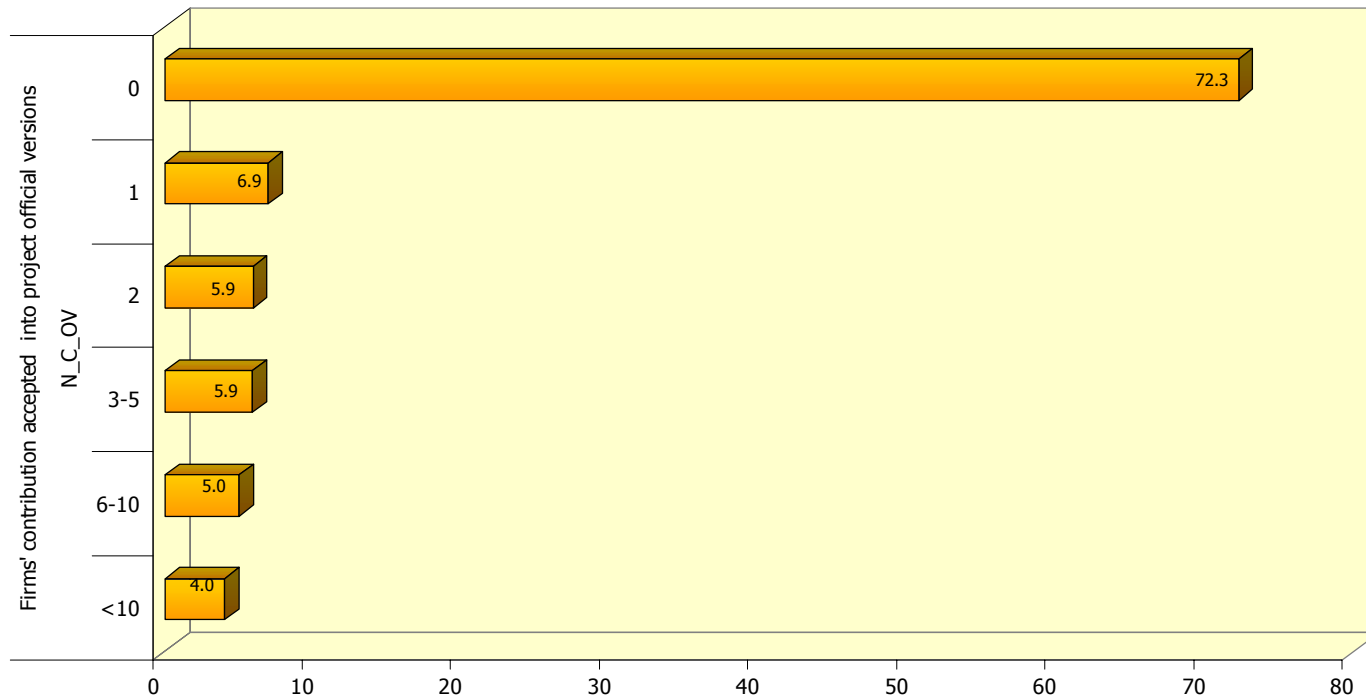
Relationships with the OSS community: Participation to OSS projects^(cont)



The distribution of the firms according to the percentage of the LOCs contributed to OSS project is also very skewed

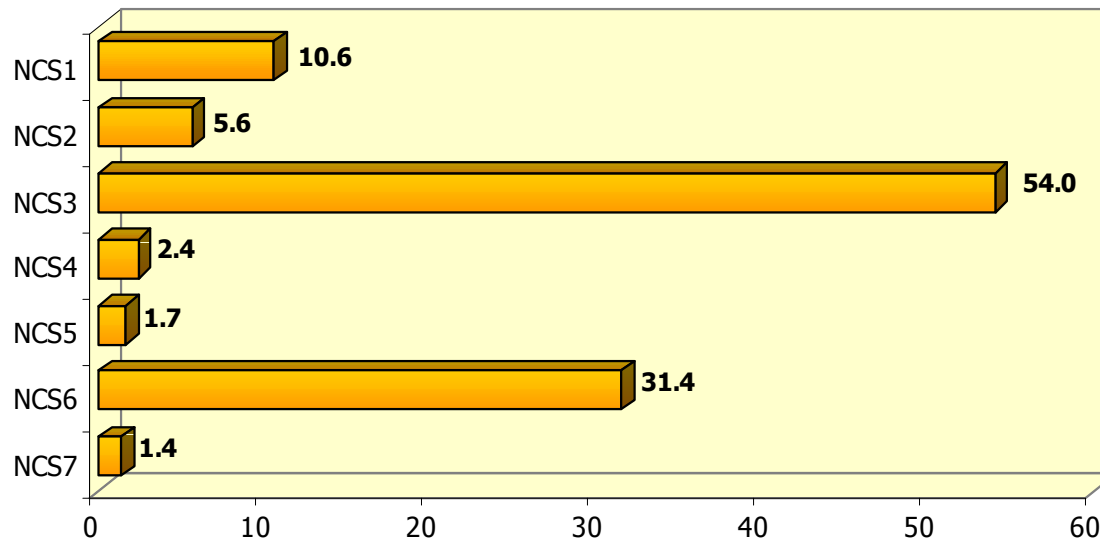
- This is consistent with the findings of the surveys made on OSS developers

Relationships with the OSS community: Participation to OSS projects^(cont)



The distribution of the firms according to the number of their contributions (patches, modules) accepted into project official versions is very skewed

Relationships with the OSS community: Firms' social contacts



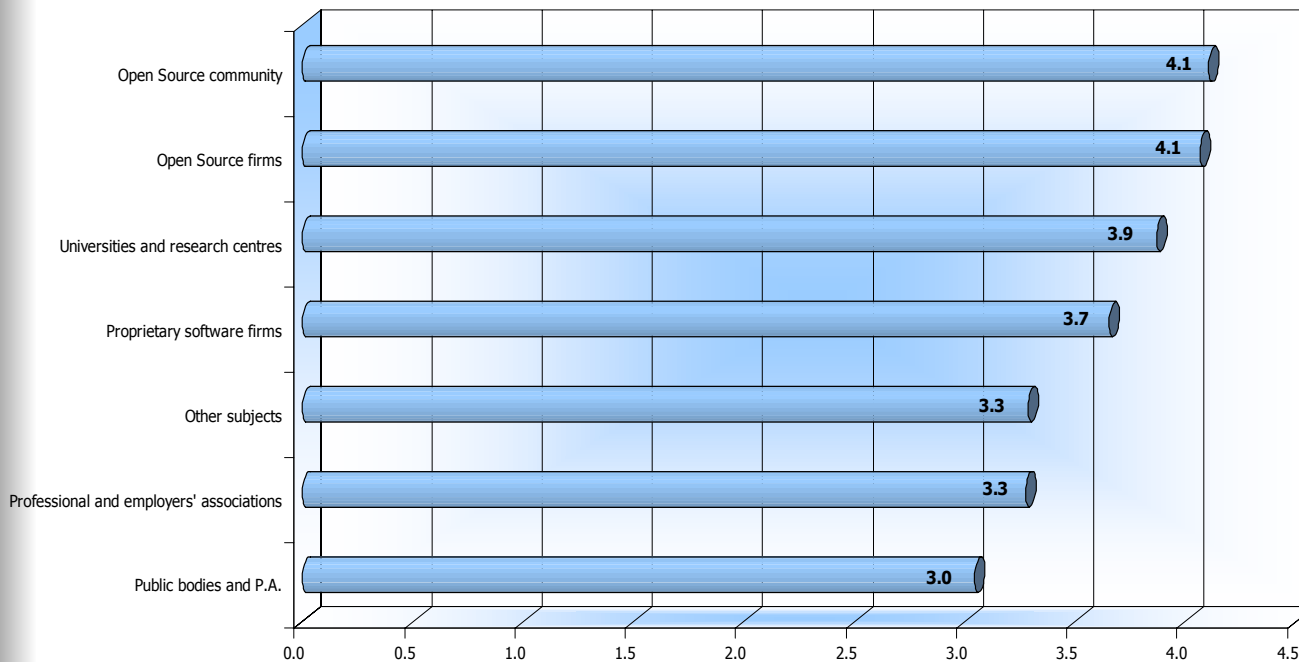
LEGEND	
NCS1	No. Of contacts with OSS firm
NCS2	No. Of contacts with firms that work with proprietary software
NCS3	No. Of contacts with the Open Source community
NCS4	No. Of contacts with Universities and Research Centres
NCS5	No. Of contacts with professional and employers' associations
NCS6	No. Of contacts with public bodies and P.A.
NCS7	No. Of contacts with other subjects

The firms of the ELISS sample have a larger total number of cumulative contacts with

- The Open Source community and the other Open Source firms
- PA and public bodies (public sector plays a central role in the shift to the new Open standards)

The data are affected by some outlier values

Relationships with the OSS community: Perceived reliability of information ^(cont)



Close-ended question.

Likert scale

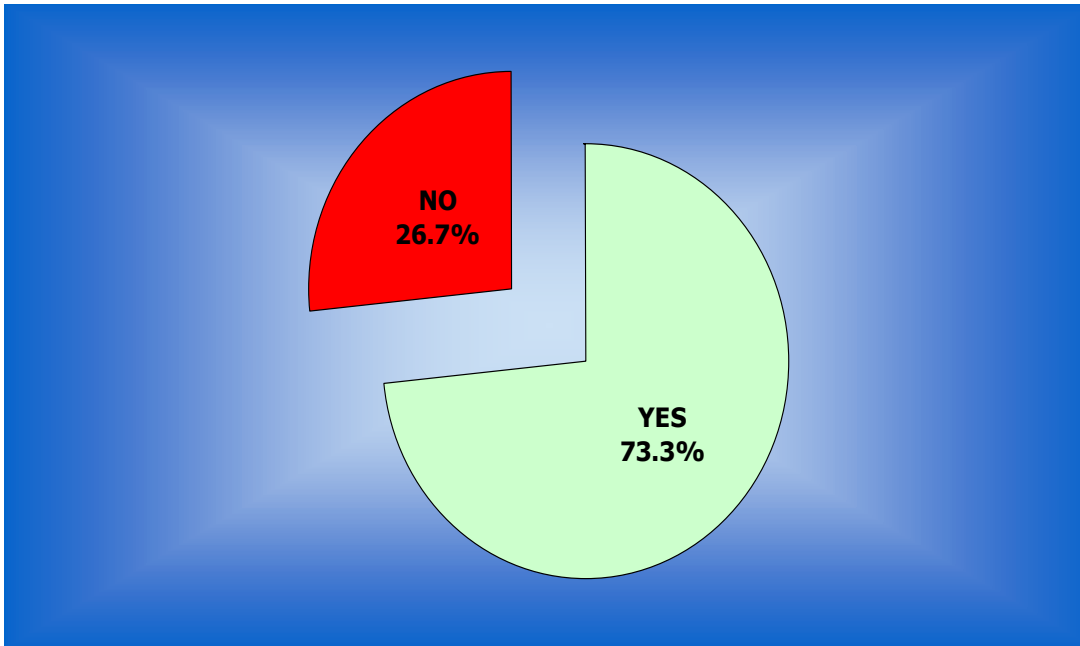
1 = I totally disagree

5 = I totally agree

The firms of the ELISS sample attach a high reliability to the information get by

- The Open Source community
- Other firms that do business with the Open Source software

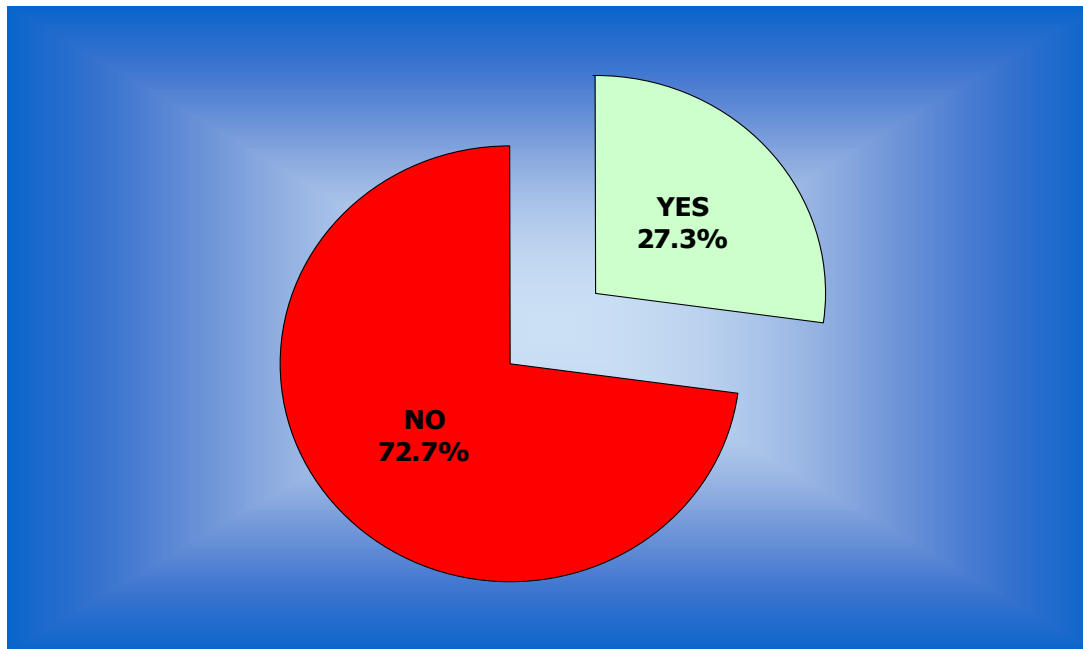
Relationships with the OSS community: OSS promotion



