

Free/Libre and Open Source Software: Policy Support

FLOSSPOLS

Deliverable D3 (cover page)

Results and policy paper from survey of government authorities

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Free/Libre and Open Source Software: Policy Support

FLOSSPOLS Deliverable D3: Results from the local governments survey

Executive Summary

A major component of the FLOSSPOLS project is the understanding of attitudes towards and usage of Free/Libre/Open Source Software (FLOSS) in the public sector in Europe, and local (including regional) government authorities in particular. To this end, a comprehensive survey has been conducted, using telephone first contacts, telephone reminders, and a questionnaire by telephone, fax or (accounting for the vast majority of responses) web-based forms. The survey has been conducted in Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Italy, Netherlands, Poland, Spain, Sweden, and the UK, in 10 local languages. Personalised questionnaires were provided to 4138 organisations from the ELGO database and augmented by an “open” questionnaire in some countries leading to a total of 955 valid responses.

Due to differences in the structure of responses in different countries, the survey is not representative at the country level, so differences between countries should be seen as applying to the respondents, not to the countries in general. Thus, most of the analysis has focussed on overall findings on government attitudes and usage, rather than country differences. The highlights of the survey findings are as follows:

- Roughly half (49%) of local government authorities report some intentional use of FLOSS. However, a large additional population (29%) reports using FLOSS software, such as GNU/Linux, MySQL or Apache, but are unaware that these are FLOSS.
- Within organisations, partial use on servers dominates (40%) followed by partial use on desktops (16%). 20% experiment in pilot projects. Complete use is very rare, whether on desktop or server.
- Demand exists: 70% of FLOSS users and 38% of non-users want to increase FLOSS use. Awareness of FLOSS leads to increased willingness to use it regardless of current use/non-use.
- More than a fifth of those wanting to increase FLOSS use want a *complete* migration to FLOSS.
- Perceived advantages of FLOSS include: customisation and the ability to combine it with existing proprietary systems. Barriers perceived by *non-users* include cost of training and being the first among peer organisations to adopt FLOSS. The experience of current users leads them not to see such barriers, and to appreciate the advantages more strongly than non-users.
- Organisations valuing interoperability are much more likely to increase FLOSS use.
- For non-users, who are more likely to use external maintenance services, a sense of vendor dependency and the need to customise software are strong drivers to future FLOSS use.
- Small budgets lead to “unaware” FLOSS use rather than intentional use or non-use of FLOSS.
- Licence fees account for 20% of IT budgets. Half of all respondents find this too high. This perception leads to increased future FLOSS use, especially among current non-users.
- FLOSS users administer 35% more PCs per IT administrator than non-users – FLOSS use appears to reduce administrator workload per PC, and IT departments with high workloads are more likely to want a future increase in FLOSS use.

The report concludes that increasing awareness, highlighting best practice case studies and encourage experimentation in pilot projects would increase and deepen FLOSS use in future.

(signed, March 31, 2005)

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Free/Libre and Open Source Software: Policy Support

FLOSSPOLS

Usage of and Attitudes towards Free / Libre and Open Source Software in European Governments

Results from the Governments Survey

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Maastricht, March 2005



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2 Free/Libre/Open Source Software for governments

Within the last 15 years, free / libre and open source software (FLOSS) products have reached a considerable position in the software market. Linux plays an equally strong role as Microsoft in the market for operating systems, and the market for web server software is even dominated by the Apache web server.¹ According to Varian & Shapiro (2003, 2) open source software has thus "... achieved a 'critical mass' sufficient to assure users that it will be available and improved for years to come, reducing the risk to users and to software developers of making investments associated with Linux." Open source software is therefore an increasingly attractive option for IT managers in the private as well as in the public sector. (Varian & Shapiro, 2003, 1; Becker, 2004)

The reasons why open source software became so attractive are manifold. They range from cost-effectiveness (Robert Francis Group, 2002; Winslow 2004; Bayerischer Oberster Gerichtshof, 2001, 63-73)² and improved flexibility (Varian & Shapiro, 2004, 2, 11) over expiration of maintenance and support through software vendors, increased technical requirements, increased interoperability, and independence from software vendors (KBSt, 2003: 19) to security aspects (Deutscher Bundestag, 2001) and improved reliability (Wheeler, 2002). The FLOSS user survey (Wichmann, 2003) showed

¹ In contrast, with a share of more than 90% Microsoft unmistakably dominates the market for desktop applications with its Windows suite (Kotadia, 2004).

² Cost-effectiveness is often first mentioned when the advantages of open source over proprietary software are discussed, since the purchase of proprietary software is aligned with high licence fees for the software usage, whereas open source software is free or charged with very low prices. However, to measure the costs aligned with software is a complex matter, since they are not only associated with purchasing costs, but also with costs for maintenance, security updates, staff training, and the more. There are different attempts to measure these 'total costs of ownership' (TCO), all associated with the problem that there is no single best way to make these costs comparable across different studies and therefore often resulting in contradictory findings. The Robert Francis Group study in 2002 found that over a three years period Linux is 250% cheaper than Microsoft Windows, which is largely confirmed by a similar study of Cybersource (2002). Both these studies have been initiated by IBM, which plays an important role as a commercial player in the field of open source. In contrast, Microsoft sponsored study by BearingPoint in 2004 claims that over a three as well as over a five years period licence and support costs for Windows servers are cheaper than for Red Hat and Novell/SUSE Linux servers. (BearingPoint, 2004) Accordingly, worldwide survey of the Yankee Group in association with Windows Tools Provider Sunbelt Software claims that a significant or complete switch from Windows to Linux would be three to four times more expensive than a Windows upgrade. (Open Source News, April 2004). Open Ireland, a lobby group that promotes the usage of open source software in Irish government, suspects many studies "to 'follow the money', giving the message of the sponsor." (Quoted from eGovernment News, 11 May 2004) Varian & Shapiro (2003, 12) "suppose that neither of these two platforms has a striking advantage over the other in terms of conventional measures of TCO." However, the crucial point in these studies is surely not the existence or non-existence of monetary interests of the research companies, but that they associate Linux with costs for services (such as support or staff training) that are not necessarily aligned with it. Winslow points out that instead negotiating support contracts it is one of the best ways to cope with the requirements of a migration towards Linux by participating actively in the open source software community, which provides a large and powerful knowledge-base and support infrastructure for occurring problems and which costs only the time to write an email. (Winslow, 2004)

that corporate IT managers in the private and public sector considered higher stability together with operation and administration costs savings as striking advantages of open source over proprietary software. Yet, as Varian & Shapiro (2003) exemplify with Linux, there are farther-reaching reasons for the public sector to adopt open source software:

“Public sector technology managers have additional reasons to adopt Linux. Adoption of Linux platform software promotes the training of software engineers and provides an open platform on which commercial or open source applications can be built, thereby spurring the development of a robust domestic industry. Certainly, any government information technology manager seeking to put in place a flexible computing environment that also helps promote the domestic software industry should give serious consideration to Linux.” (Varian & Shapiro, 2003, 20)

Thus, the broad adoption of open source software by the public sector is expected to result in increased economic growth and employment.³ Indeed, the great success has been enough for open source to be considered as a useful alternative for e-government applications. Consequently many governments, on the state level as well as on the regional and local level, started political interventions in order to increase the use of open source software.⁴ (See Schmitz, 2001; Ghosh et al., 2002; critical: Bernard and Reddy, 2002) At current, these political initiatives gain significance because they coincide with “the biggest desktop refresh since Y2K”. (Kotadia, 2004) Because maintenance and support contracts for investments that were done in 2000 in order to avoid Y2K problems expire now, the Gartner Group estimates that 220 million corporate desktop PCs will be replaced in 2004 and 2005. (Gartner Group, 2004) Thus, right now we are at crossroads that determine the design of corporate IT systems for the next product lifecycle.

However, several gaps remain in our understanding of the functioning and purposes of open source software. One of these gaps concerns contents and directions of government policies towards open source software. To know which experiences with open source software have been made and which experiences are missing, what kind of open source software is used, and which obstacles may hinder

³ This view gets support from an empirical study on open source usage in Italy (CENSIS, 2004). Weber (2004) supports this hypothesis while stressing a different aspect. He points out that the democratic principles of open source have a strong potential in other industries than the IT industries, especially in biotechnology and publishing.

⁴ An overview of such activities is provided by the European Commission’s Open Source Observatory (see <http://europa.eu.int/idabc/oso/>) and by Becker (2004). Presumably as a reaction to some local governments that have opted for open source even on the desktop, such as the city of Munich (Shankland, 2003) or the city of Paris (Guillemin & Broersma, 2004), Microsoft has obviously changed its pricing policy and now offers special discounts for municipalities if they keep to Windows, as the example of the city of Newham in the UK indicates. Newham’s IT director claims to save one million pound per year by sticking with Microsoft because of special terms that deviate from the general terms that are negotiated by the UK Office of Government Commerce. (Open Source News, January 2004).

the usage of open source software in government institutions is of crucial importance for any political activity in this field. The FLOSSPOLS Government Survey contributes to the generation of this knowledge and helps thus to better adapt political strategies in the field of open source software to the actual needs and preferences of IT officers in the public sector. Related Europe-wide data include the “Study into the use of Open Source Software in the Public Sector”⁵ published by the IDA Programme of DG Enterprise, for which Unisys Belgium conducted a survey, in three languages, in 2001 with 66 respondents from 6 EU countries. The FP5 project “Three Roses” in 2003-2004 conducted a small web-based survey of similar size. Furthermore, the FP6 project COSPA is currently gathering information from public administrations, focussing more on technical aspects of FLOSS use. However, with 955 respondents across 13 EU countries, the FLOSSPOLS survey carried out in 10 languages is by far the largest, most comprehensive in-depth survey on usage of and attitudes towards FLOSS in government authorities to date, worldwide.

⁵ <http://europa.eu.int/idabc/servlets/Doc?id=1973>

3 Research questions and hypotheses

Open source software is not at all unknown in government institutions. Research on the Dutch public sector revealed that experiences with free software and open source software are widely spread: In a 2003 survey a majority of the surveyed organisations in the Netherlands have had experiences with FLOSS. But at the same time these experiences were clearly limited in government institutions, as the lion share of them reported only experiences with Linux, Apache web server, and MySQL, whereas desktop applications like OpenOffice and Internet applications like Mozilla are hard to find. (Glott & Ghosh 2003: 23) This reveals clearly that in government organisations open source software is used rather in the form of isolated applications than throughout the whole IT system, which is in line with the overall structure of the software market. Since desktop and Internet applications are used by office employees and not only by IT experts they are essential for a fundamental increase of the use of open source software in government institutions. (As pointed out in the above section, government institutions play a very significant role for tapping the potentials of open source.)

Therefore, the current level of open source software usage and the plans with regard to the future advancement of local governments' IT systems provide a main topic of the survey. Our hypothesis on that point is that it is rather unlikely that European local governments will migrate completely towards open source software in future. Rather, they will aim at a combination of proprietary and open source software.⁶ The technological trend develops also in this direction, as the interoperability of many open source software systems allows using them in a proprietary software environment, and as for many open source software applications (such as OpenOffice) exist special versions that run under Microsoft Windows.

Similarly to our findings from the study of the public sector in the Netherlands we expect the attractiveness of open source to grow with increasing degrees of practical experiences of local governments with open source software. In this context we assume to find significant differences between European countries, as the development of the information society varies considerably between different regions of the EU.

Attitudes towards open source and proprietary software provide another important issue of the survey in order to identify factors that support or hinder the advancement of open source software usage in European local governments. A presumed lack of technical support and high costs for training

⁶ This assumption is shared by Varian & Shapiro (2003, 5).

provide severe obstacles to decide in favour of open source software. Especially those chief IT officers who have no experiences with open source software turned out to be extremely reluctant to an increase of the share of open source software in their organisation within the next two years, whereas almost three fifths of the chief IT officers who had experiences with open source software stated that they would find such an increase useful. (Ghosh & Glott 2003: 22) As instructive as these findings however might be, they describe the situation only for one country and cannot be generalised for other European countries. In order to improve the benefits of open source software for public administrations a Europe-wide strategy has to take into account dissimilarities and asynchronicities.

4 Methodology, Coverage, and Response

4.1 Methodology

According to the survey methodology and work plan as described in FLOSSPOLs deliverable No. 1 the creation of the questionnaire was completed in April 2004 and pre-test interviews, which were carried out by phone or face-to-face, were conducted in May and June 2004. Overall 50 such pre-test interviews have been done in four different countries (Germany, Greece, Poland, Spain, and the UK) and evaluated with regard to the functionality of the questionnaire. Responses to the pre-tests that corresponded to the final version of the questionnaire have been included in the final sample. The final version of the questionnaire is attached to this document (see appendix 1).

The main survey was carried out as an online survey in two different forms, a "personalised" and an "open" survey. For the personalised survey IT managers in European municipalities were contacted directly by email and provided with a link to the online questionnaire.⁷ The examination of different sources of contact information for public administrations, such as directories, almanacs of public authorities and websites of municipal and regional organisations, such as [urbanicity.org](http://www.urbanicity.org)⁸ showed that building a contact list from these source would be too complex, time-consuming, and expensive. Talks with experts from government organisations, other researchers as well as our consortium member Eurocities/Telecities recommended the ELGO (European Local Governments) database, which covers over 14,000 local and regional authorities in 27 European countries. It provides information on municipal administrative units with at least 5.000 inhabitants.⁹ Where personal information on the IT manager was not available, the mayors' offices have been contacted. Contacts were in several cases made by phone in order to find the right respondent, remind them to fill out the on-line questionnaire, or (in some cases) to record the responses. For the open survey, support from

⁷ The respondents' privacy was protected by the fact that each recipient of such an email found a "personalised" link to the online questionnaire, so that access of third parties to the information given by a certain respondent was impossible. Each respondent filled out his or her personal questionnaire and had no access to the answers of other respondents.

⁸See <http://www.urbanicity.org/>

⁹ For more details on the elgo database see: <http://www.elgo.co.uk/>. ELGO is a unique database providing information that is not provided by any other organisation, such as statistical offices, municipal organisations or other government institutions. It is also used by private companies for their activities in the public sector.

TeleCities¹⁰ and ELANET¹¹, the European Local Authorities Network Initiative, has been used. Both organisations asked their members in the surveyed countries to support the survey by announcing it to the municipal administrations and distributing the questionnaire among their members. Such support has been provided by Austria (Österreichischer Städtebund), Czech Republic (SMO CR), Italy (UIP / CRC), the Netherlands (OSOSS Programma, Ministry of the Interior, Ministry of Economic Affairs), Poland (PIDG / EMCOM), Spain (FEMP).

Overall, the FLOSSPOLs local governments survey covered 13 European countries:

- Austria
- Belgium
- Czech Republic
- Denmark
- France
- Germany
- Greece
- Italy
- Netherlands
- Poland
- Spain
- Sweden
- UK

Questionnaires and all communications, including phone calls, were in local languages for all countries except Denmark, i.e.: Czech, Dutch, English, French, German, Greek, Italian, Polish, Spanish, Swedish. The English version of the questionnaire was the original, the other nine languages were translations by native speakers, with phone calls by native speakers.

Representatives of Hungarian municipal organisations who attended a presentation of preliminary results of the FLOSSPOLs project on November 18, 2004, in Den Haag, decided to carry out such a survey in Hungary, too, by using the FLOSSPOLs questionnaire and methodology. The FLOSSPOLs local governments survey in Hungary is not completed and was not initiated by the FLOSSPOLs project but an early outcome of the dissemination activities of the FLOSSPOLs project.¹²

¹⁰ TeleCities, part of EuroCities is the major European network of cities committed to leadership in the Information and Knowledge Society, and is a partner in the FLOSSPOLs project. See: <http://www.telecities.org/aboutTC/index.htm>

¹¹ See <http://www.ectaa.gr/ELANET/>

¹² Results from Hungary will be integrated in the FLOSSPOLs database when available.

A hindrance towards the FLOSSPOLS public administration survey and the requested support by national municipal organisations was the fact that IT administrators in public authorities are overwhelmed by commercial surveys and that municipal organisations, especially in the UK, had a stronger interest in protecting their members from surveys than supporting actively the FLOSSPOLS project. Some municipal organisations, including those not supporting the distribution of the FLOSSPOLS questionnaire, offered to provide data on open source usage in their country's municipalities to be compared to the FLOSSPOLS results. Thus the overall support by municipal organisations for the FLOSSPOLS project has been (and still is) significant.

4.2 Contacts and Responses

By March 10, 2005, 4138 IT administrators in public authorities across 13 EU member states¹³ have been contacted for the FLOSSPOLS public administration survey (see table 1).

Table 1: Contacts and Responses

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
	Personalised Contacts**	Structure of contacts	No. of Responses to personalised questionnaire	No. of responses to open questionnaire	Total No. of responses	Sample structure [country shares (col. 6) in total number of responses (955)]	Response rate [share of col. 6 in col. 2 + col. 5]***
Austria*	119	2.9	56		56	5.9	47.1
Belgium	242	5.8	83	1	84	8.8	34.6
Czech Republic*	31	0.7		24	24	2.5	43.6
Denmark	165	4.0	9	1	10	1.0	6.0
France	681	16.5	70	6	76	8.0	11.1
Germany	1492	36.1	277		277	29.0	18.6
Greece	72	1.7	37		37	3.9	51.4
Italy*	259	6.3	42	5	47	4.9	17.8
Netherlands*	374	9.0	141		141	14.8	37.7
Poland*	58	1.4	14	5	19	2.0	30.2
Spain*	221	5.3	40		40	4.2	18.1
Sweden	262	6.3	116		116	12.1	44.3
UK	162	3.9	28		28	2.9	17.3
Total	4138	100.0	913	42	955	100.0	22.8

* = Supported by national municipal organisations.

** = Based on elgo data, only records with email addresses were selected.

*** = Since the number of those who have been informed by national municipal organisations cannot be quantified the response rate must be estimated.

Due to the limitations of the ELGO data there are strong differences by country with regard to the number of people who could be contacted (see col. 2 of table 1). There is a strong dominance of German addressees, whereas the number of contacts in Poland and Greece was relatively low. These differences result from the fact that the ELGO data base contains many more records for North and

¹³ Excluding Hungary, where no-one has been contacted directly by the FLOSSPOLS project team.

West European countries than for South and East European countries. In addition, almost all German records contained an email address, while for instance French and Italian records showed a large proportion of records with no email address. While telephone calls to database contacts were made by the FLOSSPOLs team to gather e-mail addresses, this was limited by resources available to the project.

The country surveys did not start all at the same time, but in a sequential manner. 955 persons have responded to the survey by March 10, 2005, which corresponds to a response rate of roughly 23 percent.¹⁴ The response rate shows strong country-related differences, whereby it is evident that the irregularities regarding the structure of contacts are to a certain degree reproduced with regard to the response rate (col. 8) and the sample structure (col. 7). The sample structure largely reproduces these differences, as Germany, France, the Netherlands, and Sweden provide the large shares in the number of contacts as well as in the number of respondents.

Austria, Denmark, Greece, and Spain provide significant exceptions to this observation, indicating that the structure of the respondents is not at all a linear function of these irregularities in the sampling. Obviously there are also country specific patterns that determine the willingness to participate in such surveys. For instance, the response from Denmark is considerably low, whereas the response from Sweden is quite high, although both countries were surveyed at the same time. (Language could be one explanation for this, as the questionnaire was translated into Swedish, but not into Danish; contacts in Denmark were made in English).

Another factor that plays a significant role for explaining country-specific differences in the response is support from national municipal organisations. All countries where national support from municipal organisations was provided show a higher response rate (column 8) than the countries' respective shares in the sample of overall contacted authorities (column 3). This applies especially to Austria, the Netherlands, and the Czech Republic. In the Netherlands, in particular, the responses are rather high and are also, we believe, least susceptible to self-selection bias. This is due to the strong

¹⁴ Since the number of persons who got knowledge of the FLOSSPOLs local governments survey by the activities of the national organisations that supported the project cannot be quantified, the response rate can only be estimated. For this purpose the number of respondents to the open questionnaire was added to the number of contacts in total. Thus, the estimated response rate is calculated as follows:

response rate = total number of responses / (number of personalised contacts + number of respondents to open questionnaire) x 100.

With regard to the columns in table 1 this formula can also be read as:

col.8 = col.6 / (col.2 + col.5) x 100.

If only the directly contacted persons are considered, the response rate is about 18%.

support given by the Dutch Ministries of Economic Affairs and Internal Affairs and the government's OSOSS Programme. In cooperation with the OSOSS Programme, the FLOSSPOLS team conducted a more extensive survey of all Dutch government authorities with an extended questionnaire designed to be compatible with the Dutch 2003 survey as well as the FLOSSPOLS survey in other countries. (However, only the Dutch local authorities from this survey have been included within the FLOSSPOLS results in this report). Though the same observation can be made in some countries that did not provide such support for the FLOSSPOLS survey, such as Belgium, Greece, Sweden, and the UK, it must be noted that the response from Denmark, France, and Germany remained clearly below these countries' respective shares in the number of contacted authorities and also below the average response rate of 23%.

5 Findings

5.1 Usage of FLOSS

The usage of FLOSS in European local governments is already a quite usual phenomenon, as roughly half (49%) of the participants in the FLOSSPOLS local governments survey say that they use FLOSS programs in their organisation. 47% say they do not use FLOSS at all and another 4% say they do not know whether they use FLOSS.

Since the FLOSSPOLS local governments survey addresses the issue of open source software usage, users of open source software might have been more willing to participate in the FLOSSPOLS local government survey than non-users. In order to estimate whether such a self-selection of the sample might have biased our results we contacted 2942 non-respondents after the final closure of the survey, and asked them why they didn't fill in the questionnaire. Based on our experiences from the pre-test interviews and preliminary contacts, which were done by phone or in person, the respondents were offered to choose one or more from four responses:

- they were too busy;
- they had a general policy not to participate in surveys;
- they were non-users of FLOSS and therefore not interested in participating in the survey; or
- they had other reasons not to participate.

Table 2 illustrates that for 36% of the respondents non-usage and being too busy were the main reasons why they did not respond to the FLOSSPOLS survey, while policy and other reasons were mentioned by roughly 25%.

Table 2: Reasons not to participate in the FLOSSPOLS local governments survey

Reason	Percentage of respondents
I was too busy	36.3
We have a policy not to participate in surveys	23.6
We do not use FLOSS and are therefore not interested in the survey	36.6
Other reason	26.8

Sum of percentages exceed 100% because multiple responses were possible

n = 284

If there was a self-selection of FLOSS users in the sample the share of *non-respondents* who gave non-use of FLOSS as their reason for not responding should exceed the non-user share of 47% among the survey *respondents*. The share of only 36% reported non-use as a reason for non-response indicates that on the aggregate level there was no self-selection of FLOSS users. However, as we will see in a later section of this report, there are differences in the data at the country level, showing differing levels of self selection biases for some countries. This limited the scope of country comparisons that can be carried out with the FLOSSPOLS data.

It appears noteworthy that even to IT managers it is not always clear whether a program is free software / open source software or not. Moreover, in an online survey based on a standardised questionnaire it is not always clear to the respondent whether the question "Do you use open source software systems in your organisation?" (see question 1 in the questionnaire in appendix 1) refers to all kinds of usage or only to regular usage of FLOSS programs in everyday work. Therefore the questionnaire contained a number of additional questions in order to examine in more detail the degree of FLOSS usage in European local governments. The respondents were thus also asked to check from a list of FLOSS programs and from a list of operating systems, reporting what they use. In addition the respondents were asked to which degree they use FLOSS on the server and on the PC, whereby they could choose between (almost) complete or only partial use of FLOSS on the servers / PCs and could also indicate that they are only experimenting with FLOSS in pilots. If the answers to all these questions are taken into account in order to determine correctly the spread of FLOSS in European local governments the respective percentage increases considerably to **79% of local government authorities show some**

use of FLOSS. In the following sections we will therefore distinguish three types of organisations with regard to FLOSS usage: those using FLOSS and being aware of this ("aware usage"), those using FLOSS software (such as Linux or Apache) but reporting that they don't use open source ("unaware usage"), and non-usage.¹⁵ Table 3 shows the shares of these three types within the FLOSSPOLS local government survey.

Table 3: Types of FLOSS usage in European local governments.

Type of FLOSS usage	Percentage
aware usage	49.4
unaware usage	29.9
non-usage	20.6
Total	100.0

n = 955

Given the high incidence of FLOSS in European local governments, the crucial question is to what degree it is used. As shown in table 4, only a very small proportion of the local governments uses FLOSS as regular systems on their PCs, whereas the usage of FLOSS on servers is quite usual. The proportion of 20% of the local governments experimenting with FLOSS in pilots indicates that local governments' interest in using FLOSS has not already reached its peak, but that there are still many organisations trying to find out whether and how it would be useful for them.

Table 4: Degree of usage of FLOSS in European local governments

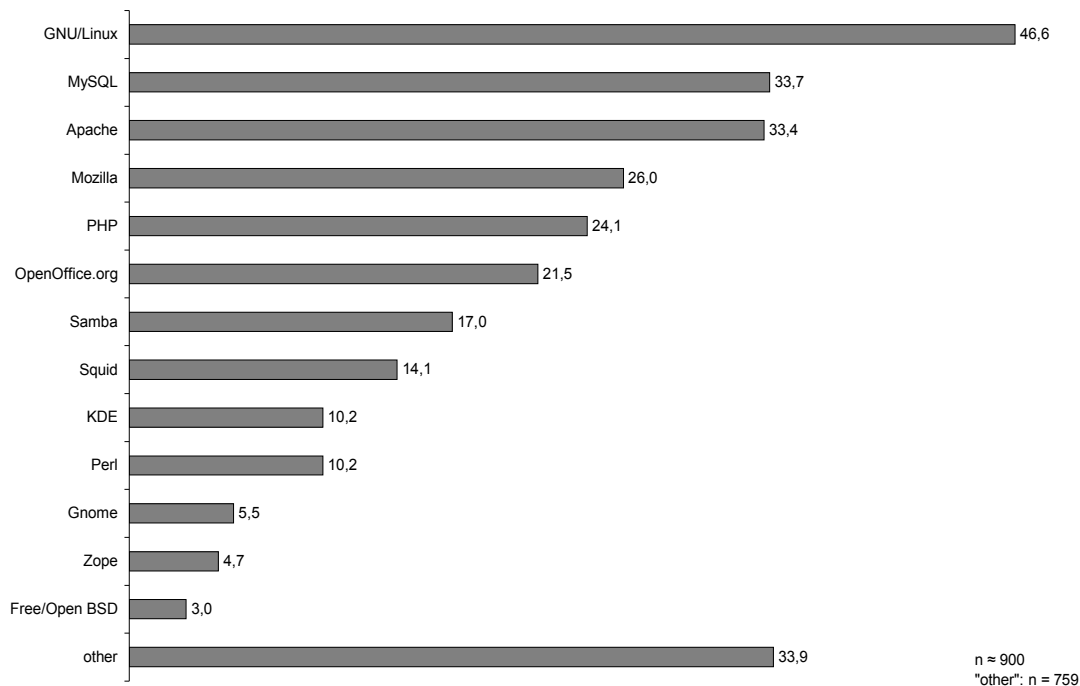
¹⁵ Though it is theoretically difficult to explain why attitudes towards FLOSS should differ between two groups that both think they do not use FLOSS, the results of the analyses clearly confirmed that it is useful to distinguish between these groups. Presumably, those who are aware that they use FLOSS and those who are aware that they do not use FLOSS are more careful about the software that runs on their IT systems than those who think they do not use FLOSS but actually use it. We will see in a later section that the way how an organisation buys its software seems to have an impact on these differences, too. Thus, the significant differences we observe between the unaware users and non-users are apparently the outcome of different kinds of the organisation of work in the IT department or of different professional habits rather than of different ways of using FLOSS. This does of course not imply that those who are unaware that they use FLOSS do their job worse than the other two groups – they do their job differently and have obviously different priorities from the other two groups. Such differences may consist in allowing or prohibiting users outside the IT department to install software on their PCs without coordinating with the IT department.

Use of FLOSS		Percentage
on the PC	(almost) completely	1.6
	partially	16.3
on the servers	(almost) completely	3.8
	partially	40.3
experimenting in pilots		20.3

(n=817)

Figure 1 ranks different FLOSS software systems by the share of local governments using these systems. Evidently the GNU/Linux operating system, which is used by almost half of the respondents, is the engine that drives the trend towards FLOSS. The MySQL database system and the Apache web server - used by more than one third of the respondents, respectively – are also widely used FLOSS systems. The Internet browser Mozilla, PHP – a scripting language for developing Internet-applications –, and the desktop suite OpenOffice provide a third important group of FLOSS systems within European local governments, reaching shares of more than one fifth. Samba, Squid, KDE, and Perl provide FLOSS systems that cover 10 to 17% of the local governments, while Gnome, Zope, and Free/OpenBSD play a less significant role. Finally, one third of the respondents reported using “other” FLOSS systems, which suggests that there is a significant usage of niche applications or software for other areas that were left off our list of the most commonly used FLOSS software systems.

Figure 1: Incidence of FLOSS systems in European local governments



The data shows that the high incidence of FLOSS usage does not at all indicate that FLOSS has become a standard within European local governments. A majority of government authorities have *some* use of FLOSS, but usage *within* most organisations is not widespread. FLOSS plays an important role as operating system and for Internet applications, but with regard to desktop applications the potential of FLOSS remains quite untapped.

Clearly, FLOSS has already been quite successful in advancing from the operating systems and Internet applications level to the desktop level, but this process has just begun. The reasons that underlie these differences in terms of desktop adoption could not be clarified by the FLOSSPOLS survey and are subject to further research with a stronger focus on individual FLOSS applications in the field, and desktop applications in particular¹⁶.

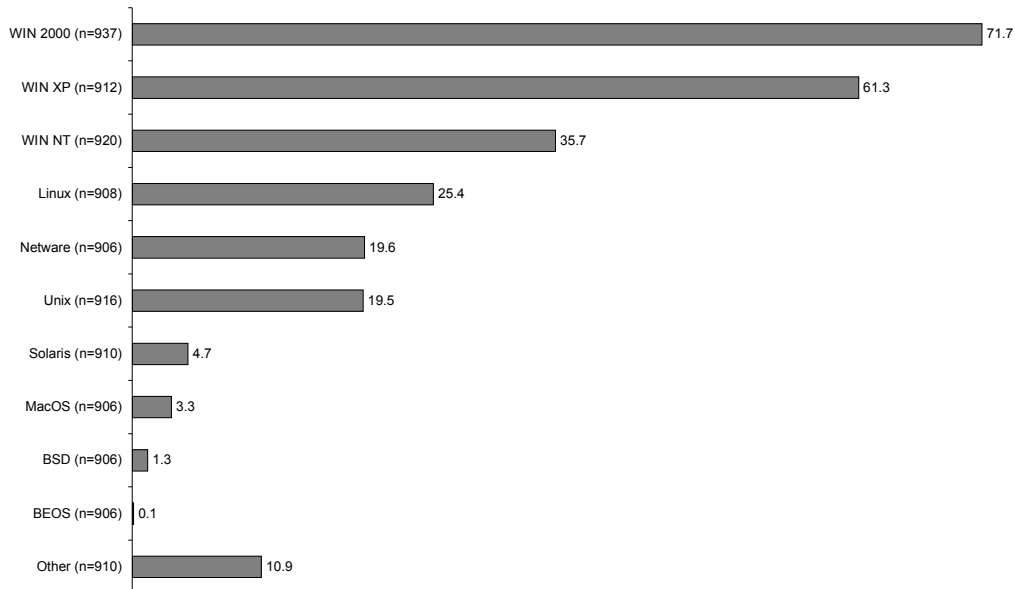
The strength of the GNU/Linux operating systems is not only evident by its incidence of usage, but also by its perception as a basic component of the IT system of the respondents' organisations.¹⁷ Though operating systems of the Microsoft product family have of course a dominant position in the

¹⁶ Some research on the technical and cost-related reasons for adoption of FLOSS applications on the desktop is being conducted by the EU FP6 / IST project COSPA.

¹⁷ See question 3 in the attached questionnaire.

field it is remarkable that already more than one quarter of the local governments that answered the survey consider Linux to be a basis of their overall IT system (see figure 2).

Figure 2: Basic operating systems in European local governments



Besides the Microsoft operating systems and Linux only Unix and Novell Netware reach shares of users above 20%. Given the relatively close relation between Unix and Linux it could be assumed that those organisations that use Unix as their basic operating system at current might change towards Linux rather than towards Microsoft Windows if they decide to migrate. In this regard the potential of Linux that can be estimated from figure 2 would cover 45% of all respondents, which would exceed, for example, the share of Windows NT users.