In general the firms of the ELISS sample

- Take part in Open Source promotion activities, such as fairs, conferences, meetings with users

Relationships with the OSS community: OSS promotion^(cont)



We asked whether:

- *In their budget there is a provision for the promotion of OSS activities*

In general Open Source promotion

- Is not a planned activity
 - The greater part of the promotion activity is carried out among the customers

A comparison between firms born after and before 1999

Variable	Acronym	Year of establishment						Total			TEST MANN-WHITNEY (P VALUE)
		After 1999			Before 1999			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
Average age of partner	AAP	54	32.6	6.4	75	38.7	7.2	129	36.1	7.5	0.000
Average age of employees	AAE	25	28.5	3.9	62	30.4	4.1	87	29.8	4.1	0.070
Average age of freelances	AAF	47	28.8	4.3	69	31.2	6.6	116	30.2	5.9	0.027
Open Source turnover in 2001	OSST01	35	61.7	33.5	68	38.7	36.6	103	46.5	37.0	0.003
Customers	NC	49	31.7	73.7	70	187.8	478.1	119	123.5	376.6	0.000
No. Of Linux based products	NPBL	58	3.6	2.1	87	2.9	2.0	145	3.2	2.0	0.033
No. Of products based on proprietary software	NPBPS	58	0.7	1.3	87	1.4	1.9	145	1.1	1.7	0.033

In general firms that were born after 1999 are characterized by

- Younger partners, employees and freelances
- A higher % of Open Source turnover
- A higher number of Linux based products and a lower number of products based on proprietary software

A comparison between firms born after and before 1999^(cont)

Variable	Acronym	Year of foundation						Total			TEST MANN-WHITNEY (P VALUE)
		After 1999			Before 1999			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
% of GPL use	PGPL	19	54.7	33.4	24	35.4	37.0	43	44.0	36.4	0.064
No. of projects joined during last year	C_PM	53	1.9	3.2	70	1.3	2.4	123	1.6	2.8	0.083
% of LOCs contributed on average to each project	%_LOCs	42	14.2	26.6	62	8.1	21.1	104	10.6	23.5	0.033
Reliability attached to the information received by Universities and research centres	RIPSF	31	3.6	1.2	30	4.1	0.9	61	3.9	1.1	0.085
No. Of contact with firms that work with proprietary softwarecontatti con imprese che lavorano con software proprietario	CURC	42	4.7	7.8	53	6.4	6.6	95	5.6	7.2	0.088
No. Of contact with firms working with proprietary software	CPSF	41	67.4	216.4	45	41.7	156.3	86	54.0	186.7	0.046

In general firms that were born after 1999

- Make heavier use of the *GNU General Public License* (GNU GPL)
- Have closer links with the Open Source community (project membership and contribution, social contacts with members of the Open Source community)

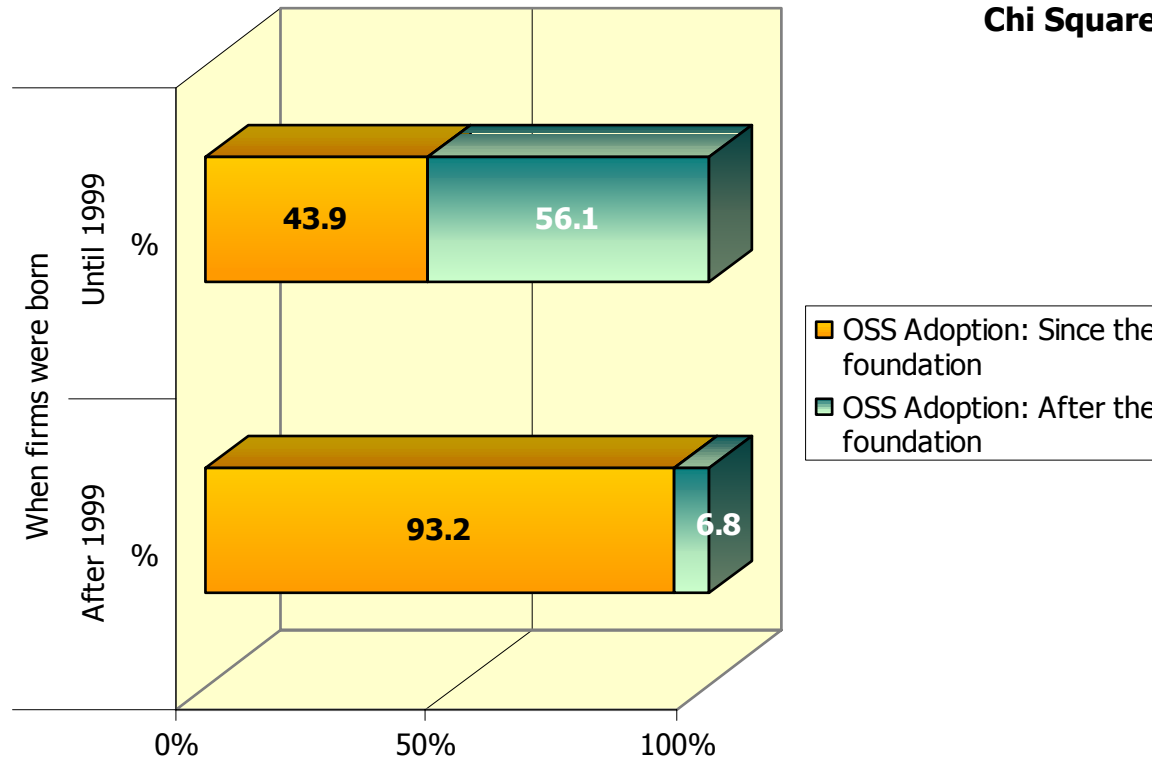
A comparison between firms born after 1999 and the other ones^(cont)

Variable	Acronym	Year of foundation						Total			TEST MANN-WHITNEY (P VALUE)
		After 1999			Before 1999			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
<i>Importance attached by the customers: availability of large number of applications</i>	ENAP	55	2.3	1.1	80	2.7	1.4	135	2.5	1.3	0.080
<i>Importance attached by the customers: Certainty of product support</i>	CPR	56	3.8	1.1	83	4.1	1.1	139	4.0	1.1	0.068
<i>Obstacles to the OSS adoption: Lack of in marketing and advertising</i>	H4	59	3.3	1.3	86	2.9	1.2	145	3.1	1.3	0.062
<i>Obstacles to the OSS adoption: Difficulty of use</i>	H5	59	3.7	1.2	85	3.1	1.4	144	3.4	1.3	0.034
<i>Motivations to use OSS: Gain of reputation among customers and competitors</i>	M2	57	3.3	1.2	84	3.0	1.2	141	3.1	1.2	0.097
<i>Motivations to use OSS: Studying the code written by others</i>	M9	57	3.5	1.3	82	3.1	1.2	139	3.3	1.3	0.097
<i>Motivations to use OSS: Availability of products that are not on the proprietary market</i>	M11	57	2.7	1.3	82	3.2	1.3	139	3.0	1.4	0.035

In general firms that were born after 1999

- Have customers that attach less importance to the availability of a large number of applications and to the certainty of product support
- Think that the diffusion of the Open Source software is lowered by the perceived difficult of use

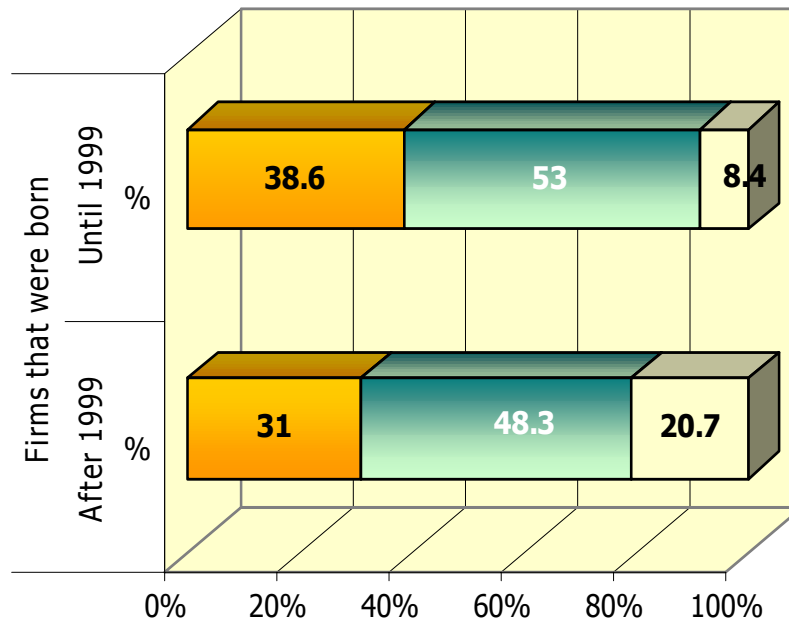
Firms born after 1999: OSS adoption



In general firms that were born after 1999

- Adopted OSS technology at the very start of their activities

Firms born after 1999: Promoting partners



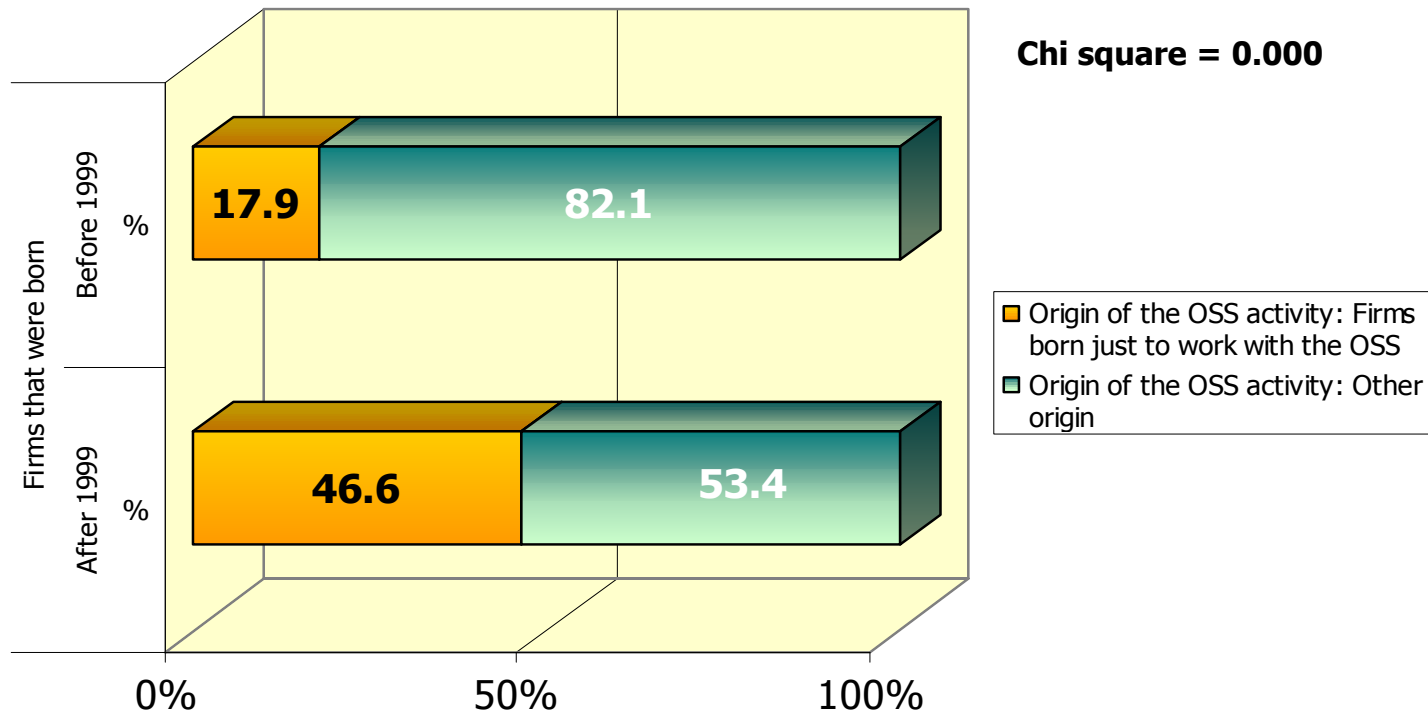
- Firms established by: Ex- employees
- Firms established by Entrepreneurs and professionals
- Firms established by: Start up companies