In order to estimate the satisfaction with as well as the future potential of FLOSS usage in European local governments the respondents were asked whether they would find it useful to increase the share of FLOSS in their organisation. While 52% of all respondents agreed, only 21% clearly said no. 28% were not sure whether an extension of FLOSS in their organisation would be useful (see the last column in table 5).

Table 5: Usefulness of increasing the share of FLOSS in European local governments

	Type of FLOSS usage in organisation			
Useful to extend FLOSS in organisation?	aware usage	unaware usage	non-usage	Average
yes	69.9	30.2	38.3	51.5
no	11.0	31.6	28.1	20.7
I don't know	19.1	38.2	33.7	27.8
Total	100	100	100	100

p < 0,001

Contingency Coefficient: 0,349

n = 953

Table 5 allows us to draw two important conclusions from the FLOSSPOLS local governments survey. First, we see that above-average shares of those who find it useful to increase the share of FLOSS in their organisation occur only among the *aware* users of FLOSS¹⁸. Thus we conclude that *intentional* use and experience with FLOSS leads to a greater willingness to make more use of it; use of Apache, say or Linux – without being aware that this is FLOSS, does not lead to momentum to increase FLOSS usage. The second conclusion derives from the fact that the utility of extending FLOSS use is found less among those organisations who are not aware that they actually use it (unaware users) than among those who are aware that they do not use it (aware non-users). Together with our first observation this suggests that awareness of FLOSS leads to a stronger willingness to use it – regardless of whether or not it is already used in the organisation. One might object here that this is an obvious conclusion, but we would like to point out that it is hard to predict how a group of IT managers who are unaware of which systems they use actually thinks about FLOSS. Thus the opposite result – i. e. a greater willingness of this unaware user group to extend the use of FLOSS in their organisations – could also occur (but does not). Overall these two observations show that ignorance of FLOSS seems to be a strong impediment towards the greater usage of FLOSS. Education and publicity programmes, including the dissemination of best practices, will thus significantly increase the intention of administrations to extend the usage of FLOSS within their organisations.

With regard to the future composition of IT systems in the public sector, experts expect mixed systems (combining proprietary and FLOSS systems) to come up rather than a complete replacement of proprietary systems by FLOSS systems (KBST 2003). Reasons for this assumption are that users

¹⁸ It should be noted that aware usage of FLOSS does not automatically lead to positive experiences and a demand for more FLOSS: exchanging the axes on table 5 shows that 24% of those who do *not* want an increase of FLOSS are aware users, though as the table shows this is a small minority (11%) of all aware users.

are used to proprietary systems, that many proprietary systems have become *de facto* standard applications, and that vendor contract conditions often hinder a rapid and full replacement. Nevertheless, though these strong arguments must also affect the perceptions and opinions of IT managers in local governments we found a strong demand for a complete replacement, as more than one fifth (22%) of those who say they would find it useful to increase the share of FLOSS in their organisation would like to replace all proprietary components of their IT system by FLOSS systems. Roughly 74% of the respondents prefer to replace some proprietary components by FLOSS, another 5% do not know whether they prefer to replace components or all proprietary software.

There is a significant¹⁹ correlation between the degree of FLOSS usage and the preferred degree of replacing proprietary software by FLOSS, indicating that 27% of the aware users, but only 12% of the unaware users and 15% of the non-users wish to replace *all* proprietary software components by FLOSS.

5.2 Driving forces and barriers

Given the strong incidence of FLOSS in European local governments, the question is which are the driving forces that fuel this trend. The FLOSSPOLS local governments questionnaire therefore asked the respondents which advantages and which disadvantages they attribute to FLOSS.

Besides the cost savings argument that is always stressed as a striking advantage of FLOSS, another strong argument for FLOSS is supposedly that it provides access to the source code and thus allows (skilled) users to adapt and improve the software systems according to their specific needs. We therefore asked the respondents whether it would be a substantial improvement for their IT department to have access to the source code. It turned out that this feature of FLOSS is not directly related to the strong interest of local governments in increasing the share of FLOSS in their organisations. Only 28% think it would be an improvement to have that access, whereas 52% think it would not. 20% said they do not know whether access to the source code would be an improvement for their IT department. We suppose that one reason for the relatively low importance of access to the source code is that the exploitation of this advantage of FLOSS requires good programming skills and consumes a considerable amount of time. Especially time is usually a scarce factor in IT departments and therefore we imagine that it is difficult to benefit from access to the source code even for those

¹⁹ $P < 0.01$; contingency coefficient: 0.150. Respondents who answered "I don't know" to question no. 4a in the questionnaire, which are 5% of the respondents, are ignored in this correlation.

IT managers who have the required good skills in programming. However, as the later analysis shows, many respondents believe in the value of FLOSS as more customisable than proprietary software, which is a direct result of the availability of the source code – even if respondents did not always make this connection. Several other attributes of FLOSS that are valued by respondents result directly from the FLOSS licences that provide free access to source code for inspection and third-party modification, even if the access is not itself directly valued.

In order to evaluate better the perception of FLOSS in IT departments the respondents were given four statements of possible advantages and four statements of possible disadvantages of FLOSS as compared to proprietary software. The respondents indicated whether and how strongly they agreed or disagreed, and also had the option to express a neutral position or to say "I don't know".

The statements on possible FLOSS advantages were:²⁰

1. Open source software is easier to use than proprietary software
2. Open source software is easier to customise than proprietary software
3. Open source software is more reliable than proprietary software
4. Open source software can very easily be combined with proprietary software within the same IT system

²⁰ See question no. 6 in the attached questionnaire.

Table 6: Perception of advantages of FLOSS compared to proprietary software

	FLOSS advantages ...			
	easier to use	easier to customise	higher reliability	combinability
	n = 927	n = 938	n = 926	n = 936
Scale:	Percent			
(-2) I strongly disagree	5.6	3.2	5.7	5.1
(-1) I disagree	43.6	24.9	33.4	24.6
(0) neutral	35.4	25.4	37.8	28.4
(1) I agree	12.3	35.4	16.2	31.3
(2) I strongly agree	3.1	11.1	6.9	10.6
Total	100.0	100.0	100.0	100.0

As shown in table 6, usability is not seen as an advantage of FLOSS over proprietary software, as only 15% agreed with statement 1 compared to almost 50% disagreeing. Another third of the respondents showed a neutral position. The statement that FLOSS is easier to customise than proprietary software attracts the strongest endorsement (47%) and the lowest share of respondents with a neutral position. As with usability, reliability is also not seen as an advantage particular to FLOSS. Though 23% of the respondents agree that FLOSS is more reliable than proprietary software, 38% of the respondents are neutral and 39% disagree with the statement (note: this could mean they think it is equally reliable). Meanwhile, combinability provides the feature with the second strongest agreement among the respondents (42%) and comparably low shares of disagreement or neutrality.

The features that were addressed as advantages of FLOSS are general software features - i. e. whether FLOSS is easier to use than proprietary software or not – and responses do not, by and large, depend on the organisation that uses it. However, the following possible disadvantages may be highly dependent on the specific capacities and conditions of the organisation that is represented by the respondent. Therefore, the wording of the statements on disadvantages of FLOSS directly addressed the respondent's organisation in order to make sure that he or she will react to the statement from his / her specific organisational view:

5. If open source software would only provide access to the source code, but would not be cheaper than proprietary software, my organisation would not use it.

6. It is too hard for my organisation to find companies that provide technical support for open source software
7. Migrating to open source software makes sense only if other organisations like mine do it first.
8. Training people in my organisation to use open source software will be too expensive or take too much time.

Table 7: Perception of disadvantages of FLOSS compared to proprietary software

	OSS disadvantages ...			
	accessibility of sourcecode not sufficient, price is also important	lack of technical support	first mover problem	expensiveness of training (cost, time)
	n = 898	n = 935	n = 936	n = 938
Scale:	Percent			
(-2) I strongly disagree	4.8	7.8	8.9	6.4
(1) I disagree	16.9	24.4	29.4	29.6
(0) neutral	31.0	28.4	25.0	25.2
(1) I agree	28.5	26.6	23.7	25.3
(2) I strongly agree	18.8	12.8	13.0	13.5
Total	100.0	100.0	100.0	100.0

Table 7 confirms our previous finding that access to the source code alone is not seen as the most important attractor of FLOSS, as the statement that this feature is only interesting in combination with inexpensiveness finds the strongest agreement and the lowest disagreement. (Of course, it is the same licensing terms that provide both source code access and low costs for FLOSS, so the two cannot be disassociated; however this response also indicates that non-FLOSS methods of providing limited access to source code – such as Microsoft's Shared Source programme – may not be seen as an advantage). Difficulties in finding technical support for FLOSS systems are considered to be a problem by 39% of the respondents. Thus, price and technical support would seem to provide the crucial factors for a broad adoption of FLOSS in European local governments. In contrast to these two features, fear of the organisation becoming technologically isolated if it migrates towards FLOSS as a first mover plays a less important role than expected, though it is still significant for 37% of respondents. The fact that FLOSS has reached a critical mass of users (Varian & Shapiro, 2003, 2) has perhaps contributed to lowering the fear of being isolated. Finally, the fear that migrating towards FLOSS would cause large investments in time and money in order to teach people how to use FLOSS still exists for 39% of respondents..

Based on the values attributed to the respective degree of agreement, disagreement, or neutrality (-2 for strong disagreement, -1 for disagreement, 0 for neutrality, 1 for agreement, and 2 for strong agreement) the the mean values for each item can be calculated, which expresses the overall attitudes towards the different statements. In addition to this, table 8 also provides an overview of differences between aware FLOSS users, unaware FLOSS users, and non-users with regard to their attitudes towards the statements on advantages and disadvantages of FLOSS.

Table 8: Advantages and disadvantages of FLOSS by type of FLOSS user – mean values

Advantages of FLOSS	Total			aware FLOSS users			unaware FLOSS users			non-users		
	Mean	N	Std. deviation	Mean	N	Std. deviation	Mean	N	Std. deviation	Mean	N	Std. deviation
(2) easier to customise	0.26	938	1.05	0.45	470	1.09	0.21	283	0.97	-0.12	185	0.97
(4) combinability	0.18	936	1.08	0.33	469	1.18	-0.03	283	0.94	0.09	184	0.93
(3) higher reliability	-0.15	926	0.99	0.03	467	1.08	-0.29	283	0.89	-0.41	176	0.77
(1) easier to use	-0.36	927	0.88	-0.36	467	0.98	-0.31	283	0.81	-0.44	177	0.71
Disadvantages of FLOSS												
accessibility of sourcecode (5) not sufficient, price is also important	0.40	898	1.11	0.41	458	1.22	0.35	285	1.02	0.44	155	0.95
(6) lack of technical support	0.12	935	1.15	-0.02	469	1.23	0.43	283	1.01	0.01	183	1.04
(8) expensiveness of training (cost, time)	0.10	938	1.16	-0.07	469	1.20	0.35	283	1.09	0.15	186	1.09
(7) first mover problem	0.03	936	1.19	-0.18	470	1.25	0.31	283	1.07	0.12	183	1.09

* = According to the scale used in table 5, mean values close to -2 stand for strong disagreement, mean values close to -1 for disagreement, mean values close to 0 for a neutral position, mean values close to 1 for agreement, and mean values close to 2 for strong agreement. Statements are sorted in descending order by mean values of total response, i. e. the most important advantage / disadvantage comes first and the least important advantage / disadvantage last.

The features that were represented in the eight statements are sorted (in descending order) according to their mean values in the "total" column in Table 7, so that the item with the strongest agreement comes first and the one with the strongest disagreement last.²¹ The means of the total column thus reproduce our description above: ease of customisation and combinability are the strongest attractors of FLOSS, training and technical support issues are the strongest hindrances towards the adoption of FLOSS systems.

There are however significant differences between the two types of FLOSS users and the non users. Aware FLOSS users differ significantly from non-users in their perceptions of all the proposed

²¹ While the mean values may theoretically vary between -2 and +2 (see explanation to table 8), the actual means are much lower and vary between -0.36 and +0.45. This is due to the fact that extreme attitudes (-2 or +2) occur seldom and that neutral positions (0) occur quite often. Given this range, mean values close to -0.4 must be considered as strong disagreement and mean values close to +0.4 as strong agreement.

advantages of FLOSS, and they differ from unaware users in all proposed advantages except for ease of use. Aware FLOSS users have a very positive opinion on ease of customisation and combinability of FLOSS and they are also much more likely to believe that reliability is an advantage of FLOSS than unaware users or non-users. This is perhaps unsurprising and fairly strong evidence that the greater reliability and customisability of FLOSS is a matter of fact (which only aware users can judge) rather than perception (which is most likely to be expressed by unaware users and non-users).

Meanwhile, as one might expect, unaware users differ very little from non-users - only with regard to the ease of customisation, where unaware users agree that this is an advantage of FLOSS, while non-users slightly disagree.

Regarding the negative statements on FLOSS, aware and unaware users differ significantly in their valuation of all statements except for one (access to source code without lower prices is not sufficient for either group). Aware users show a neutral or slightly disagreeing attitude towards the last three items, whereas unaware FLOSS users obviously agree that these are disadvantages. Interestingly aware users and non-users hardly differ in their attitudes towards the negative items that were presented in statements 5 to 8, and both differ considerably from unaware users. Aware users and non-users differ significantly only with regard to the first mover problem (statement 7) and the expense and time consumption of training efforts (statement 8). Obviously, IT managers who have not implemented FLOSS systems in their organisation so far fear being the first to do so and are also worried about perceived high training costs as a consequence of implementing FLOSS. It must however be noted that the mean values of the non-users with regard to these items do not suggest that they are really deterred from FLOSS by these features, on average. Instead, they show a neutral attitude towards these statements. Nevertheless, these features are strong enough to result in a certain degree of uncertainty in these organisations, perhaps leading the IT management to stay with those (proprietary) systems with which they are already familiar.

Unaware users differ significantly from non-users with regard to their perception of a lack of technical support (statement 6)²², being the first to adopt FLOSS systems (statement 7), and costs of training (statement 8)²³. Again, unaware users are much more affected by these fears than non-users. This perhaps reflects the lower level of technical awareness of these users; aware users clearly have

²² $p < 0.01$

²³ For statements 7 and 8, $p < 0.1$

the most (first-hand) knowledge of FLOSS, but a significant subset of non-users can be presumed to have a better knowledge of FLOSS than the unaware users .

The first mover problem is very closely related to the fear of a lack of technical support for FLOSS. This relation is depicted in table 9, which illustrates that almost 60% of those who say that they fear a lack of technical support for FLOSS also agree that they would not like to be the first among their peer organisations to adopt FLOSS. Accordingly, more than two thirds of those who disagree that technical support for FLOSS is hard to find also disagree with the statement on the first mover problem. Thus, the first mover problem seems to be an expression of the fear of venturing into a new system without support rather than an actual negative perception based on the observation of practices of other local governments.

Table 9: Technical support for FLOSS and the first mover problem

		"It is too hard for my organisation to find companies that provide technical support for open source software"			
		I disagree	neutral	I agree	Total
"Migrating to open source software makes sense only if other organisations like mine do it first"	I disagree	69.3	17.5	27.8	38.3
	neutral	12.0	55.5	13.1	24.7
	I agree	18.7	27.0	59.1	37.0
	Total	100.0	100.0	100.0	100.0

p < 0.001

contingency coefficient: 0.517

n = 930

5.3 Organisational context of FLOSS

In general, European local governments usually buy their software separated from the hardware. This applies to 48% of the respondents (see last column in table 10). Another 15% buy their hardware together with the software. 38% buy software in both ways (separated from and together with the hardware) to the same degree. Table 10 illustrates that aware FLOSS users are significantly more likely to buy their software separated from the hardware than unaware FLOSS users or non-users of FLOSS. Accordingly, unaware users and non-users are much more likely to buy their software together with the hardware than aware FLOSS users. This might partially explain why some IT managers do not care as much about (and consequently lack awareness of) the software that runs on their IT system, as they may implicitly leave their software choices to hardware vendors or integrators.

Table 10: Ways of software purchases in European local governments

How do you usually buy your software?	Type of FLOSS usage in organisation			
	aware usage	unaware usage	non-usage	Average
Together with the hardware	10.9	17.4	19.6	14.6
Separated from the hardware	54.8	40.6	41.3	47.9
Both to the same degree	34.3	42.0	39.2	37.6
Total	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.150

n = 934

Table 11 examines the software purchasing practices in European local governments in relation to the perceived usefulness of increasing the share of FLOSS in their organisation in future.

Table 11: Software purchasing practices and future FLOSS use

How do you usually buy your software?	Would you find it useful to increase the share of FLOSS in your organisation?			
	Yes	No	I don't know	Average
Together with the hardware	11.2	21.0	15.7	14.5
Separated from the hardware	54.1	43.1	39.5	47.9
Both to the same degree	34.7	35.9	44.8	37.6
Total	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.154

n = 933

Those who would find it useful to increase the share of FLOSS in their organisation clearly tend to purchase software separated from the hardware, whereas those who consider an increase of FLOSS in their organisation not to be useful tend to purchase software together with the hardware. Those who don't know fall somewhere in the middle, buying software together with and separated from the hardware to the same degree. Acknowledging the relatively weak correlation between these two items, these observations may nevertheless indicate that buying software separated from the hardware generates more willingness to use FLOSS than buying software together with the hardware. One interpretation of this is that those who buy software separately are more in control of their software choices, and want to remain more in control – thereby increasing their awareness and consideration of FLOSS. This is linked to our findings related to interoperability.

One of the major supposed advantages of FLOSS is its capacity to be interoperable with other software systems (for instance because of the usage of open standards). It is also quite straightforward for a producer of a software application to enable interoperability with a data format used by a FLOSS application even if it is not a standard – e.g. by examining or simply using the FLOSS application's source code. Unless a truly open standard is used, however, it is much more difficult for a software producer to enable interoperability with a data format used by another proprietary software vendor. As a result, software buyers often try to achieve “vendor-independence”, which is to retain the ability to change software products or producers in future without loss of data or significant loss of functionality, e.g. through the use of truly open standards for interoperability. However, this can conflict with implicit or explicit criteria for software purchasing, in particular whether new software is compatible with previously purchased software. Buyers who use the latter criterion rather than a general requirement for open standards or vendor-independent interoperability in effect remain locked in to their previously purchased software. Thus, even if they see the benefits of open standards and believe in interoperability, buyers whose preference for new software is based instead on compatibility with previously installed software are not, in practice, supporting or benefiting from interoperability.

To examine this relationship, the respondents were asked whether they find it more important that new software they buy is compatible with other software from the same product family they already use (= "compatibility") or that new software is compatible with software from other producers and product families (= "interoperability").²⁴ It turned out that 59% of the respondents opted for interoperability and 33% for compatibility (8% said they did not know). Local governments that are aware they are using FLOSS tend much stronger towards interoperability, 67%, compared to a significantly lower 52% of unaware FLOSS users and 50% of non-users.²⁵ In line with that only 26% of aware users of FLOSS opt for compatibility, while 42% of unaware users and 39% of FLOSS non-users selected this option, respectively. We can thus conclude that limitations to interoperability that are set by proprietary software help to increase a demand for FLOSS in an organisation – given of course that the IT department of that organisation truly wants interoperability, and is aware of the conflict between interoperability and proprietary software applications that promote lock-in to their own proprietary standards. In contrast, organisations that do not choose first for interoperability are

²⁴ See question no. 8 in the questionnaire

²⁵ n = 953, p < 0.01, contingency coefficient: 0.174

more likely to remain locked in to proprietary vendors providing compatibility with previously purchased software, or to use FLOSS without being aware of it.

We also see that the perceived usefulness of an increase of FLOSS increases with the perceived need for interoperability. While overall 33% of the respondents opt for compatibility and 59% for interoperability, two thirds of those who value a future increase in FLOSS use opt for interoperability and only one quarter of them for compatibility. In contrast, 48% of those who do not value a future increase in FLOSS use useful opt for compatibility, while another 48% opt for interoperability.²⁶

The question of who determines software purchases in local governments turned out to be difficult to answer, as only 478 respondents replied to that question. The decision-making process in software purchasing in European local governments is highly dependent on the IT managers, i.e. the respondents to the FLOSSPOLs survey. 42% declared that the IT manager is the most important person in the decision making processes, followed by heads of other departments (29%) and the users themselves (23%). We observe that IT managers play the most important role among unaware FLOSS users (59%) and a less important role among non-users (43%; aware users: 55%). Thus, the considerable share of unaware FLOSS users in our sample cannot be explained by a lack of participation of IT managers in software purchasing decisions.

Other department heads and the users in the organisation provide a more important decision-making group for FLOSS non-users. Though these results imply that independence of the IT manager in a local government works in favour of FLOSS, these results are not statistically significant and provide thus only an observation from the sample that should not be generalised.²⁷

Information on the number of software vendors the local government mostly rely on provides an indicator of the degree of dependency of the local governments on their software suppliers. Two assumptions were behind this approach: The first was that a low number of software vendors indicates dependence and higher numbers increasing independence, because reliance on only one or few software vendors is considered to produce a limited overview of alternatives when software is purchased and indicates limited competition between vendors. The second expectation was that a

²⁶ n = 951, p < 0.01, contingency coefficient: 0.212

²⁷ There are no significant differences with regard to the software purchasing decisions between organisations that find an increase of FLOSS useful and those who do not find such an increase useful.

sense of over-dependency on software vendors probably works as a driver for FLOSS²⁸, which is seen to provide a greater degree of independence from traditional ties to software vendors and to enhance competition among current and potential vendors.

However, it turned out from the responses that the link between a low number of vendors and a high sense of dependency was different from our expectations. Those respondents who buy from a large number of software vendors feel themselves dependent on their suppliers while those who buy from only a few software vendors consider themselves to be independent. The rationale behind this observation could be that IT managers prefer stable relationships with a small number of software suppliers, and their sense of independence derives from competition (or a larger number) among *potential* vendors, which may be unrelated to the number of actual vendors at any given point in time. Moreover, our questionnaire was not designed to determine in further detail the structure of the vendor relationship – for instance, it is possible to have many vendors and a strong sense of dependence if one of them is a large market player and the rest are small vendors. Similarly, one explanation for respondents who have a few vendors but do not feel dependent on them is that these few vendors are selected among several strong competitors.

A closer look at the relation between vendor structures and FLOSS usage revealed that aware FLOSS users usually buy software from more than four vendors, whereas non-users and especially unaware users buy usually from one to four vendors (see table 12).²⁹

Table 12: FLOSS usage and number of software vendors

Number of software vendors the organisation mostly relies on	Type of FLOSS usage in organisation			
	aware usage	unaware usage	non-usage	Average
1-4 vendors	40.8	65.5	60.9	52.7
More than 4 vendors	59.2	34.5	39.1	47.3
Total	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.225

n = 660

Aware FLOSS users are the only group that features a (slight) above average share in those feel too dependent on their software vendors (46% compared to an average of 44%), whereas only 41% of the

²⁸ This was a finding from our 2003 survey of Dutch government authorities (Ghosh & Glott 2003)

²⁹ 4 provides the median value of the number of vendors that were specified by the respondents of the survey, i.e. roughly one half of the sample buys software from one to four vendors and the other half buys software from more than four vendors.

unaware FLOSS users feel too dependent on their software vendors. Non-users show above average shares only in those who do not know whether they are too dependent on their software vendors or not (11% compared to an average of 7%).³⁰ These differences are quite small, and thus provide only slight support for the hypothesis that demand for FLOSS is driven by a feeling of dependence on software vendors.

Respondents who would find an increase of FLOSS in their organisation useful rely on more than 4 vendors, whereas those who do not find such an increase useful tend to rely on one to four vendors (see table 13). This result is of course to a large part explained by the relatively strong coincidence between FLOSS usage and the perceived usefulness of increasing the share of FLOSS in the organisation. Those who do not know whether they would find an increase of FLOSS in their organisation useful also rely rather on one to four than on more than four software vendors.

Table 13: Future increase in FLOSS use and number of software vendors

Number of software vendors the organisation mostly relies on	Would you find it useful to increase the share of FLOSS in your organisation?			
	Yes	No	I don't know	Average
1-4 vendors	46.0	58.5	61.9	52.7
More than 4 vendors	54.0	41.5	38.1	47.3
Total	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.144

n = 658

The perceived value of an increase in FLOSS use is very strongly correlated to the perception of dependence on software vendors.³¹ 53% of those who would find an increase of the share of FLOSS in their organisation useful feel too dependent on their software vendors (average: 44%) and only 43% say explicitly that they do not feel too dependent (average: 49%).³² In contrast, only 30% of those who would *not* value an increase in FLOSS use feel too dependent, and 66% of this group clearly states that they do not feel too dependent.

Although our original hypothesis that reliance on only few software vendors causes a feeling of dependency is apparently falsified, and the hypothesis that the dependency on vendors would generate a desire for FLOSS is apparently confirmed. While differences between users and non-users

³⁰ p < 0.05, contingency coefficient: 0.102; n = 954.

³¹ p < 0.01, contingency coefficient: 0.256; n = 952.

³² The remaining 4% answered "I don't know."

in terms of a sense of dependency are very small, the fact that aware FLOSS users provide the only group that shows a higher-than-average share of those who feel too dependent on software vendors could suggest that this dependency motivates this group to use FLOSS. However, we cannot confirm the direction of causality with this correlation. Some explanation may be provided by the relationship between intensity of current FLOSS use and sense of dependence. While not statistically significant, we observe a tendency for the sense of vendor dependence to reduce with increased intensity of FLOSS use (partial use on server: 46%; partial use on desktop: 43%; complete use on server: 42%; and complete use on desktop: 38% feel too dependent on vendors).

The direction of causality is clear, though, with the much stronger correlation between a high sense of dependency a perceived value of increasing FLOSS use in the future. So a sense of dependency may or may not cause current use of FLOSS, but it clearly does cause an interest in increasing future use of FLOSS.

Meanwhile, a closer look at the group of respondents who do not already use FLOSS – including unaware users who only think they do not use it – provides deeper insights into the issue of buying from multiple vendors. We defined two sub-groups of these non-users - those who would value increased FLOSS use, let's call them future adopters (17%) and those who would not, let's call them persistent non-users (15%). Examining them with regard to the number of software vendors they use shows no statistically significant difference. This suggests the number of vendors is unrelated to FLOSS use, and determined by external factors.

The comparison of the two sub-groups of non-users (including unaware users) with regard to their perception of dependency on software vendors however revealed strong significant differences. On average, 45% of combined non-users and unaware users considered themselves too dependent on vendors and 51% felt not too dependent. . However, 58% of the sub-group of “future adopters” say they are too dependent on vendors, while only 32% of the “persistent non-users” feel too dependent. Similarly, only 39% of “future adopters”, compared to 64% of “persistent non-users” feel not too dependent on vendors.³³ These differences indicate that for even for those who do not already use FLOSS (consciously), vendor dependency is indeed a strong driving force towards FLOSS use in the future.

³³ $p < 0.01$, contingency coefficient: 0.255; $n = 306$.

Each IT manager knows that software, whether it is proprietary or FLOSS, often does not meet all specific requirements of the organisation that will use it and must therefore be customised after it is implemented. Proprietary software is relatively limited in allowing customisation while FLOSS by definition enables users to customise it (or have it customised by third parties other than the original vendor). We therefore expect a low need for customising software to go in line with low shares of FLOSS usage and a strong need for customising to be aligned with higher shares of FLOSS usage. In other words, we consider customisation requirements for software to be an engine for FLOSS usage in European local governments. It turned out that only 10% of the European local governments that participated in the FLOSSPOLS survey never have to customise software after they bought and implemented it in their IT system, while 51% have to do this sometimes, another 24% regularly, 8% do this often and 4% very often. 2% did not know how often they have to customise their software after implementation.

As shown in table 14, usage of FLOSS in local governments is closely related to the degree of the need to customise software. Those local governments that state they never have to customise software show the largest shares in non-users of FLOSS and the lowest shares in aware users, whereas those that often have to customise software show the largest shares in aware users. This result is fully in line with our hypothesis.

Table 14: Need to customise software and FLOSS usage

Type of FLOSS usage in organisation	How often do you have to customise software after implementation?			
	never	sometimes	regularly or often	Average
aware users	26.8	50.7	56.4	50.3
unaware users	32.0	33.1	24.3	29.7
non-users	41.2	16.2	19.3	20.0
Average	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.213

n = 926

Similar results are obtained when the need for customising software is related to the perceived value of increased FLOSS use. As shown in table 15, those who never have to customise software are least likely to value increased FLOSS use.

Table 15: Need to customise software and wish to increase the share of FLOSS in organisation

	How often do you have to customise software after implementation?			
Would you find it useful to increase the share of FLOSS in your organisation?	never	sometimes	regularly or often	Average
yes	35.1	47.0	64.7	52.3
no	29.9	24.8	12.9	21.0
I don't know	35.1	28.1	22.4	26.7
Average	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.206

n = 924

Similarly, the more often a local government has to customise software, the more likely it is to value of increased FLOSS use.

It is worthwhile to once again examine the group of combined non-users (including unaware users) with regard to their need to customise software reinforce our previous findings. As table 16 shows, the stronger the need to customise software, the larger the shares of “future adopters”, while lower customisation requirements are found among “persistent non-users”. So for current non-users, the need to customise is a strong driver towards future increases in FLOSS use.

Table 16: FLOSS non-users and the need to customise software

	How often do you have to customise software after implementation?			
FLOSS non-users	never	sometimes	regularly or often	Average
I would find it useful to increase the share of FLOSS in my organisation	36.6	45.2	70.2	52.7
I would NOT find it useful to increase the share of FLOSS in my organisation	63.4	54.8	29.8	47.3
Average	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.253

n = 300

These findings, given the limited capacity of proprietary software to enable users to customise it according to their specific needs, leads one to expect that non-users rely much more on external maintenance services than (aware) FLOSS users. This assumption is confirmed by the results presented in table 17. Aware FLOSS users provide the lowest and non users the largest shares among

those who never deploy maintenance services, but these differences are quite small. On the other hand, non-users provide by far the largest share among those who often deploy external maintenance services.

Table 17: Deployment of external maintenance services and FLOSS usage

To what degree do you deploy external maintenance services?	Type of FLOSS usage in organisation			
	aware users	unaware users	non-users	Average
never	6.6	7.3	9.6	7.4
sometimes	46.2	51.3	34.2	45.3
often	47.2	41.5	56.1	47.3
Average	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.122

n = 930

However, deployment of external maintenance services for software is a relatively weak indicator for FLOSS-related differences between European local governments, as compared to the need for software customisation. Besides the low contingency coefficient in table 17, the weakness of this indicator is also reflected in the fact a comparison of the two sub-groups of non-users (“future adopters” and “persistent non-users”) showed no significant difference in their pattern of deploying external maintenance services.

Budgetary constraints are usually supposed to play an important role for the decision to migrate towards FLOSS, as the licence fees for FLOSS are zero. The average IT budget of the 492 local governments that have provided valid figures for 2004 is € 1,788,509, the standard deviation is € 3,482,669.³⁴ The high standard deviation indicates a very large variation of IT budgets, therefore the median, which is € 200,000, provides a better estimate for the average IT budget 2004.