Chi Square = 0.105

In general among the firms that were born after 1999 there are more

- Start up companies

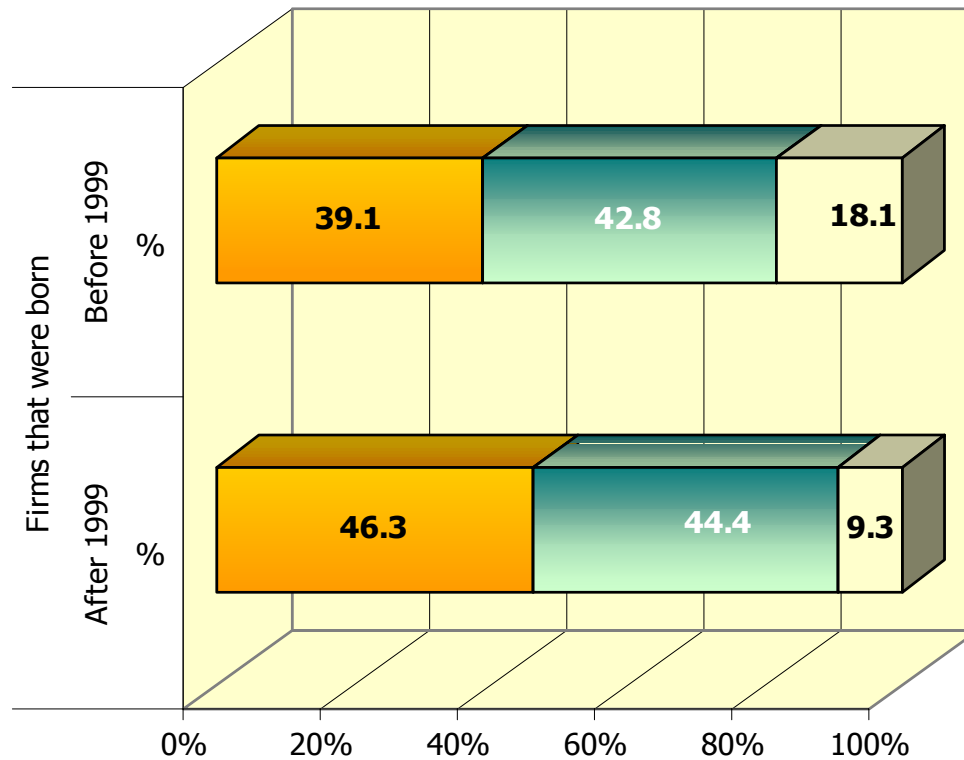
Firms born after 1999: Origin of the OSS activity



Almost half of the firms that were born after 1999

- Were established just to work with the OSS

Firms born after 1999: Staff



- Employee class: Less than 6 employees
- Employee class: From 6 to 20 employees
- Employee class: More than 20 employees

Employees: partners + employees in stricto sensu + free lances

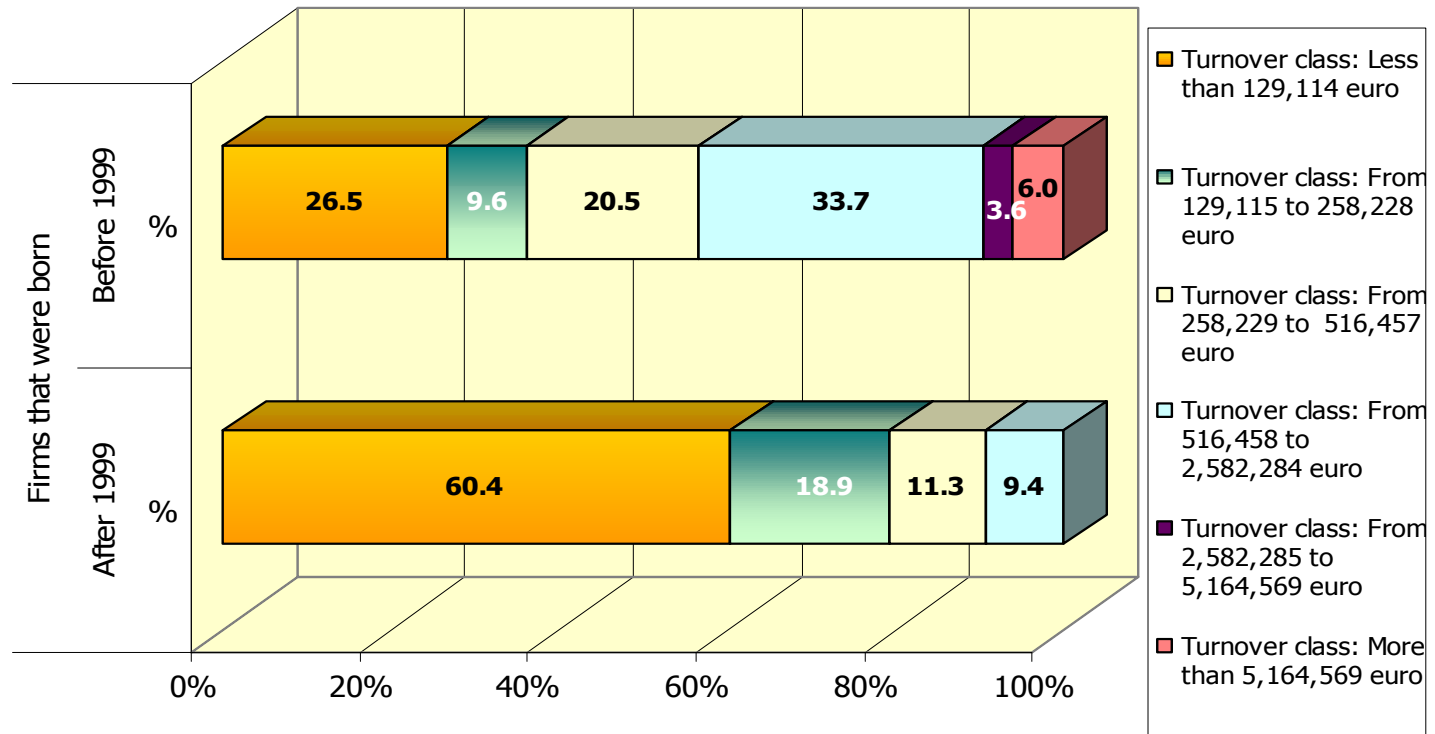
In general firms that are born after 1999