The basic assumption regarding the impact of budgetary constraints on the use of FLOSS in local governments is that the smaller the budget the stronger becomes the willingness to use FLOSS. Yet,

³⁴ 350 respondents did not answer this question. In addition, extreme large and extreme low figures have been ignored in the analysis, so that the sums of the IT budgets 2004 range from 5,000€ to 30,000,000€. Extreme figures of local governments outside the EURO-zone have been converted into EURO. Though we asked the respondents to specify their statements in EURO, conversion appeared to be necessary for extreme statements from Czech Republic, Denmark, Poland, and Sweden. The factors for converting these currencies are: 1 CZK = 0.03350€; 1 DKK = 0.13438€; 1 PLZ = 0.25034€; and 1 SEK = 0.11024€.

as illustrated in table 18, which is based on three equally sized classes of IT-budgets (i.e. each class represents roughly one third of the 492 respondents who specified their IT budget), this hypothesis is confirmed only for unaware users of FLOSS, but not for aware users. In contrast to our assumption, the larger the annual IT budget the larger becomes the share of aware FLOSS users. Further analysis revealed that there is no statistically significant difference between aware users and non-users with regard to the IT budget 2004, whereas the IT budgets of unaware users differ significantly from the two other groups. The fact that our hypothesis is confirmed for unaware FLOSS users may appear meaningless, as these IT managers do not know that they use FLOSS and can therefore not have opted for FLOSS intentionally because of budget constraints. However, it would seem that lower-level IT staff have installed FLOSS applications due to budget constraints and have informed their managers – the respondents to our survey – of the use of such applications, without informing them of their properties as FLOSS; or, given that most unaware users have small IT departments (see below), IT managers may themselves be choosing FLOSS applications due to budget constraints, without being aware that they are FLOSS – only that they are “free of charge”. One could therefore suggest that unaware users with budget constraints are likely to increase their use of FLOSS applications and become aware users in future, as the knowledge of FLOSS filters upwards to the IT management.³⁵

Table 18: IT budgets of European local governments and FLOSS usage

Awareness of FLOSS usage in organisation	IT Budget 2004			Total
	less than € 100,000	€ 100,000 - € 800,000	more than € 800,000	
	Percentages			
aware users	40.2	57.1	60.0	52.4
unaware users	43.3	21.5	18.8	27.8
non-users	16.5	21.5	21.2	19.7
Total	100.0	100.0	100.0	100.0

p < 0.01

contingency coefficient: 0.239

n = 492

Another factor that usually is assumed to have a strong impact on an organisation's decision for or against FLOSS is the share of software license fees in the overall IT budget. The underlying hypothesis hereby is that the higher the share of license fees the stronger the incentive to avoid these costs by migrating towards FLOSS. However, though this argument is always present when costs and benefits of FLOSS are considered, it turned out in the survey that this aspect of the license issue

³⁵ The IT budget 2004 showed no significant correlation with the respondents' perception of the value of increased FLOSS use. It also does not appear to determine the potential future use of FLOSS by current non-users.

appears to be relatively unimportant for IT managers in European local governments, at least when absolute shares of licence fees are measured. The average (median) share of license fees in the 2004 IT budget of the local governments that were surveyed by the FLOSSPOLS project is 20%. There are no significant differences between aware FLOSS users, unaware FLOSS users and non-users. It should be noted that this figure is considerably higher than figures of 5-10% for licence fees commonly cited in studies of Total Cost of Ownership (TCO), but they are consistent with previous studies of licence fee shares in the public sector (Ghosh & Glott 2003). Our explanation for the high shares of licence fees in public sector IT budgets is that other costs, such as maintenance and support, are often performed in-house and salary costs for permanent staff are treated as sunk costs that cannot be changed, thus not forming part of the calculation of IT budget.

While licence fee shares don't affect FLOSS use, if the subjective perception of these shares is considered, we find some impact of the share of license fees on the usage of FLOSS. Overall, 46% of the respondents say they find the share of license fees in their annual IT budget for 2004 too high. 6% find it reasonable and another 23% find it too low (26% did not know how to answer this question). As illustrated in table 19, those who find the share of software licenses in their IT budget too high provide the largest group within aware FLOSS users and the lowest shares within the non-users. This observation confirms the assumption that high software licenses produce a stronger willingness to use FLOSS, with the reservation that this applies only to the subjective perception of these shares but not to their actual amount.

Table 19: Perception of the share of software license fees in overall IT budget 2004 and FLOSS usage

Awareness of FLOSS usage in organisation	Share of license fees in overall IT budget 2004				Total
	too high	reasonable	too low	I don't know	
aware users	55.7	44.4	50.9	38.3	49.5
unaware users	27.7	16.7	34.7	32.9	30.0
non-users	16.6	38.9	14.4	28.8	20.5
Total	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.202

n = 953

As shown in table 20, those respondents who feel the share of license fees in their overall IT budget too high tend clearly towards an increased use of FLOSS in future, whereas those respondents who consider the share of license fees in their overall IT budget too low provide a clearly above-average share among those who would not like to increase the share of FLOSS in their organisation.

Table 20: Perception of the share of license fees in the total IT budget and willingness to increase the share of FLOSS

	Share of license fees in overall IT budget 2004				
Would you find it useful to increase the share of FLOSS in your organisation?	too high	reasonable	too low	I don't know	Total
Yes	64.1	50.9	41.2	38.3	51.6
No	14.1	26.4	33.8	19.8	20.7
I don't know	21.8	22.6	25.0	42.0	27.7
Total	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.276

n = 952

Again, comparing the combined two group of non-users, with regard to their perception of license fees confirms our previous findings, as illustrated in table 21. Those non-users who consider the share of license fees in their IT budget too high tend clearly towards using FLOSS in future (“future adopters”), whereas those who consider this share as reasonable or too low remain “persistent non-users”.

Table 21: Perception of software license shares and non-usage of FLOSS

	Share of license fees in overall IT budget 2004				
FLOSS non-users	too high	reasonable	too low	I don't know	Total
I would find it useful to increase the share of FLOSS in my organisation	66.4	40.0	33.8	49.4	52.6
I would NOT find it useful to increase the share of FLOSS in my organisation	33.6	60.0	66.2	50.6	47.4
Total	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.259

n = 306

Together these observations are probably meaningful for policy and programmes that aim to increase the usage of FLOSS for e-government. As long as a significant group of IT managers is convinced they do not pay too much for software license fees, but take such fees for granted as an attribute of

using proprietary software (while ignoring the fact that they may already use some FLOSS), such policies will probably fail to get supported by this group. 29% of the unaware FLOSS users find the share of software license fees in their overall IT budget too low, another 3% find them reasonable, and another 28% of this group does not know how to qualify the share of license fees in their IT budget. Thus, one third of the unaware users draws a positive picture of license fees while thinking they use proprietary software only, and almost another third of this group is insecure about the impact of license shares on their IT budget but does not know that their situation might be worse if they in fact used only proprietary software. Together, these two groups account for almost one fifth (17%) of the total sample.

Given these findings it is understandable that half of the respondents think it is necessary to reduce the share of software licenses in their IT budgets within the next two years (i. e. 2005 and 2006). Still 36% do not think so, and another 14% do not know whether this is necessary. In accordance with the previous findings, an above-average share of those who want to reduce licence fees are aware FLOSS users (60%, average: 49%), whereas those who do not see a need to reduce licence fees have larger shares of unaware users (36%, average: 30%) and non-users (25%, average: 21%).³⁶ 65% of those who see a need to reduce license fees would like to increase the share of FLOSS use, and only 41% of those who do not see such a need would like to increase FLOSS use (average: 52%).³⁷ The same applies to the non-users of FLOSS: While on average 53% of this group say they would like to use FLOSS in future, 66% of non-users who want to reduce licence fees also want to increase FLOSS use, against only 38% of non-users who do not see a need to reduce licence fees.³⁸

The number of persons working in European local governments' IT departments varies between one person and one thousand persons.³⁹ On average, each IT department employs 12.9 persons, but the distribution of department sizes over the sample is extremely left-tailed, indicated by the median value of 3, which means that 50% of the respondents have an IT department size of up to three persons and the other half has larger IT departments. A large share of local governments (21%) have only one person in the IT department.

As illustrated in Table 22, the larger the IT department becomes the more aware FLOSS users are found. In contrast to this, unaware FLOSS users are a typical phenomenon of small IT departments

³⁶ $p < 0.01$, contingency coefficient: 0.203; $n = 953$.

³⁷ $p < 0.01$, contingency coefficient: 0.302; $n = 951$.

³⁸ $p < 0.01$, contingency coefficient: 0.257; $n = 306$.

³⁹ Extreme large IT departments in this sense are evidently belonging to large municipalities and regional bodies.

with only one or a maximum of three persons. Non-users of FLOSS show above average shares only in medium-sized IT departments with 2 – 3 or 4 – 10 persons. The mean values for the three groups differ significantly and indicate strong distinctions between aware users (mean size of IT department: 18.1 employees), unaware users (5.4), and non-users (11.1).

Table 22: Size of IT departments (personnel) and FLOSS usage

Awareness of FLOSS usage in organisation	Number of employees in IT department					Total
	1	2 - 3	4 - 10	11 thru 30	more than 30	
aware user	31.2	43.9	56.2	65.3	77.0	50.1
unaware user	50.3	34.7	22.5	16.5	6.8	30.0
non-user	18.6	21.4	21.3	18.2	16.2	19.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.299

n = 923

In line with these observations we found that the wish to increase the share of FLOSS in the organisation grows also with increasing IT department size, whereas reluctance to FLOSS is especially pronounced in small IT departments (i.e. 1 – 3 employees). In contrast, the size of the IT department has no significant impact on non-users' willingness to use FLOSS in future.

In addition to the size of the organisation and therefore the (related) size of the IT department, another important factor that influences FLOSS usage is the overall computer equipment of the local government that must be administered. The number of PCs and laptops that is administered by the IT managers who responded to the FLOSSPOLS survey ranges from 1 to 30,000.⁴⁰ On average, each local government has 498 PCs and laptops, whereby the standard deviation of 992 illustrates a very wide range of computer equipments. Half of the organisations have not more than 130 PCs and laptops, which again indicates a left-tailed distribution. Similar to our findings on the effect of the IT departments' size, the usage of FLOSS grows – though not constantly - with increasing numbers of PCs and laptops in the organisation as a whole (see table 23). Unaware FLOSS usage appears again as a matter of small organisations with not more than 50 PCs and laptops. Non-users are over-represented in very small (not exceeding 25 laptops and PCs) and medium-sized organisations (101 – 200 PCs).

⁴⁰ In order to avoid the results becoming too much biased by one extremely large organisation, the local government with 30,000 PCs and laptops was excluded from the following analyses of average computer equipment in local governments. The maximum decreased thus to 8,000 PCs and laptops.

Table 23: Number of PCs and laptops in the organisation and use of FLOSS

	Number of PCs and laptops in organisation							
Awareness of FLOSS usage in organisation	up to 25	26 - 50	51 - 100	101 - 200	201 - 500	501 - 1000	more than 1000	Total
aware user	22.3	29.2	49.1	56.3	65.0	59.3	70.6	50.6
unaware user	54.4	54.6	30.1	19.6	20.0	20.9	11.0	29.8
non-user	23.3	16.2	20.8	24.1	15.0	19.8	18.3	19.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.346

n = 904

In line with our findings on the effect of the IT departments' size on FLOSS usage, the average number of PCs and laptops administered by aware users, unaware users, and non-users differs significantly. IT managers who are aware they use FLOSS administer roughly 642 PCs and laptops on average, whereas unaware users administer 250 and non-users 503 PCs.⁴¹

As illustrated in table 24, the willingness to increase the share of FLOSS in the respondents' organisation increases with the number of PCs and laptops that must be administered in the organisation, whereas this willingness decreases with decreasing size of the organisation.

Table 24: Number of PCs and laptops in the organisation and willingness to increase the share of FLOSS

	Number of PCs and laptops in organisation							
Would you find it useful to increase the share of FLOSS in your organisation?	up to 25	26 - 50	51 - 100	101 - 200	201 - 500	501 - 1000	more than 1000	Total
Yes	31.1	42.3	54.3	60.8	57.9	61.1	56.9	52.6
No	28.2	23.8	17.9	20.9	21.4	16.7	13.8	20.4
I don't know	40.8	33.8	27.7	18.4	20.7	22.2	29.4	27.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.207

n = 903

Again, the two groups of non-users of FLOSS do not differ through the size of the organisation.

The size of IT department as well as of the overall organisation that is administered by the IT department play a significant role for the usage of FLOSS, but it does not affect current non-users. This finding implies that our observation of stronger FLOSS use in large organisations is partially due to the fact that larger organisations are more likely to use a larger variety of software than small

⁴¹ A similar observation can be made with regard to the number of servers in the local governments, which is therefore not discussed in detail here.

ones. Thus, the size-effect of the IT department can partially be described as the effect of a higher probability of the incidence of FLOSS in larger organisations, which results in positive experiences with FLOSS, which again generates a wish to extend its usage. If, however, no FLOSS is used in the organisation, the size of the organisation has no effect on the tendency for future use.

The average PC per IT administrator (i.e. ratio of PCs in the whole organisation to persons in the IT department)⁴² in all local governments that participated in the survey is roughly 60 (median is 40; standard deviation: 133.5). This measure, which we would like to consider as an indicator for the workload of the IT departments, differs significantly between aware users of FLOSS and the other two groups, but there is no significant difference between the PC-per-administrator ratios of unaware users and non-users. Aware FLOSS users show the highest average PC per administrator ratio (66.3) compared to unaware users (53.0) and non-users (53.0). This may suggest that FLOSS systems have considerably lower demands on in-house support and administration staff, allowing FLOSS users to manage on average 35% more PCs than IT administrators who do not use FLOSS. Thus, the ability to reduce administrator workload and thus allow a greater number of PCs to be administered by the same number of administrators would seem to be a feature of using FLOSS in an organisation.

The PC-per-administrator ratio for those who would like to increase the share of FLOSS in their organisation and those who would not differs significantly, though their mean ratio is almost equal (55 PCs per administrator in the group of those who would increase the share of FLOSS, 54 PCs per administrator in the group of those who would not increase the share of FLOSS). A better impression of the differences is therefore provided by the median and the mode. The median PC-per-administrator ratio of those who would like to increase the share of FLOSS in their organisation is 42.5, the mode (i.e. the most frequent PC-per-administrator ratio) is 50. The two respective values for the group of those who do not want to increase the share of FLOSS in their organisation are smaller, with a median of 37.5 and a mode of 25. This correlation does show causality in that respondents with a higher workload (more PCs per administrator) would like to increase their use of FLOSS, possibly indicating a perception that increased FLOSS use could reduce the workload per PC, thus allowing the number of PCs per administrator to remain constant while reducing overall workload. This perception is clear, but we cannot confirm that it results from the experience of already facing a reduced per-PC workload due to current use of FLOSS.

⁴² The average PC per IT administrator ratio is the average (mean) of all PC per administrator ratios of each local governments that participated in the survey. It must not be confused with the ratio that is obtained from dividing the average (mean) number of PCs (= 501.51) and laptops by the average (mean) number of persons in the IT department (= 13.3), which is 37.58 .

So far we have shown that the use of FLOSS is stronger in large organisations than in small organisations and that it increases with increasing PC-per-administrator ratios. In order to examine deeper the impact of these two factors on the FLOSS-usage we compared four different types of organisations:

1. small organisations with a low PC-per-administrator ratio
2. small organisations with a high PC-per-administrator ratio
3. large organisations with a low PC-per-administrator ratio
4. large organisations with a high PC-per-administrator ratio⁴³

As shown in Table 25 the current use of FLOSS is more present among large organisations with a low PC-per-administrator ratio (69%) than in large organisations with a high workload of the IT administrators (65%). In addition, table 25 reveals an important additional detail: In large organisations, a low PC-per-administrator ratio of the IT administrators is correlated with usage of FLOSS whereas the share of FLOSS users among large organisations with a high PC-per-administrator ratio is slightly lower. However, in small organisations the relationship tends in the opposite direction and the difference is stark: high PC-per-administrator ratio organisations have a 50% share of FLOSS users and low PC-per-administrator ratio organisations have only a 21% share of FLOSS users (but as much as 57% unaware users). Thus, while a high PC-per-administrator ratio is correlated with FLOSS use overall, its effect on large organisations is ambivalent while in small organisations it is very strongly related to FLOSS use.

Table 25: Size and workload effects on the usage of FLOSS in European local governments

	Workload by size of organisation & IT Dept.				Average
	small size - low workload	small size - high workload	large size - low workload	large size - high workload	
aware FLOSS users	21.1	50.0	69.0	64.9	42.8
unaware FLOSS users	57.0	38.2	17.2	19.1	39.1
non-users	21.8	11.8	13.8	16.0	18.1
Total	100.0	100.0	100.0	100.0	100.0

p < 0.01

Contingency Coefficient: 0.405

n = 299

⁴³ Small organisations with low workload are defined as organisations with less than 3 IT administrators, not more than 70 PCs and laptops, and a maximum average PCs per head ratio of 30.0. These figures determine the boundaries of the lowest third of the respondents in these three categories. Small organisations with a high workload are defined as organisations with less than 3 IT administrators, not more than 70 PCs and laptops, and a minimum average PCs per head ratio of 55.0 (the boundary of the upper third of the respondents in the workload category). Accordingly, large organisations with a small workload are defined as organisations with more than 6 IT administrators, more than 287 PCs and laptops (which are the boundaries of the upper third of the respondents in these two categories), and a maximum average PCs per head ratio of 30.0. Large organisations with a high workload are defined as organisations with more than 6 IT administrators, more than 287 PCs and laptops, and a minimum average PCs per head ratio of 55.0.

In contrast to the current use of FLOSS, which relates differently to workload in large and small organisations, the perceived value of increased FLOSS use is mainly determined by the organisational size. As illustrated in table 26, the need for FLOSS is clearly above average in large organisations, whereas small organisations show slightly above average shares of those who see no need for an increase of FLOSS in their organisations and clearly above average shares in those who do not know whether an increase of FLOSS would be useful for them.

Table 26: Size and workload effects on the need to increase the share of FLOSS in European local governments

Would you find it useful to increase the share of FLOSS in your organisation?	Workload by size of organisation & IT Dept.				Average
	small size - low workload	small size - high workload	large size - low workload	large size - high workload	
yes	30,3	38,2	69,0	61,7	44,8
no	29,6	26,5	17,2	13,8	23,1
I don't know	40,1	35,3	13,8	24,5	32,1
Total	100,0	100,0	100,0	100,0	100,0

p < 0.01

Contingency Coefficient: 0.307

n = 299

5.4 Variations of the use of FLOSS in European countries

As shown in section 5.1, the overall share of FLOSS non-users (including unaware users) is 47%. While on the aggregate level the results of the FLOSSPOLS local governments survey were not biased by an over-representation of FLOSS users (see table 2), it could be possible that the response from some countries might have been biased by a self-selection of respondents. As table 27 illustrates, in all the countries that were surveyed for the non-respondents analysis, the share of those who say that they do not use FLOSS and are therefore not interested in the survey is well below 47%. Only Germany provides a relatively large share of respondents in this category (though still below 47%). The response from Italy, Spain, the UK, and especially Sweden appear even less biased by an over-representation of FLOSS users, as only very small shares of respondents say that they did not participate in the survey because they do not use FLOSS.⁴⁴

⁴⁴ Czech Republic and Greece have been excluded from the non-respondents list because response and non-response were anonymous, as in the case of Czech Republic, or the interviews were carried out by telephone and covered all local governments provided by the ELGO database. It should also be noted that the non-response analysis was voluntary, i.e. contacts were not forced to provide their reasons for non-response. There could thus be differences, country-related or otherwise, in contacts' acknowledgement that they were not interested in the survey due to their lack of FLOSS use.

Table 27: Reason for non-response to the FLOSSPOLS local governments survey by country

	Austria	Belgium	Denmark	France	Germany	Italy	Spain	Sweden	UK	Total
Reason	Percentage of respondents (multiple response)									
I was too busy	37,0	45,0	28,6	57,9	32,8	33,3	33,3	50,0	42,9	36,3
We have a policy not to participate in surveys	22,2	10,0	-	-	29,9	-	16,7	-	35,7	23,6
We do not use FLOSS and are therefore not interested in the survey	33,3	25,0	28,6	31,6	43,5	16,7	16,7	-	14,3	36,6
Other reason	29,6	45,0	71,4	21,1	19,8	50,0	50,0	50,0	35,7	26,8

If we compare the shares of respondents in the different countries in the four different categories for the motivations to the respective average shares of respondents in these four categories we can identify the main reasons that determined non-response in the different countries (i.e. categories that are over-represented). In Austria, Denmark, Italy, and Spain non-response was mainly determined by other reasons; in Belgium and Sweden it was mainly determined by a combination of lack of time (“too busy”) and other reasons. Non-response from France is mainly explained by lack of time. In Germany, non-response was clearly motivated by a general policy of local governments not to participate in surveys and, as mentioned above, by FLOSS non-use. Non-response from the UK is motivated mainly by reasons other than FLOSS-non-use.

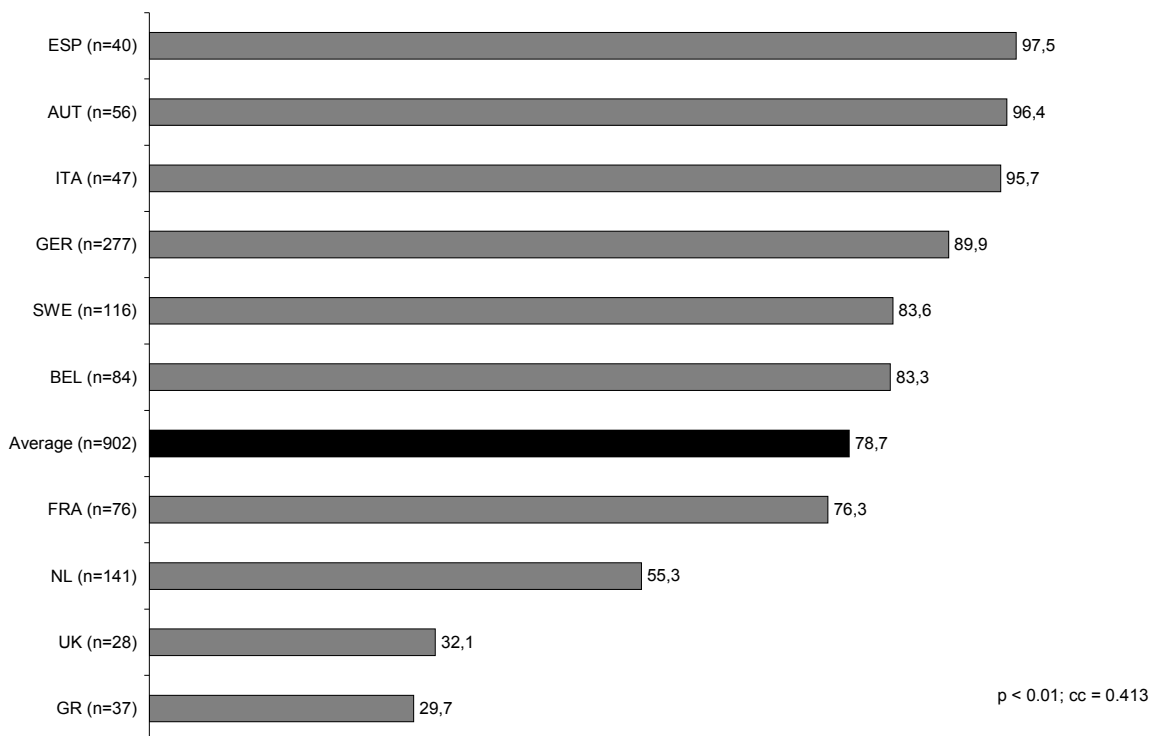
Figure 3 depicts the shares of FLOSS users (*including* unaware users) in ten of the surveyed countries.⁴⁵ It is evident that in the majority of the countries the average share of FLOSS-using local governments is exceeded, reaching shares up to 98% (Spain). Only France, the Netherlands, UK, and Greece show below average shares of FLOSS users. As explained in the earlier discussion of overall response rates (table 1, section 4.2), we consider the results from the Netherlands to be most reliable because they are based on an almost complete sampling of the local governments, with a high response rate, whereas in the other countries the survey covered a considerably smaller proportion of all local governments. The FLOSSPOLS local governments survey is an explorative survey that does not claim to be representative on the country level,⁴⁶ but the differences observed here are

⁴⁵ The response from Czech Republic, Denmark, and Poland remained too low to provide statistically reliable results when the countries are compared and have therefore been excluded from this comparison.

⁴⁶ The survey is based on the group of local governments that could be identified in the ELGO database and for which email contact details were provided or made available through our telephone contacts. Although widely used, the ELGO database is far from exhaustive, and the relation with the total population of

nevertheless a clear depiction of the sample of respondents. Statistical tests and the non-respondents analysis indicate a sufficient degree of reliability and validity of our observations. To which degree these observations match the overall situation in the surveyed countries or result from biased answering patterns remains however subject to more "census"-style studies that cover a representative share of the total of local governments for each country. Due to the support of the Dutch OSOSS Programme this was achieved for the Netherlands, but for other countries a similar effort with high-level support may be necessary in order to achieve the sampling required for comparable results. As such, our later observations regarding the structure and relationships among various attributes of the respondents may be more useful – and applicable to the general population of each country – than a country comparison of shares of FLOSS use.

Figure 3: FLOSS usage in European local governments – differences between countries

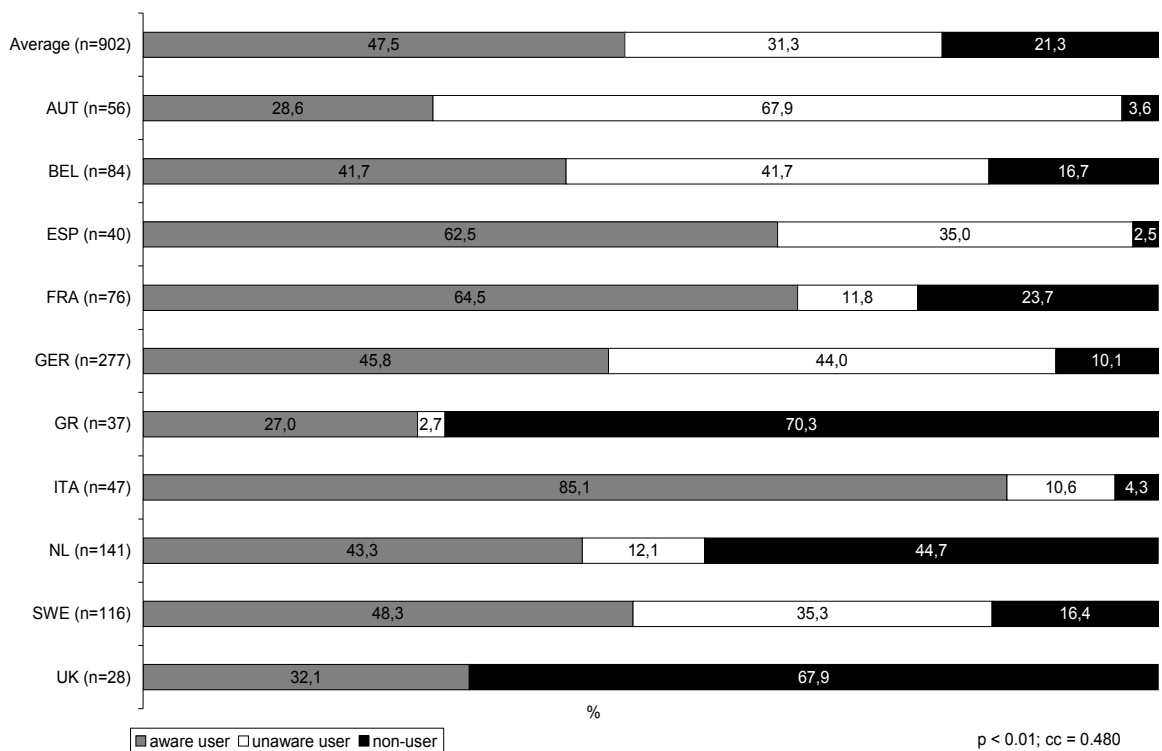


As illustrated in section 5.1, table 3, roughly one third of the usage of FLOSS in European local governments is unaware use – respondents state that their organisations do not use FLOSS, but also that they use applications such as Apache and KDE, obviously without being aware that these are

authorities is not consistent across countries. Moreover, participation in the survey was voluntary. The survey sample is not a random sample and thus cannot lead to conclusions representative of the total populations of governments in the surveyed countries.

FLOSS applications. Figure 4 shows that there are remarkable and significant differences between the countries with regard to the awareness or unawareness of FLOSS usage. It indicates that a very large part of the FLOSS usage in Austria must be explained by unintentional use, which places the country's high incidence of FLOSS use in a different context. Besides Austria, but to a much lower extent, Germany, Belgium, Sweden, and Spain show above average shares of unaware FLOSS users. However, Spain is not only characterised by unaware usage of FLOSS, but also, like France and especially Italy, large shares of aware FLOSS users.⁴⁷ The UK and – with some reservation – Greece provide a different pattern, as unaware FLOSS users do not occur (UK) or are negligible in our sample.

Figure 4: Types of FLOSS usage – differences between countries



⁴⁷ Though this result is statistically insignificant it should be mentioned here that Spain and Italy show considerable shares of local governments using FLOSS as a regular system on their PCs (6.9% in Spain and 4.3% in Italy, compared to an average of only 1.7%). FLOSS is also used more often as a regular system on the servers in these two countries, which also applies to France and Belgium. Despite the reservation that we cannot exclude a bias in responses from these countries, these observations provide some indication that the respondents from Spain and Italy differ considerably from the respondents from other countries in our sample with regard to the extent of FLOSS usage within any given organisation. Whether this observations can be generalised for the whole of local governments in these two countries remains however an open question.

These differences relate to distinct national patterns and practices in the usage and administration of software by IT managers of local governments. While these different settings help to explain other differences we observe with regard to the usage of FLOSS in European local governments, we cannot determine these different settings in detail, as this would require a thorough examination of work organisation, software purchasing strategies, decision-making, and maintenance practices in the offices of the IT departments. We will however discuss some relevant aspects of these different national and organisational settings in the following sections of this chapter. A closer analysis of these settings is necessarily subject to future research activities in this field.

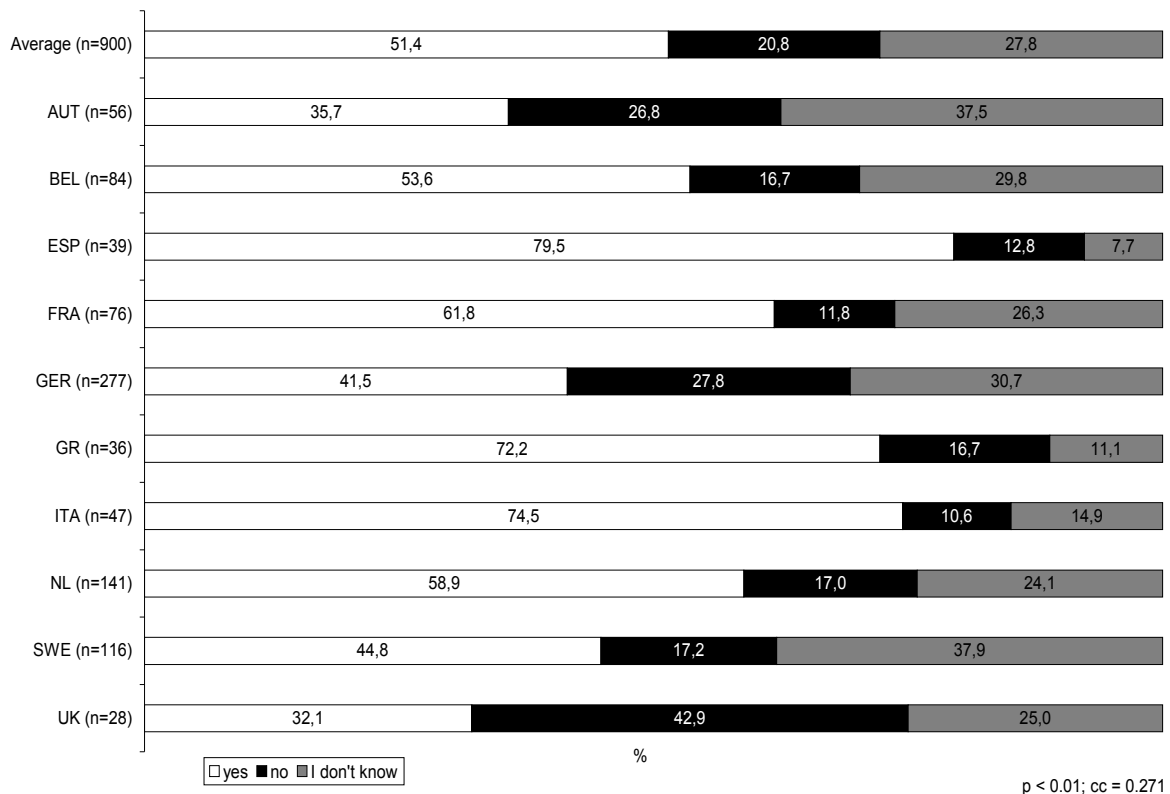
The surveyed countries differ significantly with regard to whether an increase of the share of FLOSS would be useful. In particular, local governments in Spain, Italy, and Greece, but also many respondents from France and the Netherlands show a high demand for increasing usage of FLOSS in their organisations (figure 5). To some degree this strong demand in Greece and the Netherlands may be explained by the relatively low shares of FLOSS usage among our respondents from these countries (as shown in figure 3), which might indicate a suppressed potential demand in these countries. However, given the fact that FLOSS is usually not the standard software in European local governments the same argument could apply to countries with a high incidence of FLOSS, as most of those who do use it do not use it extensively. In these cases we assume that positive experiences with FLOSS result in an interest in deploying it on a larger scale. This conclusion is valid for the survey overall, where there is a strong correlation between current FLOSS use and the perceived value of increased FLOSS use, as was shown in table 5, section 5.1.