- Are smaller
 - Almost half of them have less than 6 employees

Chi square = 0.079

Firms born after 1999: Turnover

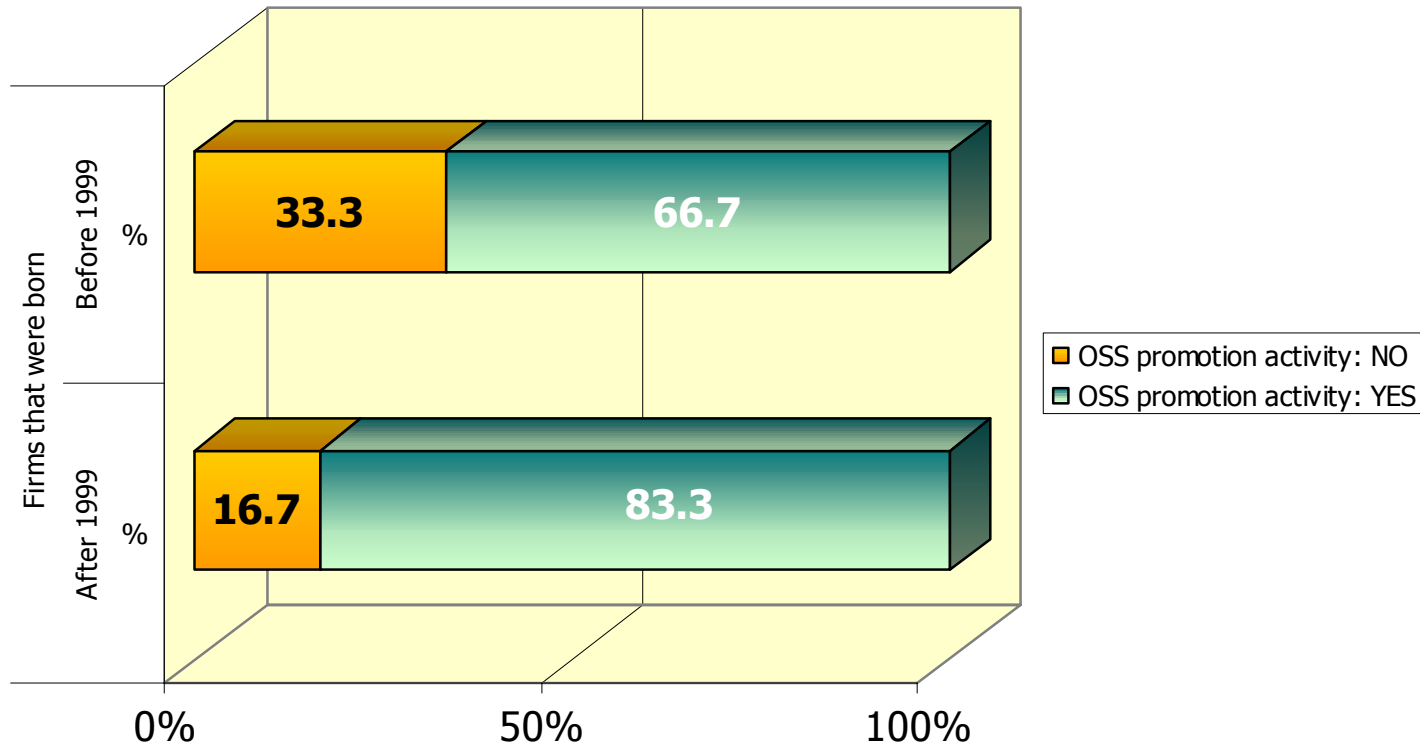
Chi square = 0.000



The analysis of the turnover classes corroborates the previous findings

Firms born after 1999: OSS promotion

Chi square = 0.032

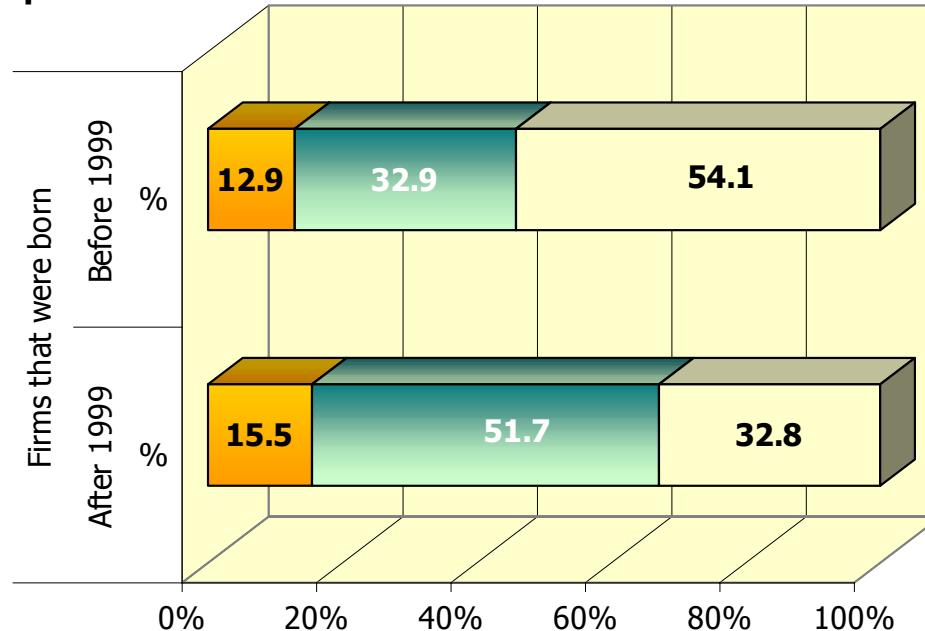


In general firms born after 1999

- Carry out more OSS promotion activity

Firms born after 1999: Solutions offered to the customers

Chi square = 0.036

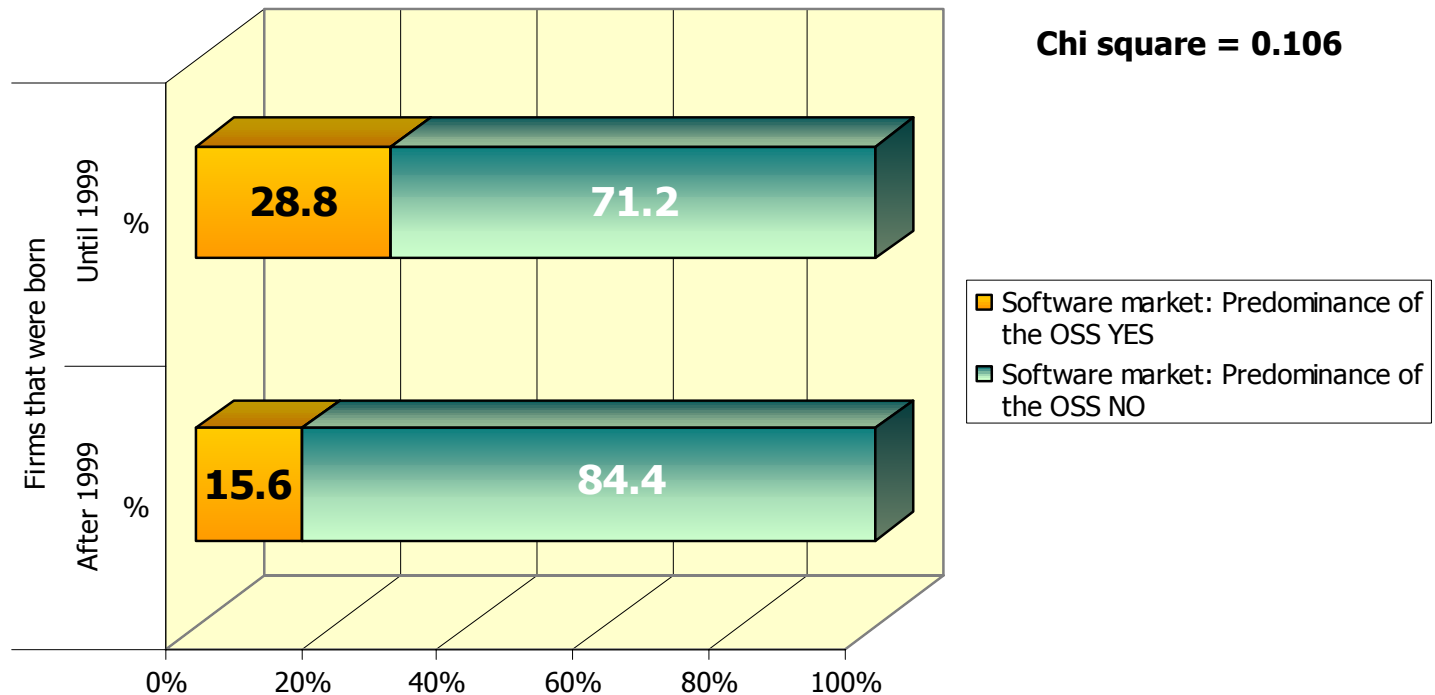


- Solutions offered to customers: Only OSS
- Solutions offered to the customers: Mainly OSS
- Solutions offered to the customers: Indifferently OSS/PS

In general firms that were born after 1999

- Offer more frequently Open Source based solutions to their customers

Firms born after 1999: Software market – Private sector



A lower % of firms that where born after 1999

- Think that in 2005 the software market (private sector) will be dominated by OSS

A comparison between firms that have been adopting OSS since the foundation and firms that switched to OSS

Variable	Acronym	OSS adoption						Total			MANN-WHITNEY TEST (P VALUE)
		Since the foundation			After the foundation			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
Year of foundation	AF	91	1999	2.6	50	1991	8.3	141	1996	6.5	0.000
Promoting partners still working in the company	NP	89	2.7	1.8	46	3.3	9.1	135	2.9	5.5	0.020
No. Of male promoting partners	NSM	85	2.8	1.7	48	2.3	2.2	133	2.6	1.9	0.019
No. Of male employees	NDM	85	5.2	24.7	48	12.9	25.9	133	8.0	25.3	0.000
No. Of female employees	NDF	85	2.1	10.5	48	6.9	13.0	133	3.8	11.7	0.000
Staff - men	ADDTOTM	85	10.1	24.9	48	16.8	26.5	133	12.5	25.6	0.065
Staff - women	ADDTOTF	85	3.4	10.8	48	8.3	13.6	133	5.2	12.1	0.000
% of women within firm's staff	PF	85	17.4	18.5	48	27.7	20.0	133	21.1	19.6	0.004
Staff	ADDTOT	85	13.5	35.4	48	25.1	39.6	133	17.7	37.2	0.017
% of employees with a degree	PL	84	0.6	0.6	48	0.4	0.7	132	0.5	0.6	0.002
No. Of employees with a Ph.D	DR	88	0.5	1.1	46	0.2	0.5	134	0.4	1.0	0.048

In general firms that have been adopting OSS since the foundation

- Are younger
- Are smaller
- Hire a higher % of employees with a degree
- Hire a lower percentage of women

A comparison between firms that have been adopting OSS since the foundation and firms that switched to OSS^(cont)

Variable	Acronym	OSS Adoption						Total			MANN-WHITNEY TEST (P VALUE)
		Since the foundation			After the foundation			N	Mean	Std. Dev-	
		N	Mean	Std. Dev-	N	Mean	Std. Dev-				
Average age of partners	AAP	86	34.4	6.5	38	40.0	8.4	124	36.1	7.6	0.000
Average age of employees	AAE	49	28.6	3.4	34	31.8	4.5	83	29.9	4.1	0.001
Average age of freelances	AAF	76	29.2	4.4	37	32.1	7.8	113	30.2	5.9	0.084
Turnover/Staff	FDIV	84	2.0	1.2	47	3.2	1.6	131	2.5	1.5	0.000
Open Source turnover in 1998	OSST98	19	45.6	36.9	8	12.4	23.6	27	35.7	36.5	0.055
Open Source turnover in 2001	OSST01	69	57.9	34.8	34	23.3	30.1	103	46.5	37.0	0.000
Customers	NC	77	65.9	288.4	38	250.6	506.9	115	126.9	382.7	0.000
No. Of Linux based products	NPBL	90	3.5	2.2	50	2.8	1.6	140	3.2	2.0	0.041
No. Of products based on proprietary software	NPBPS	90	0.8	1.4	50	1.7	2.1	140	1.1	1.7	0.017

A comparison between firms that have been adopting OSS since the foundation and the other ones^(cont)

Variable	Acronimo	OSS Adoption						Total			TEST MANN-WHITNEY (P VALUE)
		Since the foundation			After the foundation			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
% of GPL use	PGPL	30	53.5	35.5	12	23.8	29.5	42	45.0	36.2	0.011
No. of projects joined from the very start of the Open Source activity	ALL_A_PM	77	4.2	8.0	38	3.2	7.8	115	3.9	7.9	0.007
No. of projects joined during last year	C_PM	83	2.0	3.2	38	0.8	1.6	121	1.6	2.8	0.003
Percentage of LOCs contributed on average to each project	%_LOCs	68	12.5	25.3	34	7.4	20.0	102	10.8	23.7	0.010
Firms' contributions (patches, modules) accepted into project official versions	N_C_OV	62	1.5	3.0	34	0.3	0.9	96	1.1	2.5	0.014
Contact with other Open Source firms	COSF	66	12.7	28.5	35	6.7	19.1	101	10.7	25.7	0.001
Contact with the Open Source community	COSC	55	75.5	227.6	30	16.2	56.8	85	54.6	187.7	0.001

In general firms that have been adopting OSS since the foundation

- Make heavier use of the GNU General Public License
- Carry out a harder work within OSS projects

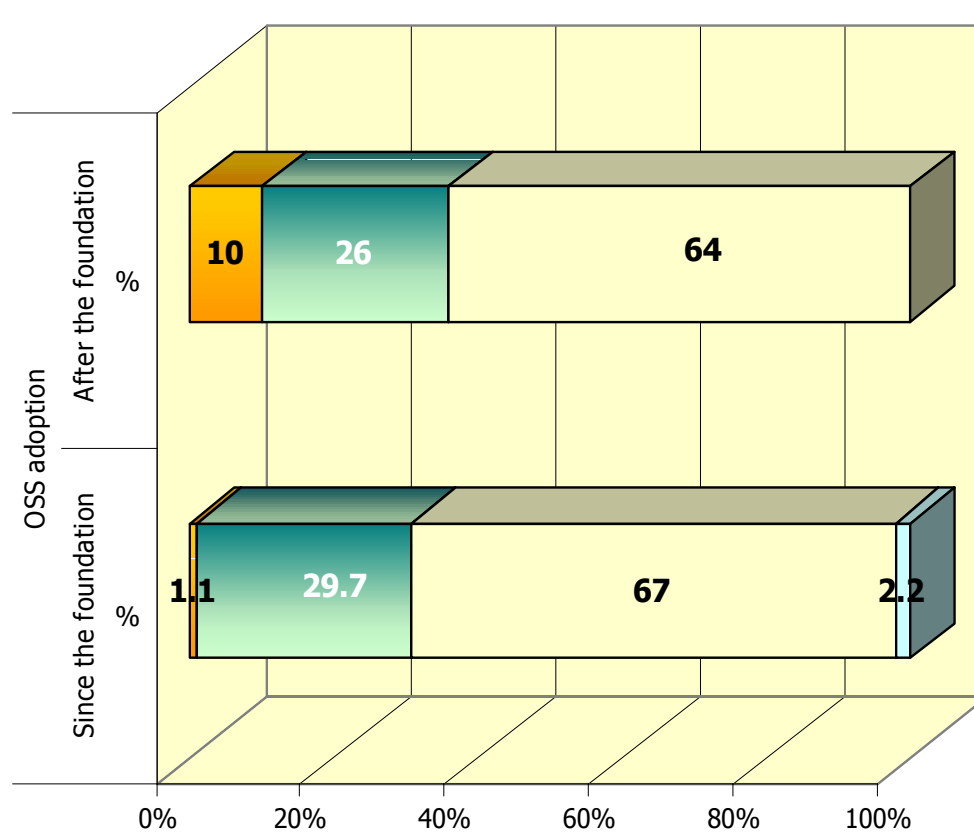
A comparison between firms that have been adopting OSS since the foundation and the other ones^(cont)

Variable	Acronym	OSS adoption						Total			MANN-WHITNEY TEST (P VALUE)
		Since the foundation			After the foundation			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
Importance attached by the customers: Certainty of product support	CPR	88	3.8	1.1	46	4.3	1.0	134	3.9	1.1	0.010
Importance attached to the customers: No license fees	CLIC	87	4.2	1.0	46	4.5	1.1	133	4.3	1.0	0.013
OSS market share: Server side in the private sector	PRSSL	71	58.4	21.1	35	49.5	22.9	106	55.4	22.0	0.037
Obstacles to the OSS adoption: Security	H2	90	1.5	1.1	48	2.0	1.2	138	1.7	1.2	0.005
Obstacles to the OSS adoptionL: Lack of marketing and advertising	H4	91	3.2	1.2	49	2.8	1.4	140	3.1	1.3	0.096
Obstacles to the OSS adoption: Difficulty of use	H5	91	3.6	1.2	48	2.9	1.5	139	3.3	1.3	0.015
Motivations to use OSSL: Contributions from the OSS community	M8	90	4.0	1.1	48	3.7	1.3	138	3.9	1.2	0.089
Motivations to use OSS: Studying the code written by others	M9	90	3.5	1.3	46	2.9	1.3	136	3.3	1.3	0.009
Technological motivations (average value)	TM	91	3.6	0.8	48	3.3	0.8	139	3.5	0.8	0.053

In general firms that have been adopting OSS since the foundation attach much more importance to

- The difficulty of use as an obstacle to the diffusion of the OSS
- The feedbacks and contributions from the OS community

OSS adoption: Competences of the promoting partners



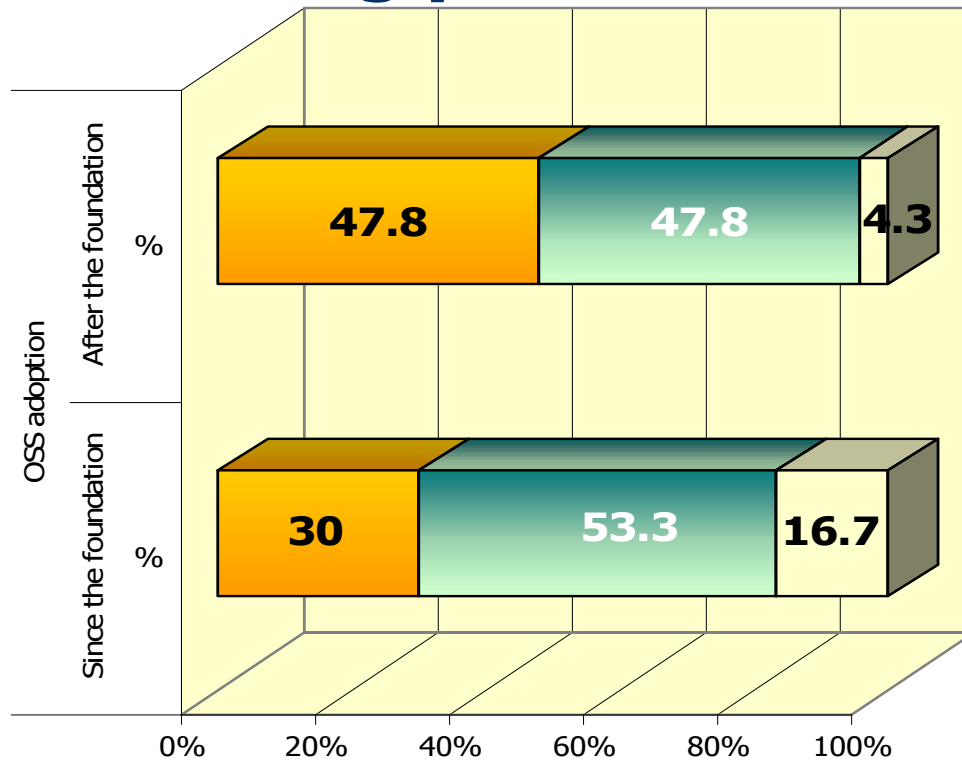
Chi Square = 0.063

The firms that have been adopting OSS since the foundation

- Are more likely to have a promoting partner group with technical skills

■ Competences: Economic ■ Competences: Technical
■ Competences: Mixed ■ Competences: Other