Reluctance to an increase of the share of FLOSS is especially expressed by respondents from the UK, which appears to have a relatively low share of FLOSS users. But German and Austrian respondents in our sample also have high shares of reluctance to increase FLOSS use, although in these countries the shares of current FLOSS users are comparatively large. Further examination of the data revealed some evidence⁴⁸ that reluctance to increasing FLOSS use from UK and Austrian respondents in our sample is mainly expressed by non-users, but to a considerable degree also from aware FLOSS users. Reluctance to FLOSS from German respondents in our sample mainly derives from unaware users of FLOSS and to some degree – though lower than in the cases of UK and Austria – from aware users. German non-users mostly do not know whether an increase of the share of FLOSS in their organisation would be useful. It is thus obvious that reluctance to further increase in FLOSS use is

⁴⁸ "Some evidence" means that the depicted observations are evident but statistically insignificant, which is due to low numbers of cases in the categories that are compared.

not simply based on ignorance and prejudices, but that negative practical experiences (among aware users) of FLOSS play also a role.⁴⁹

Figure 5: “Useful to increase share of FLOSS” – differences between countries



With regards to advantages and disadvantages of FLOSS, we observe significant differences between the countries (figure 6), whereby four different groups appear to be distinguishable. The group of those who show strong interest in access to source code differentiates further into strong FLOSS users (Spain and Italy) and extremely low FLOSS users (Greece). In Italy and Spain this interest mainly derives from aware FLOSS users.⁵⁰ Respondents from these countries feature thus a combination of practical experiences with FLOSS and an interest in getting access to the source code. In contrast to this, interest in getting access to the source code in Greece derives mainly from non-

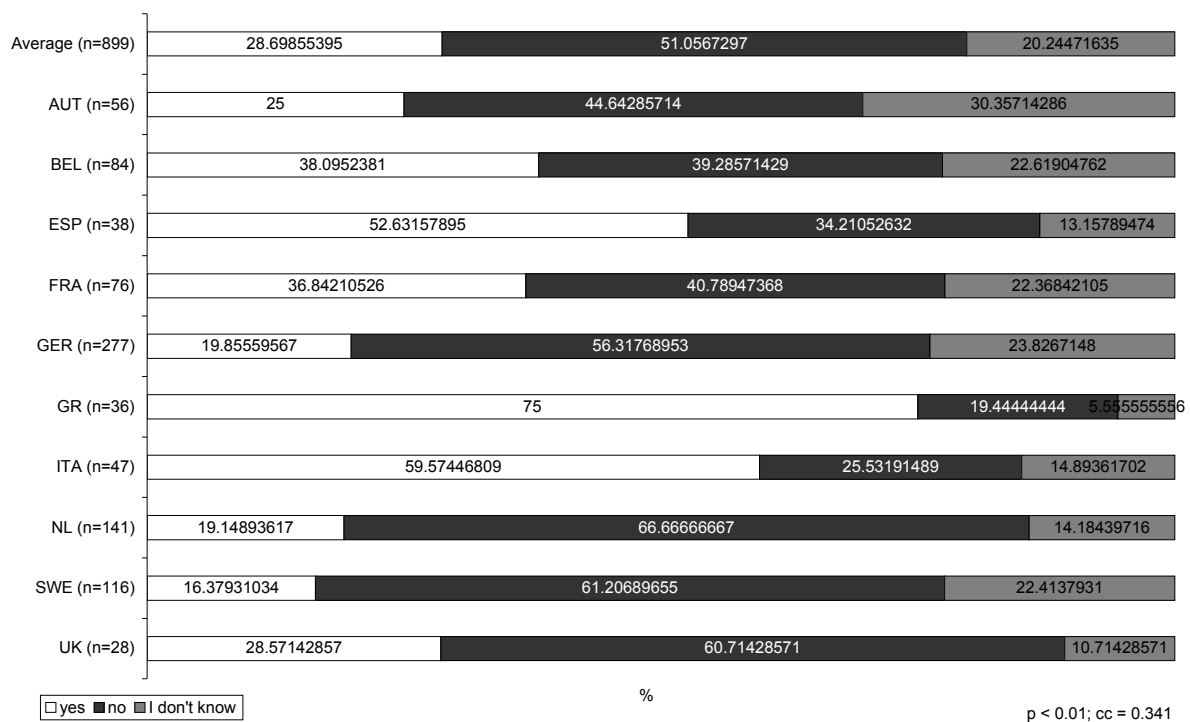
⁴⁹ See also table 5, section 5.1, showing extent of FLOSS use and the related discussion.

⁵⁰ Due to the low response from some countries the differentiation of the respondents by country and their opinion towards access to the source code results in statistically insignificant results. Nevertheless these observations provide valuable hints how the observed differences between the countries in our sample are probably explained.

users. This ambiguity might derive from the lower degree of practical experience with FLOSS compared to the other countries.⁵¹

Countries with the lowest shares of respondents who consider access to the source code to be an improvement can be grouped into high FLOSS users (Sweden, Germany) and low FLOSS users (the Netherlands, UK). These countries provide also the largest shares of respondents who explicitly do not consider access to source code as an improvement. Further examination showed that above average shares of *aware* FLOSS users who do not consider access to the source code as an advantage is a feature common to these four countries⁵². With regard to Germany and Sweden our observation may suggest that increased use of FLOSS in these countries results in an increased awareness of *other* benefits of FLOSS, while the availability of source code is taken for granted (as it is also shown by the perceived importance of customisation).

Figure 6: Access to source code is an improvement – differences by country



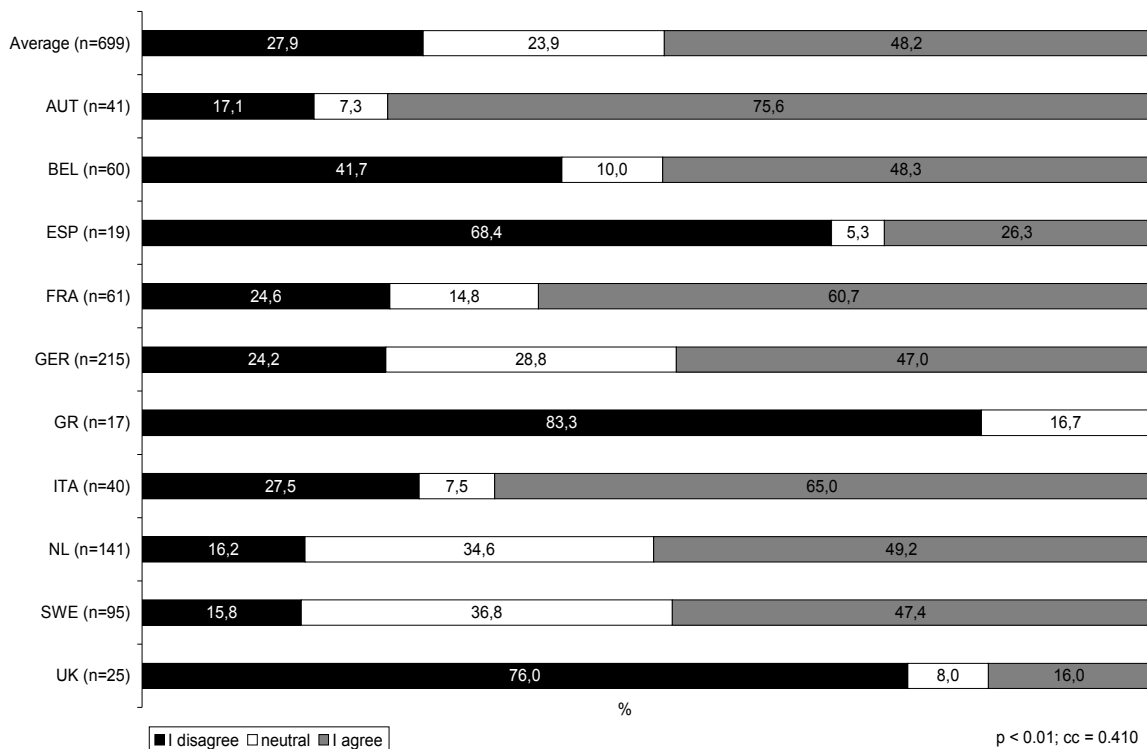
⁵¹ This assumption is supported by results from telephone interviews that revealed that IT managers in Greece often stem from other professions than IT professions (mainly management or public administration professions) and administer the activities of sub-contracted IT-companies rather than the IT-system itself.

⁵² This observation could not be validated through tests of statistical significance

Regarding the differences within the two groups of strong FLOSS users (i.e. between respondents from Spain and Italy on the one hand and Germany and Sweden on the other hand) it may be that IT managers from Spain and Italy countries have a different professional background and are more experienced in programming than their colleagues in the North European countries, leading to an increased value being placed on access to source code. An alternative explanation could be a greater access in Spain and Italy to low-cost third party individuals or organisations capable of understanding or modifying the source code, whereas in Germany and Sweden such third-party access may be relatively expensive. Nevertheless, these remain speculative explanations that require further examination in future studies.

Only two of the four statements on possible advantages of FLOSS resulted in statistically significant differences between the countries: regarding ease of customisation and combinability of FLOSS with proprietary software.

Figure 7: FLOSS easier to customise than proprietary – differences between countries



Agreement with the statement that FLOSS can be easier customised than proprietary software is strongest among respondents from Austria, Italy, and France, whereas disagreement is strongest

among respondents from Greece, the UK, Spain, and Belgium (figure 7). Positive or negative attitudes towards the ease of customisation do not depend on whether or not the respondent is experienced with FLOSS, as among the “customisation-friendly” countries Austria and Italy provide large shares of FLOSS users while France provides below average shares of FLOSS users. Similarly, among the “customisation-ignoring” countries Spain and Belgium provide strong FLOSS users whereas Greece and the UK provide low FLOSS users. We can conclude that ease of customisation, which is probably the strongest *practical* benefit of FLOSS, is valued as an advantage by FLOSS-experienced countries, whereas IT managers in FLOSS-inexperienced countries are either less likely to believe that FLOSS is easier to customise, or do not see this feature as an advantage for other reasons that are not captured by the FLOSSPOLS survey.⁵³

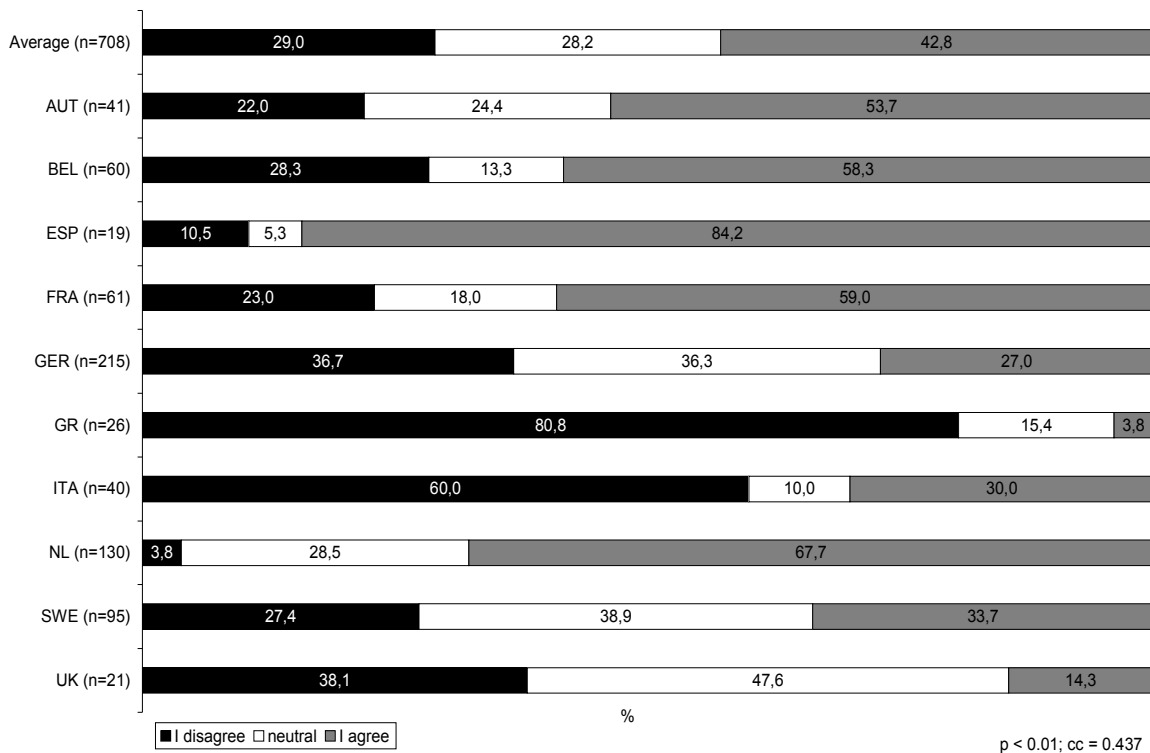
The opinion that FLOSS can very easily be combined with proprietary software within the same IT system is mostly shared among respondents from Spanish, Dutch, French, Belgian, and Austrian local governments, whereas respondents from Greek and Italian (and, to some extent, German and British) local governments disagree with this statement (figure 8). Further analyses revealed that the negative attitude towards this statement in Greek local governments is more perception rather than actual experience of FLOSS.⁵⁴ Disagreement with this statement in Italian and German local governments is more experience-based and seems to indicate that experienced users of FLOSS in these countries believe that the capacity of FLOSS to be combined with proprietary software systems has limitations. In contrast, the strong agreement with this statement by local governments in Spain and the Netherlands is also clearly experience-based.⁵⁵

⁵³ It would be interesting to know whether the proprietary software licences in the surveyed countries differ in their expiration dates, whether there are country-specific differences in the professional background of IT managers, or whether the tasks of IT departments and the organisation of work in these departments differ significantly by country. Since the questionnaire had to keep to a reasonable limit in time and scope these questions could not be examined in the FLOSSPOLS survey.

⁵⁴ All Greek non-users of FLOSS show this negative or a neutral attitude.

⁵⁵ More than three quarters of the Dutch local governments using FLOSS agree with this statement. Overall, “combinability” as an advantage is correlated to FLOSS use – see Table 8 and the discussion in section 5.2.

Figure 8: FLOSS is easy to combine with proprietary software – differences between countries



Lack of technical support for FLOSS systems is mainly considered to be a major problem in Austria, Spain, Sweden, and Germany, whereas local governments in Greece, Italy, Belgium, and the UK tend to consider this as a solvable problem (figure 9). This pattern is apparently not correlated with the different spread of FLOSS in the local governments of these countries as expressed in our sample. The following analysis will however reveal that these differences can partially be explained by the need to customise software after its purchase and by the deployment of external software maintenance services.

The first mover problem (figure 10) is very closely related to the fear of a lack of technical support for FLOSS. It is strongly pronounced in Austria, Sweden, Spain, and Germany and much lower in Greece, the UK, Italy, and Belgium. This pattern corresponds strongly to the country-specific pattern that is observable with regard to the perception of a lack of technical support for FLOSS a relation that has already been discussed in this report (table 9, section 5.2).