OSS adoption: Promoting partners



Chi Square = 0.038

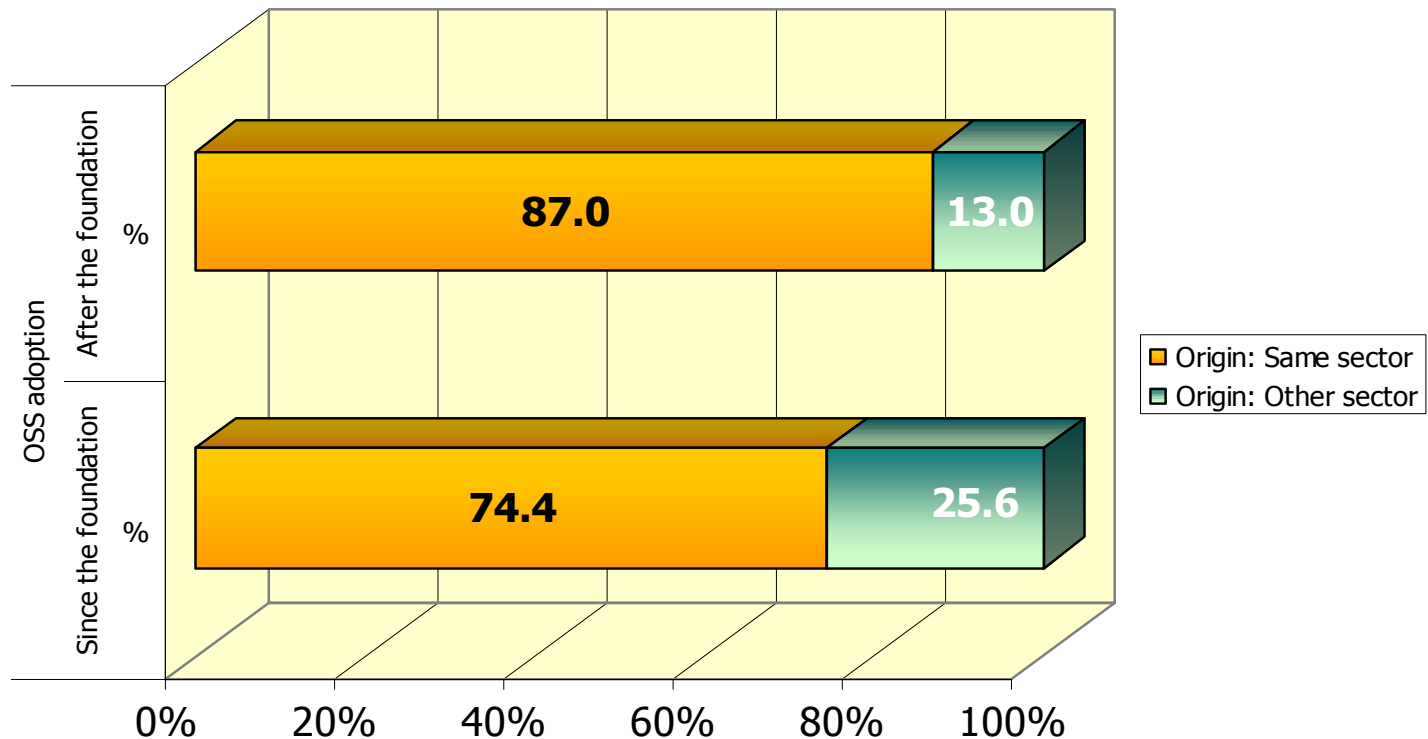
- Firms established by: Ex - employees
- Firms established by: Entrepreneurs and professionals
- Firms established by: Start up companies

Among the firms that have been adopting OSS since the foundation

- There is a higher percentage of start up companies
- Also small firms without any experience can now enter the software sector

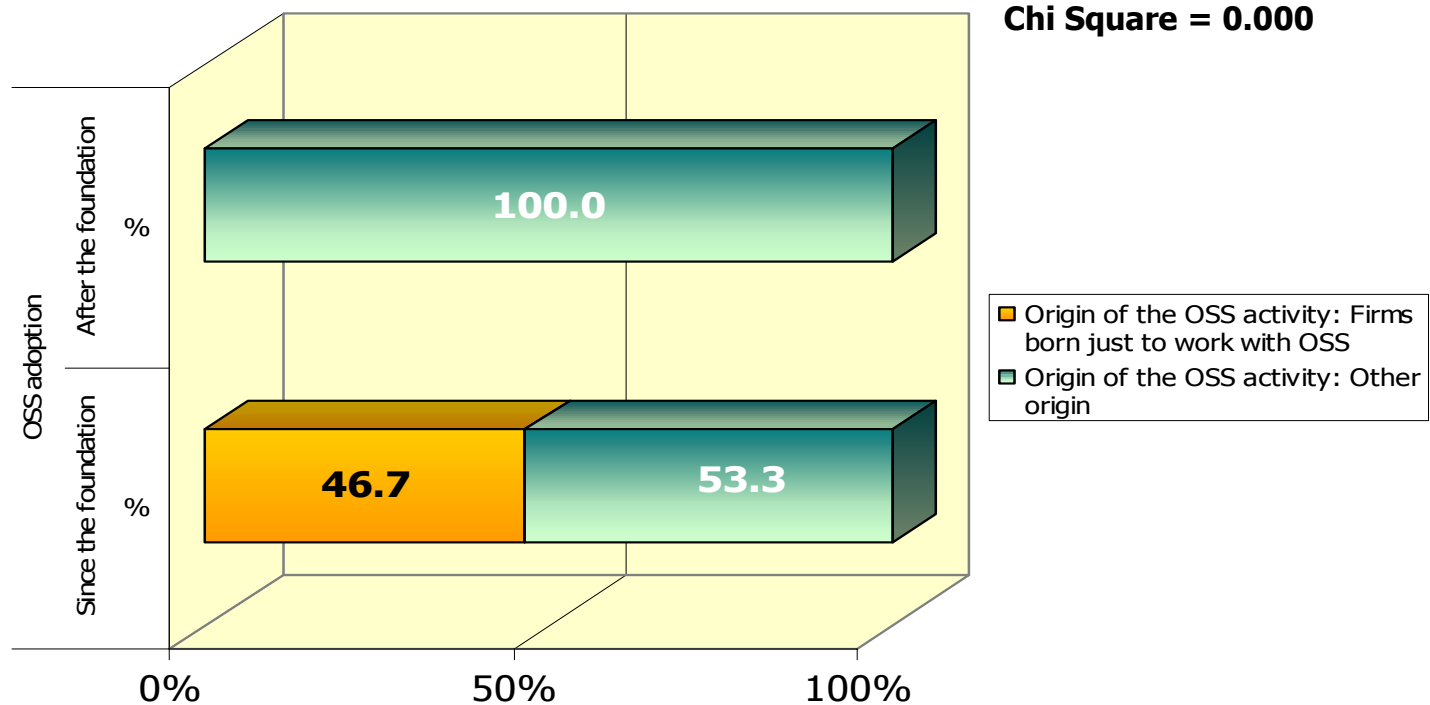
OSS adoption: Sector of origin

Chi Square = 0.069



- Among the firms that have been adopting OSS since the foundation there are a higher number of firms coming from other sectors
- Open Source software seems to lower down the entry barriers

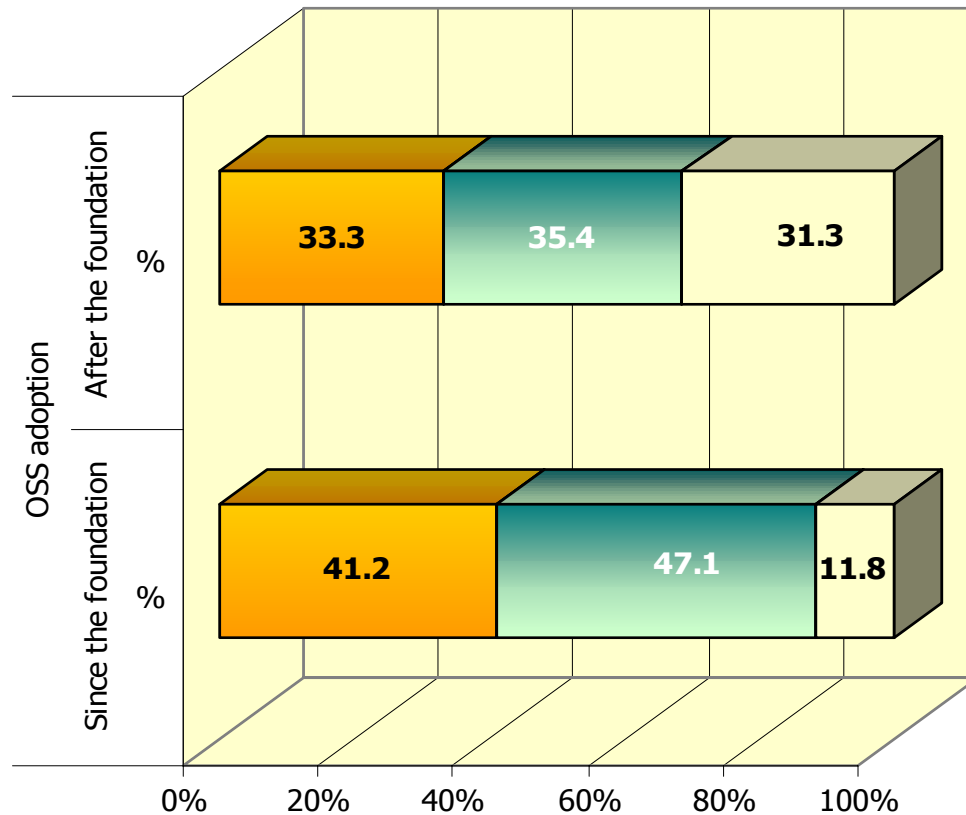
OSS adoption: Origin of the OSS activity



More than half of the firms that have been adopting OSS since the foundation

- Are born just to work with the OSS

OSS adoption: Staff



In general the firms that have adopted OSS since the foundation

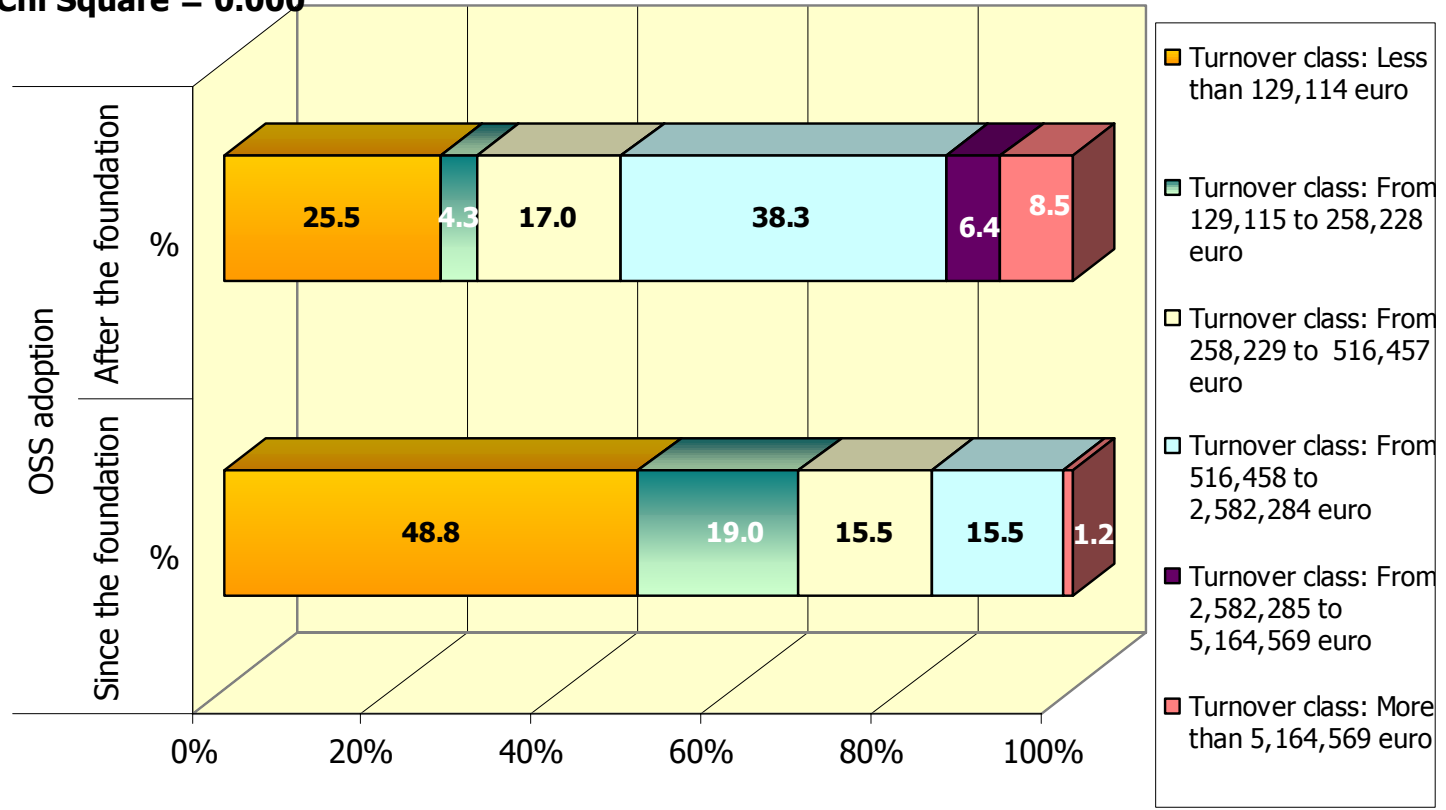
- Are smaller

■ Employee class: < 6 ■ Employee class: 6 - 20 □ Employee class: > 20

Chi Square = 0.022

OSS adoption: Turnover

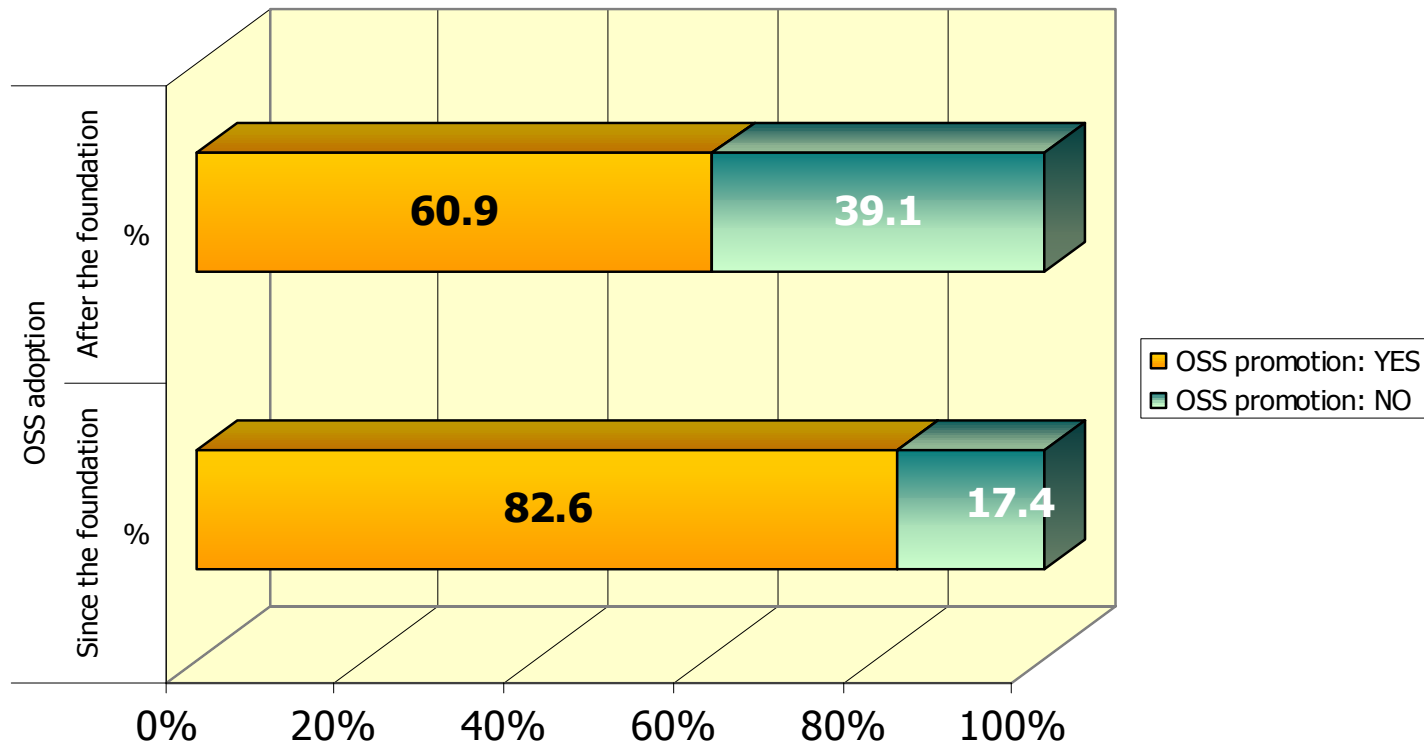
Chi Square = 0.000



The analysis of the turnover class corroborates the previous findings

OSS adoption: OSS promotion

Chi Square = 0.006

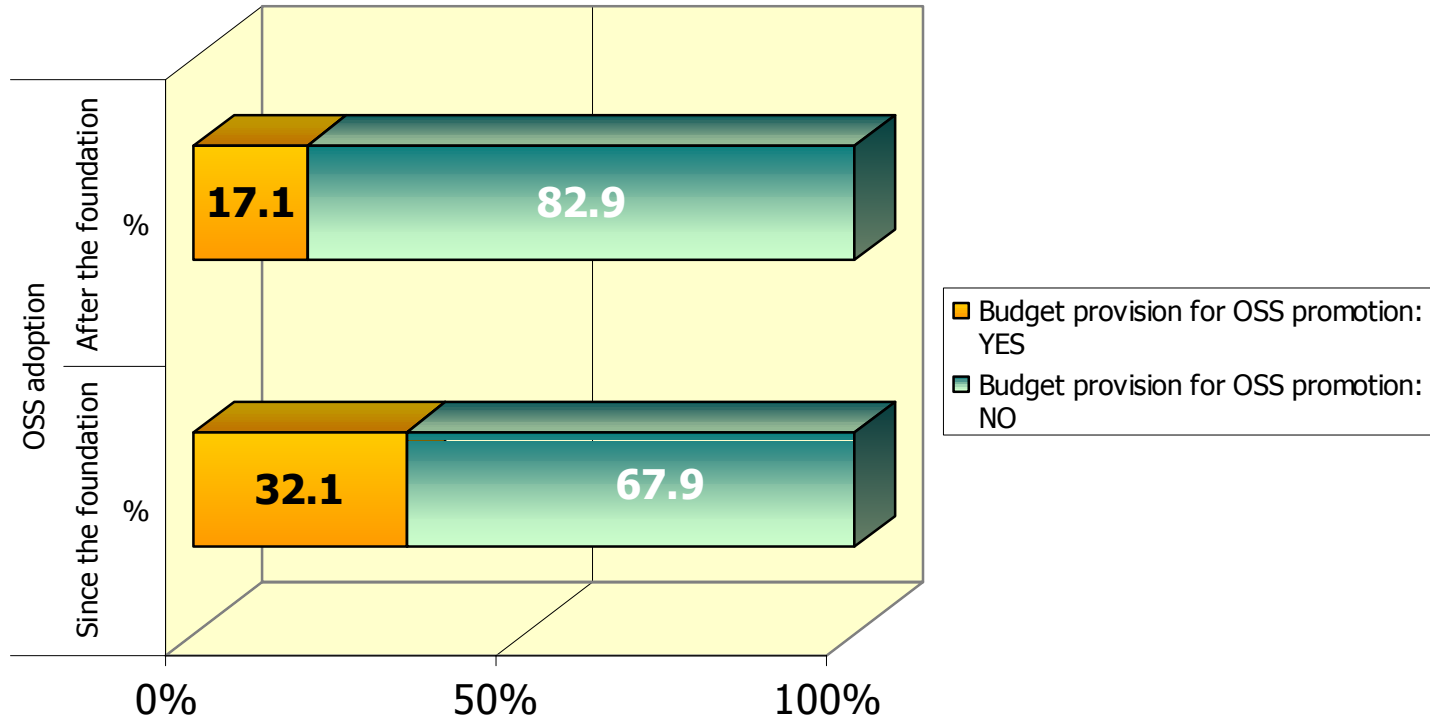


In general the firms that have been adopting OSS since the foundation

- Carry out heavier OSS promotion activity

OSS adoption: Budget for OSS promotion

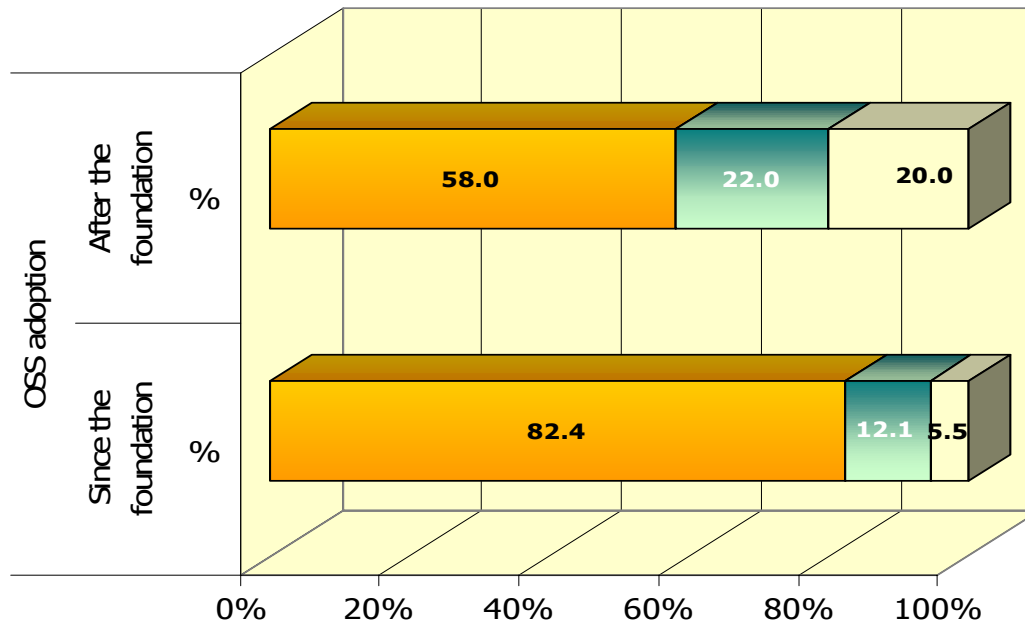
Chi Square = 0.072



More than 30% of the firms that have been adopting OSS since the foundation

- Have a budget provision devoted to OSS promotion

OSS adoption: OSS strategic importance



Chi Square = 0.004

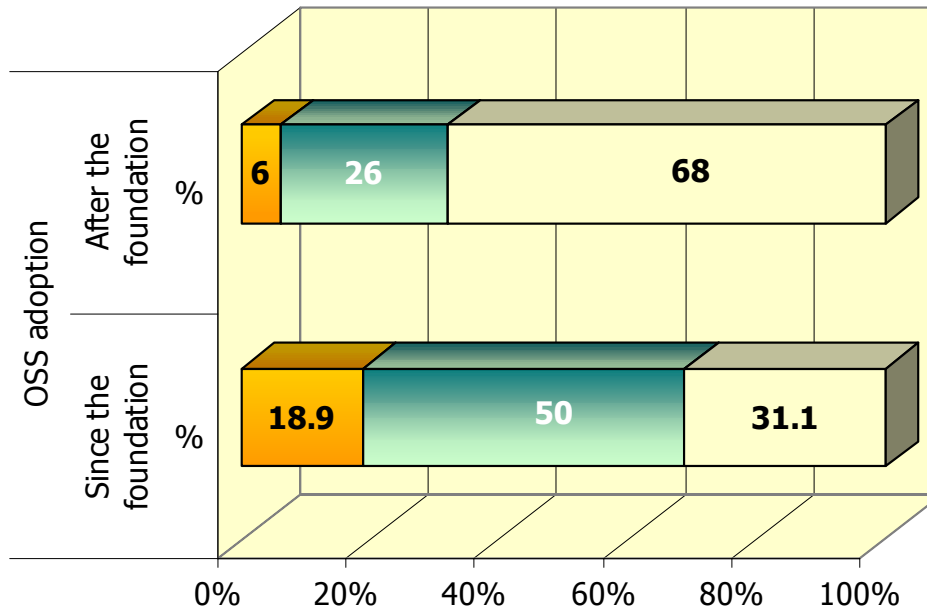
■ OSS strategic importance: High ■ OSS strategic importance: Middle
■ OSS strategic importance: Low

In general firms that have been adopting OSS since the foundation

- Attach much more strategic importance to OSS

OSS adoption: Solution offered to the customers

Chi Square = 0.000



Only 31.1% of the firms that have been adopting OSS since the foundation

- Offer indifferently Open Source and proprietary solutions to customers

- Solutions offered to the customers: Only OSS
- Solutions offered to the customers Mainly OSS
- Solutions offered to the customers Indifferently OSS/PS



Licenses: LEGEND

PURE GPL Exclusive use of the GPL vs. non exclusive use of the GPL

•**GPL** Exclusive use of the GPL

•**D_GPL** Non exclusive use of the GPL

MIXED GPL Use of the GPL vs. Non use of the GPL

•**A_GPL** Use of the GPL (Exclusive or Non Exclusive)

•**NO_GPL** No use of the GPL

Licenses: General characteristics

Variable	Acronym	Mixed GPL						Total			TEST MANN-WHITNEY (P VALUE)
		A_GPL			NO_GPL			N	Mean	Std. Dev	
		N	Mean	Std. Dev	N	Mean	Std. Dev				
No. Of male employees	NDM	106	7	23.4	25	12	30.9	131	8	25.0	0.097
Staff - % of women	PF	106	18.7	18.7	25	32.6	24.8	131	21.4	20.6	0.004
Staff	ADDTOT	106	15.1	33.9	25	24.6	47.5	131	16.9	36.9	0.082
Average age of partners	ES	99	35.4	7.2	24	39.9	8.2	123	36.3	7.6	0.009
Turnover/Staff	FDIV	104	2.3	1.4	25	2.9	1.6	129	2.4	1.4	0.071
Change in Open Source turnover (in the last 3 years)	OSSTC	52	98.6	146.3	12	60.4	96.9	64	91.4	138.5	0.085
No. Of Linux based products	DIVATTL	110	3.5	1.9	27	2.3	2.2	137	3.2	2.0	0.004

In general firms that use the GNU GPL license

- Are smaller
- Have been established by younger promoting partners
- Hire a lower % of women in their staff
- Supply more Linux based products

Licenses:

General characteristics (cont)

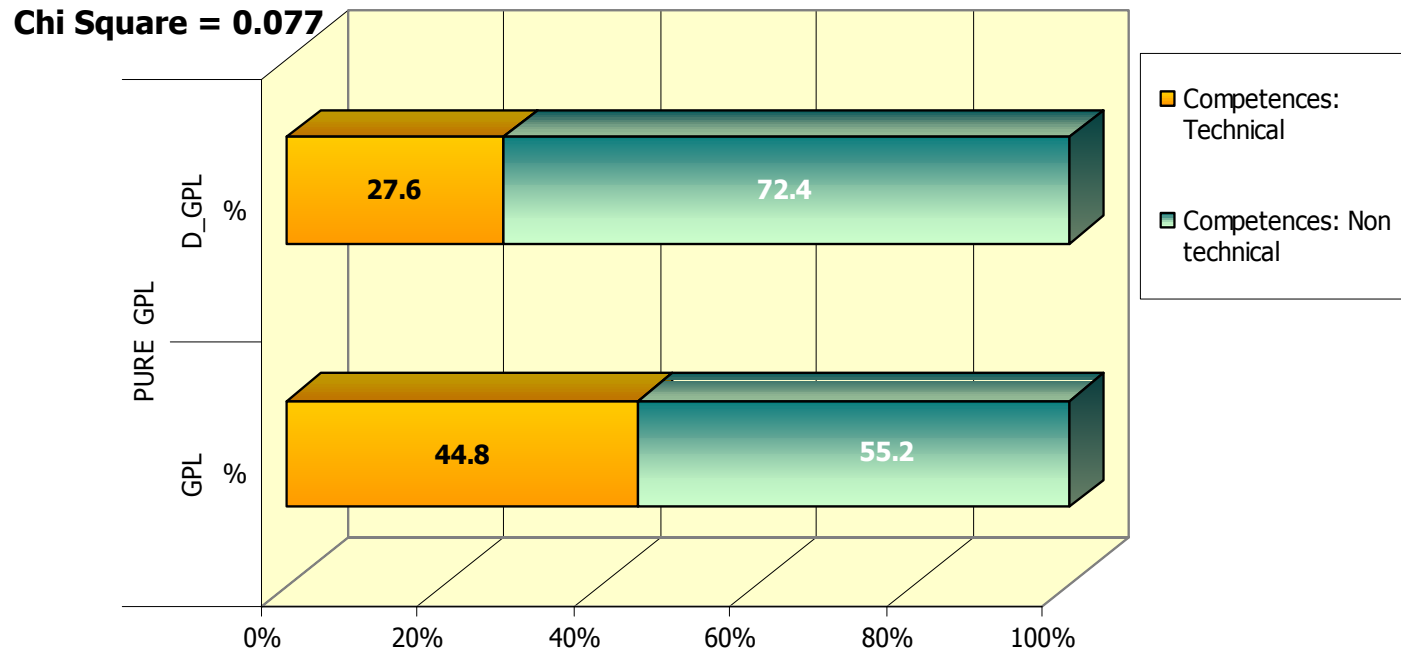
Variable	Acronimo	MIXED GPL						Totale			TEST MANN-WHITNEY (P VALUE)
		A GPL			NO GPL			N	Mean	Std. Dev	
		N	Mean	Std. Dev	N	Mean	Std. Dev				
% of GPL use	PGPL	30	59	29.1	13	10	28.3	43	44	36.4	0.000
Time devoted to OSS promotion (days per employee)	TIME	70	59.7	93.8	13	38.2	98.8	83	56.3	94.3	0.002
Advantages ascribed by the customers to OSS: Lower hardware costs	CHW	110	2.8	1.4	20	3.8	1.2	130	2.9	1.4	0.004
Importance attached by the customers: No license fees	CLIC	110	4.4	1.0	20	4.0	1.1	130	4.3	1.0	0.073
Diversification of the OSS activities	DIVATTSL	110	2.5	1.0	24	2.0	1.0	134	2.4	1.0	0.034
OSS market share: Server side PA	PASSL	90	52.8	24.7	16	40.3	22.7	106	50.9	24.7	0.061
OSS market share: Server side - private sector	PRSSL	89	57.1	21.6	15	46.0	22.7	104	55.5	22.0	0.069
Obstacles to the OSS adoption: Security	h2	109	1.6	1.1	26	2.1	1.4	135	1.7	1.2	0.023
Motivations to adopt OSS: Availability of IT specialists	M3	106	3.5	1.3	23	2.9	1.1	129	3.4	1.3	0.026
Motivations of OSS adoption: Innovation by SMEs	M4	108	4.0	1.2	23	3.6	1.1	131	3.9	1.2	0.030
Economic motivations (Average value)	EM	111	3.6	0.8	24	3.2	0.9	135	3.6	0.8	0.037
Motivations to adopt OSS: Code sharing with the OSS community	M5	110	3.5	1.3	23	2.9	1.2	133	3.4	1.3	0.028
Motivation to adopt OSS: Conformation to the OS value	M6	109	3.9	1.2	23	3.0	1.4	132	3.7	1.3	0.002
Motivations to adopt OSS: Fight for software freedom	M7	104	3.2	1.5	23	2.3	1.2	127	3.0	1.5	0.003
Social motivations (average value)+	SM	110	3.5	1.0	24	2.8	1.1	134	3.4	1.1	0.001
OSS Reliability/ Quality	M10	109	3.9	1.2	24	3.5	1.1	133	3.9	1.2	0.067
Technological motivations (Average value)	TM	110	3.6	0.8	24	3.3	0.8	134	3.5	0.8	0.065

Licenses: General characteristics (cont)

Variabile	Acronimo	PURE GPL						Total			TEST MANN-WHITNEY (P VALUE)
		GPL			D. GPL			N	Mean	Std. Dev.	
		N	Mean	Std. Dev.	N	Mean	Std. Dev.				
No. Of women among promoting partners	NSF	27	0.0	0.2	104	0.5	0.9	131	0.4	0.8	0.001
No. Of women among operative partners	NSOF	27	0.0	0.2	104	0.4	0.8	131	0.3	0.7	0.004
% of OSS turnover in 2001	FSL01	17	61.8	41.7	84	44.2	35.6	101	47.2	37.1	0.086
No. Of proprietary products	DIVATTPR	28	0.5	1.1	109	1.2	1.8	137	1.1	1.7	0.021
Product differentiation	DIVPROD	29	6.6	3.7	109	8.0	3.7	138	7.7	3.8	0.088
% of GPL use	PGPL	5	100.0	0.0	38	36.6	32.0	43	44.0	36.4	0.000
% of use of other OSS licenses	PL0S	5	0.0	0.0	38	43.7	32.0	43	38.6	33.3	0.001
% of use of own licenses	PLP	5	0.0	0.0	36	14.9	25.3	41	13.0	24.2	0.083
No. Of contacts with PA and public bodies	NCS6	19	2.4	5.0	54	42.8	275.3	73	32.3	236.9	0.083
Importance attached by the customers: Full software control	PCSW	26	3.7	1.2	102	3.0	1.2	128	3.2	1.2	0.025

Licenses:

Competences of the promoting partners

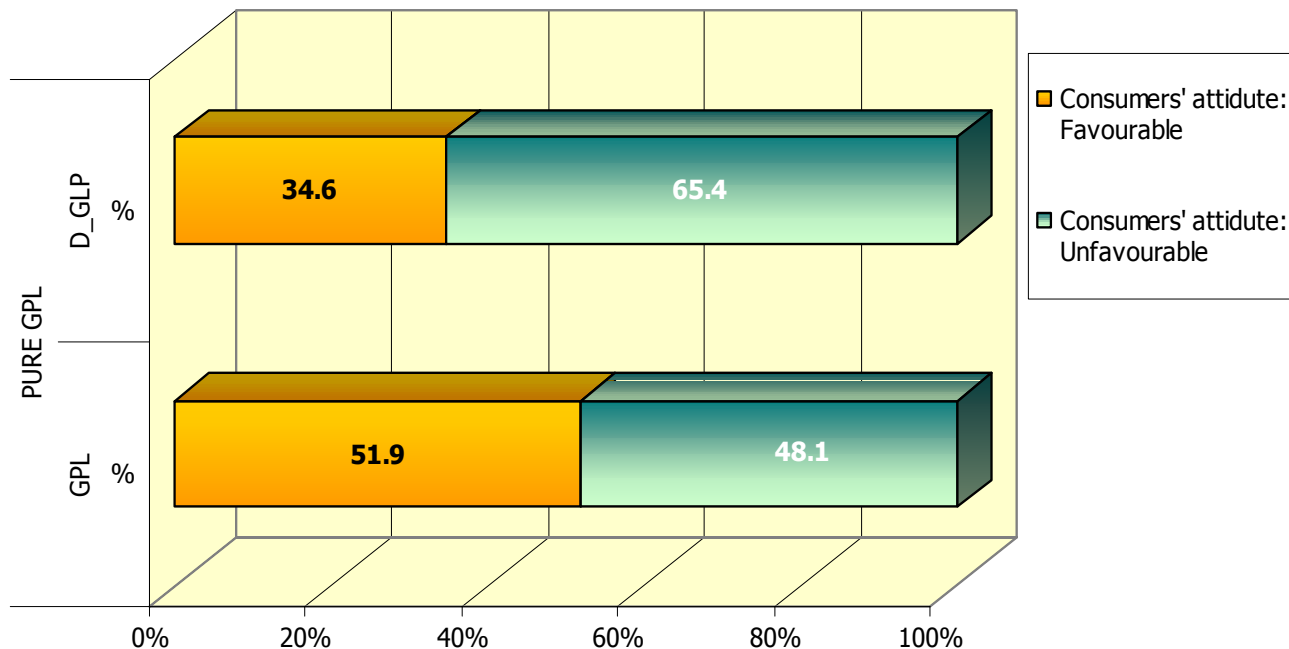


More than 40% of the firms that use only the GNU GPL license

- Were established by a promoting partner group that is composed only by technicians

Licenses: Consumers' attitudes

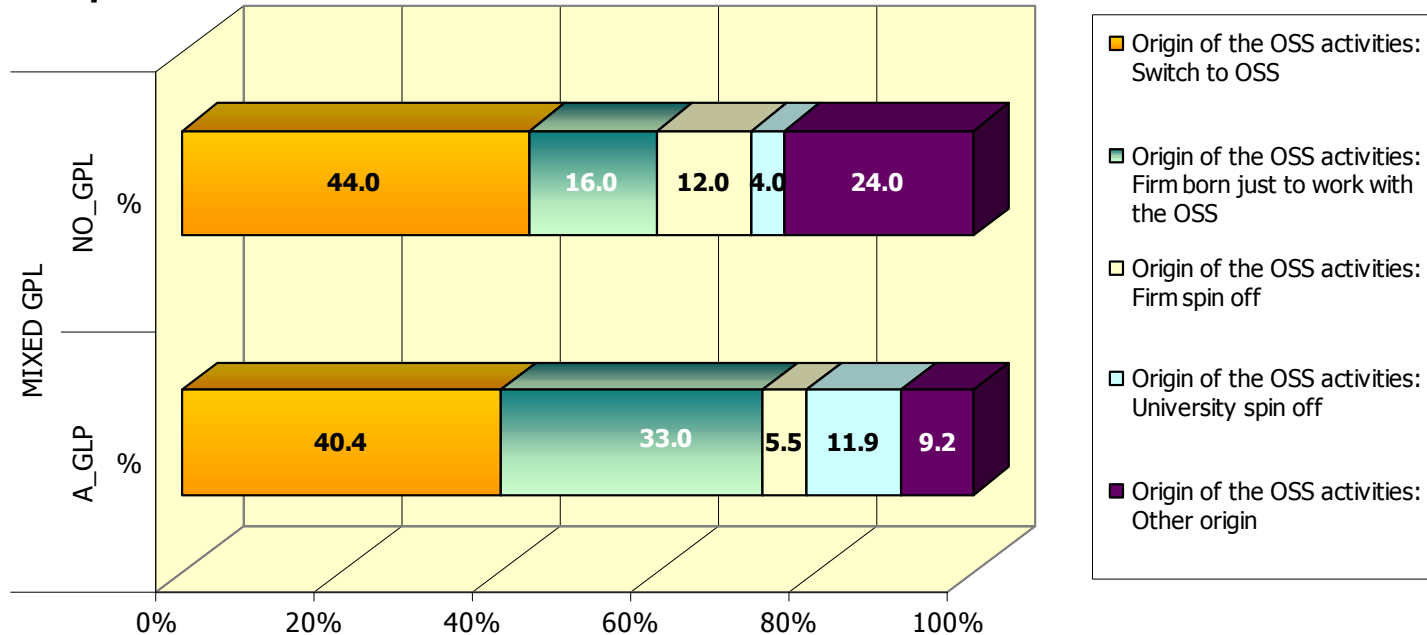
Chi Square = 0.100



Around 50% of firms that use only the GNU GPL license
•Claim that their customers are favourable to Open Source software

Licenses: Origin of the activity with the Open Source software

Chi Square = 0.082

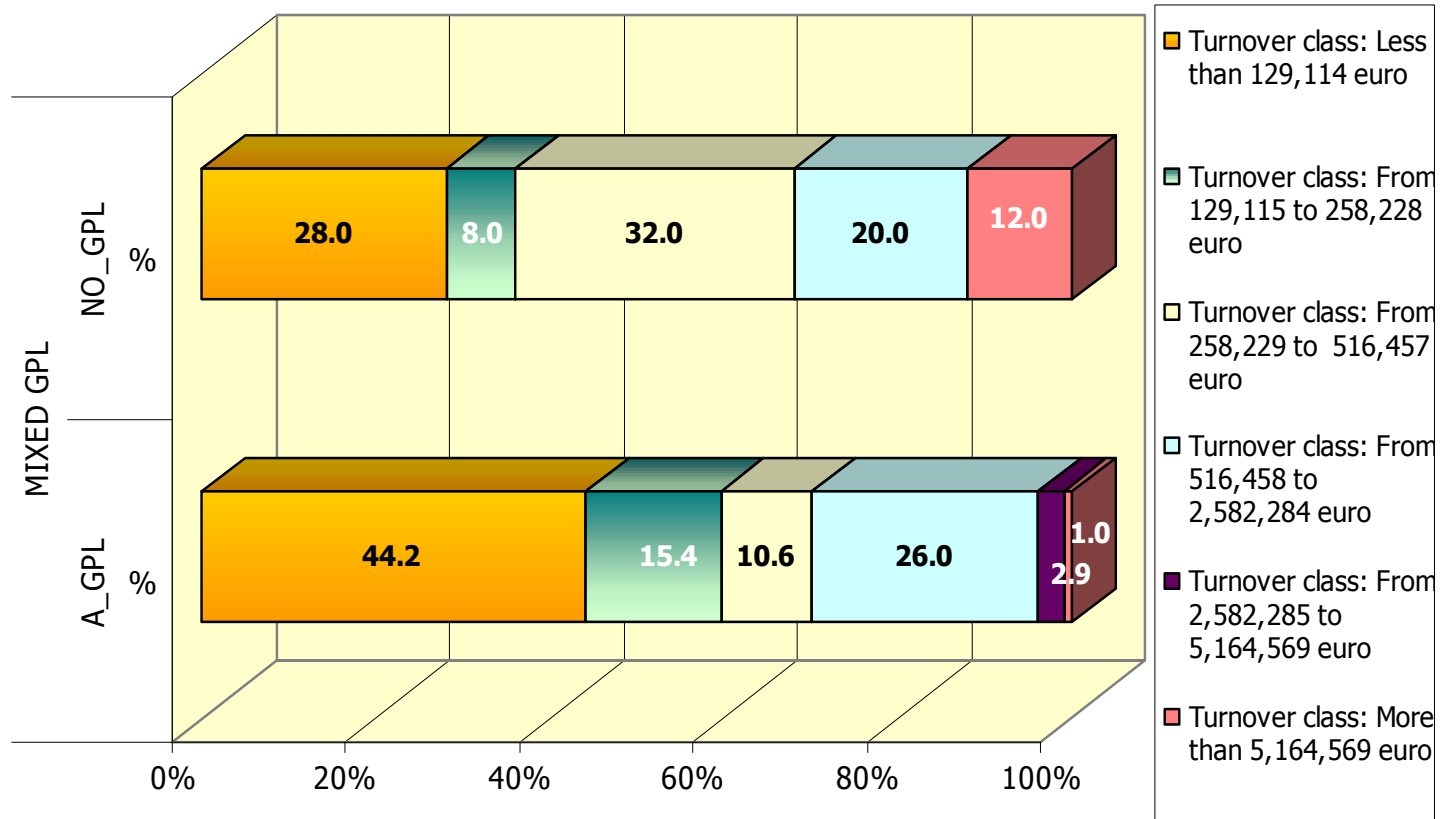


More than 30% of the firms that use the GNU GPL

- Were born just to work with OSS

Licenses : Turnover

Chi Square = 0.004

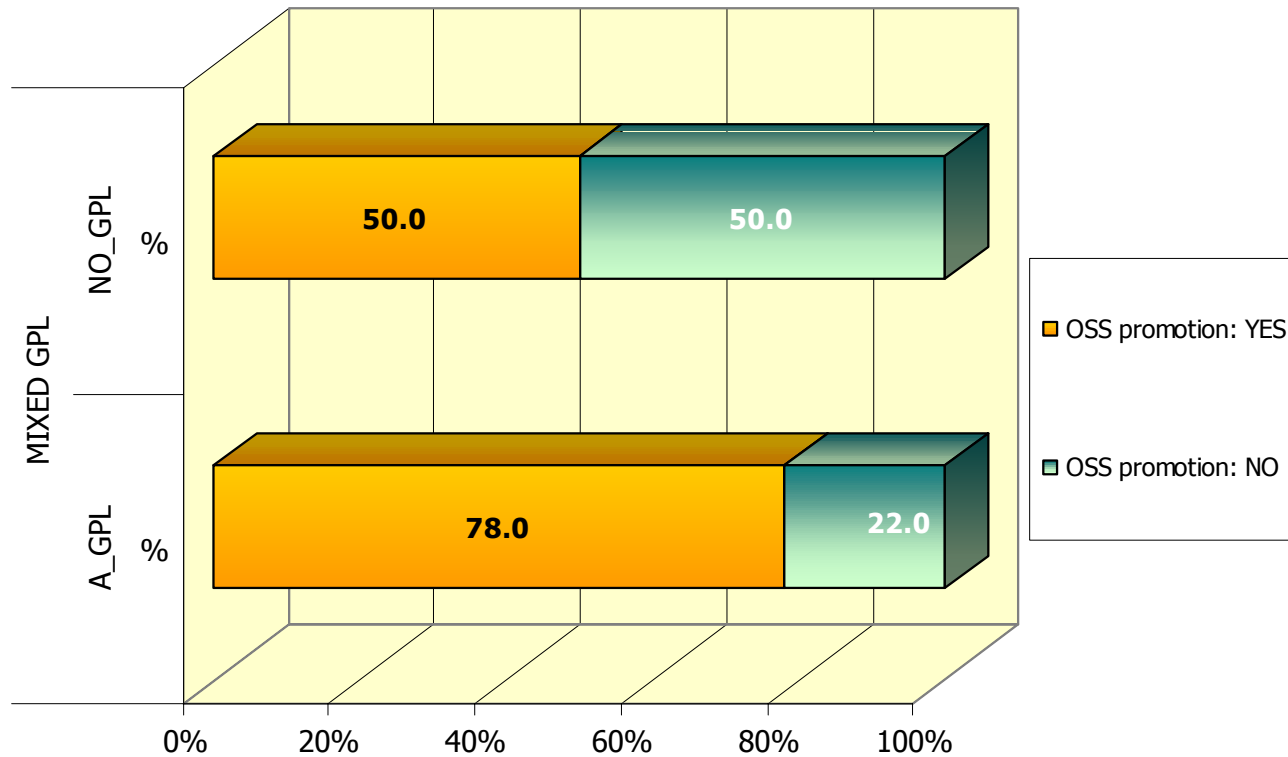


In general the firms that use the GNU GPL are

- Are smaller

Licenses: OSS promotion

Chi Square = 0.009

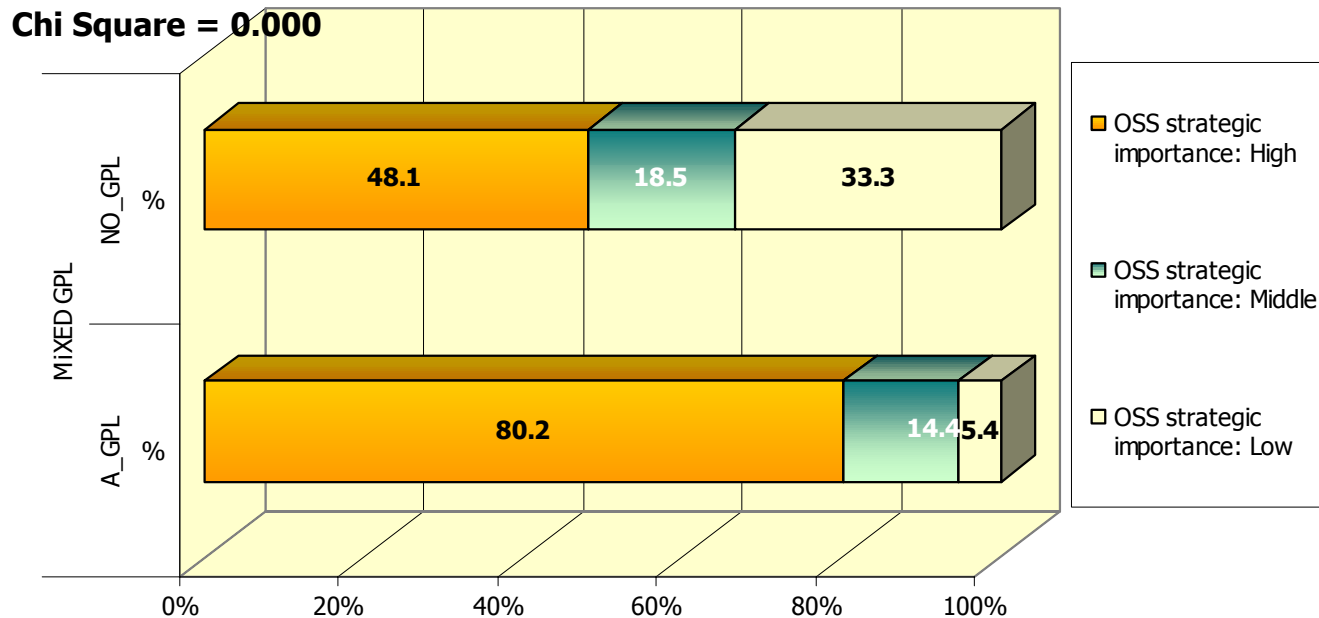


In general the firms that use the GNU GPL

- Carry out OSS promotion activities

Licenses:

OSS strategic importance



In general the firms that use the GNU GPL

- Attach much more strategic importance to the OSS