Figure 9: Difficult to find technical support for FLOSS – differences between countries

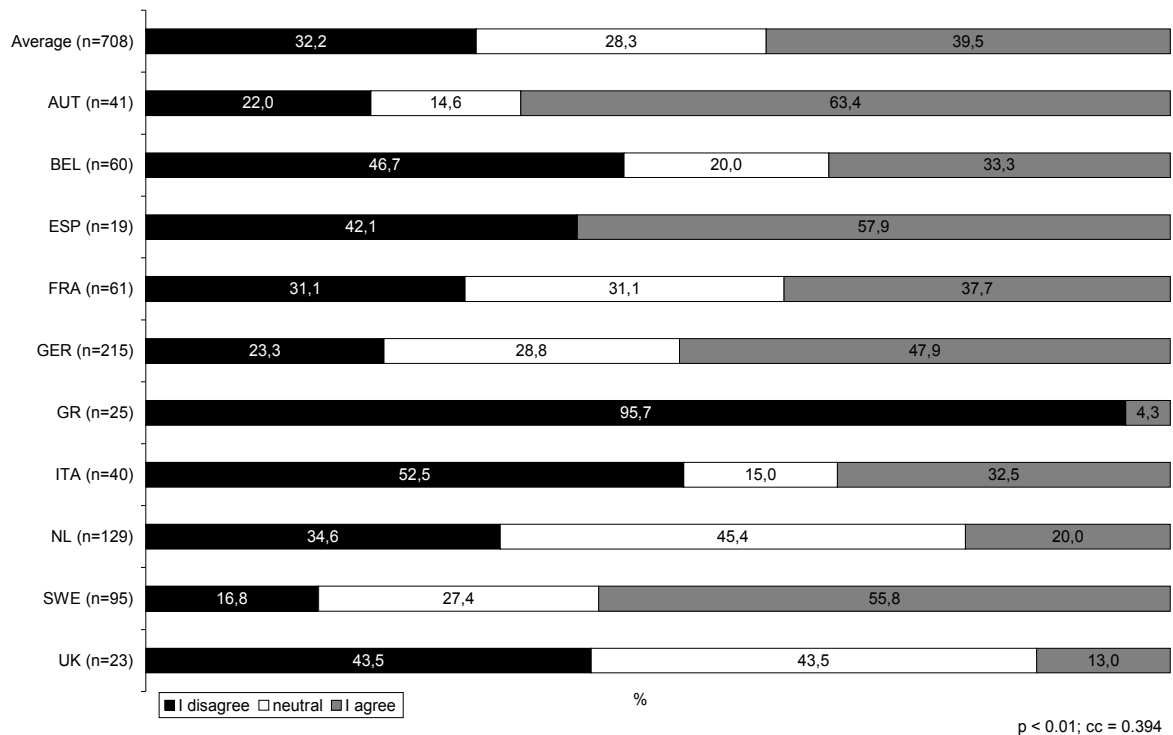


Figure 10: Migrate only if other organisations do it first – differences between countries

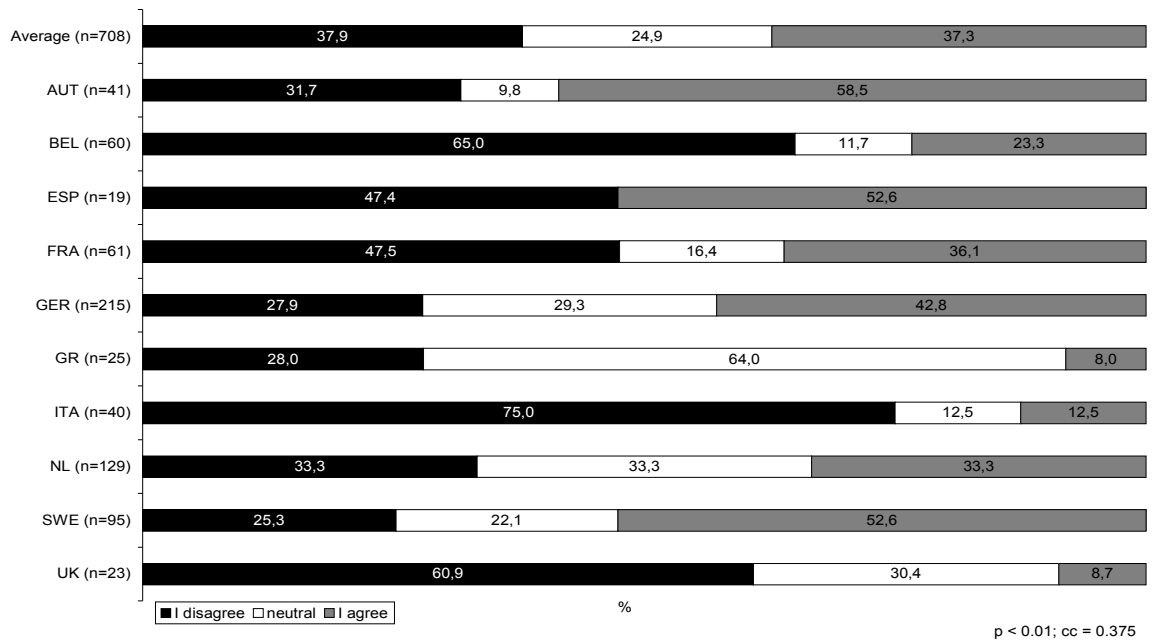
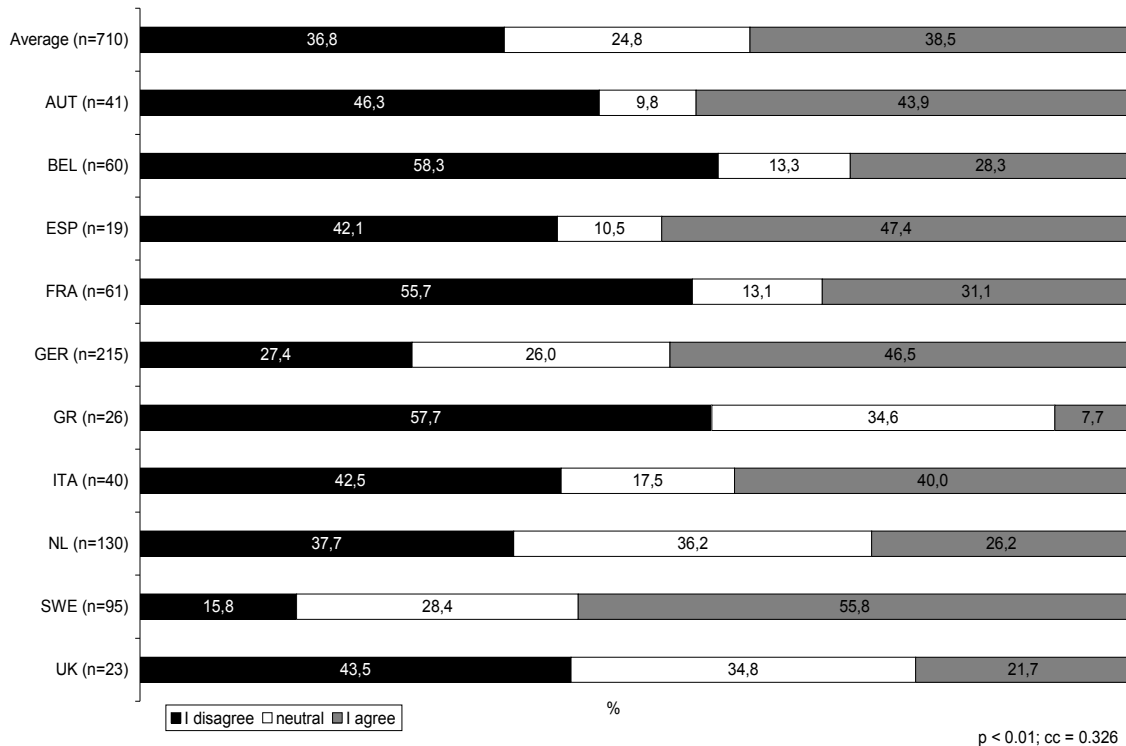


Figure 11: FLOSS training too expensive or time-consuming – differences between countries



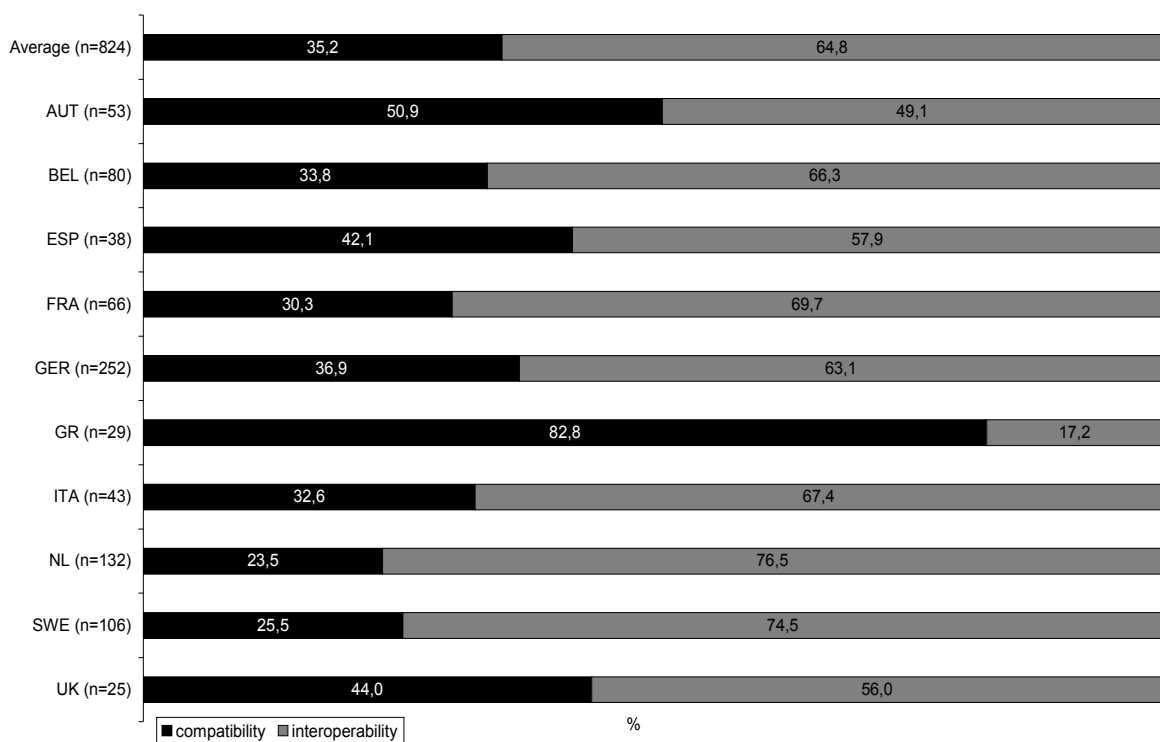
Fear of high training costs that might be required for a broad introduction of FLOSS systems in local governments are related to the spread of FLOSS usage in a country as seen within our sample (figure 11). This fear is mainly expressed by respondents from Spain, Sweden, Germany, and Austria, while respondents from countries with a lower share of local governments using FLOSS show the strongest disagreement with this statement.

Respondents from local governments in the Netherlands – as well as Sweden, France, and Italy – value interoperability higher than respondents from local governments in other countries (figure 12). In contrast to these groups, respondents from Greek local governments show the strongest interest in compatibility, which appears to be in strong contrast to the overwhelming demand for FLOSS expressed by these respondents throughout the whole survey, and may be an indication of their lack of awareness of what interoperability in practice requires. Besides respondents from Greece, respondents from local governments in Spain, the UK, and Austria show also significant shares of those with a preference for compatibility, though except for Austrian respondents the majority opt for interoperability. Thus, from the technical point of view the IT managers in European local

governments – apart from Greece and Austria – show a preference structure that would theoretically favour FLOSS over proprietary software and that apparently contributes to the overall demand for FLOSS. There is however no clearcut relation between the degree of FLOSS usage and the preference for interoperability or compatibility with regard to the differences between countries as they appear in our survey. We therefore assume that other factors play a role to explain these differences, such as license expiration dates, contract arrangements with vendors or (programming) skills of the IT administrators.

Though the number of software vendors / suppliers, the need to customise software after implementation, and the deployment of external software maintenance services varies between the countries in our sample these differences are not significant and provide thus no explanation for the differences between these countries regarding the use of FLOSS. The same applies to effects of IT budgets, software license fees, and the perception of these fees by the IT administrators.

Figure 12: Compatibility and interoperability demands – differences between countries



The strongest explanation for the differences between the countries within the sample of survey respondents is provided by different median PC-per-administrator ratios as an aggregate measure for organisational size and work volume of the IT department. As illustrated by the total figures in table 28, respondents from Sweden evidently belonged typically to large local governments (or IT departments with a huge number of PCs to administer), whereas respondents from Austria, Greece, and Spain belonged to very small local governments (or IT departments with a very small number of PCs to administer). Respondents from Germany, the Netherlands, Italy, UK, and France belonged to medium size local governments and respondents from Belgium belonged to comparatively large local governments. Table 28 is sorted in descending order by the PC-per-administrator ratios in the total column.

Table 28: Median PC-per-administrator ratios – differences between countries

Country	Total		aware users		unaware users		non-users	
	N	Median	N	Median	N	Median	N	Median
SWE	110	120,0	55	120,0	39	118,8	16	122,5
BEL	79	55,0	34	58,1	33	55,0	12	36,3
FR	73	41,7	49	42,6	n.a.	n.a.	15	49,0
UK	25	41,7	n.a.	n.a.	n.a.	n.a.	16	42,5
ITA	41	40,6	36	40,3	n.a.	n.a.	n.a.	n.a.
NL	139	38,5	61	37,5	17	38,3	61	40,0
GER	256	35,0	121	42,5	114	30,0	21	35,0
ESP	34	30,8	22	34,8	11	30,0	n.a.	n.a.
GR	32	28,0	n.a.	n.a.	n.a.	n.a.	23	28,0
AUT	54	27,4	15	35,0	37	25,0	n.a.	n.a.
Total	843	40,0	411	43,8	263	33,0	169	40,0

n.a. = not applicable because number of respondents is below 10.

The comparison of the median PC-per-head ratios of aware and unaware users and non-users in the ten countries makes a mixed showing, as in some countries our findings go in line with the overall finding of a larger PC-per-administrator ratio of aware FLOSS users (Austria, Germany, Spain) whereas in other countries they deviate from the overall trend (Belgium, France, the Netherlands).⁵⁶

⁵⁶ In order to protect the anonymity of our respondents categories with less than 10 respondents are left blank in table 28.

Table 29 indicates (for the total sample) which country differences are statistically significant on this parameter. Respondents from Sweden appear to be unique because they differ highly significant from respondents of all the other countries. Belgian respondents differ significantly from all other countries except for respondents from UK. Respondents from Austria provide the third group that differs from many other respondents. Respondents from the other countries show significant differences to respondents from three to six other countries.

Table 29: Significance of country-related differences of PC-per-administrator ratios

	AUT	BEL	ESP	FR	GER	GR	ITA	NL	SWE	UK
AUT		***		***	**		**	***	***	***
BEL	***		**	*	***	***	*	***	***	
ESP		**							***	**
FR	***	*			*	**			***	
GER	**	***		*					***	*
GR		***		**			**	**	***	***
ITA	**	*				**			***	
NL	***	***				**			***	
SWE	***	***	***	***	***	***	***	***		***
UK	***		**		*	***			***	

Mann-Whitney U-test

* = p < 0.1

** = p < 0.05

*** = p < 0.01

6 Conclusions

The FLOSSPOLs survey on local governments has clearly confirmed that FLOSS is already widely used in European local governments, as almost four fifths of the respondents use it. However, the share of those who use FLOSS without knowing that they do so is remarkable, so that we have to conclude that slightly more than half of the local governments that participated in the survey use it *by intention*. Nevertheless, this figure is still convincing, especially with regard to the fact that it is this group of aware users – the only group that is able to compare FLOSS and proprietary systems based on practical experience - that provided extremely positive attitudes towards FLOSS. Thus, our hypothesis that experience with FLOSS has in general a positive effect on the evaluation of and demand for FLOSS is clearly confirmed. Political programmes aiming at an increased use of FLOSS in governments should therefore contain strong incentives for practical experiments with FLOSS.

A reservation regarding the scope of FLOSS usage in European local governments that must be made is that FLOSS is still far from being the standard software on PCs, laptops, and servers in European local governments. FLOSS is definitely something that is rather used partially, as a supplement, than as the basic software. While this is true for applications software, it is even more true for operating systems. The survey shows that this will probably hold true for the coming few years, though the strong incidence of Unix among respondents might become an advantage for a further advancement of the use of the GNU/Linux operating system. The range of FLOSS systems and their application by the respondents revealed that the march of FLOSS towards the computer desktops has only just begun.

However, there is undoubtedly a great potential for an increased usage of FLOSS in European local governments in the coming years, as a majority of respondents – even among those who do not use FLOSS – would like to extend the use of FLOSS in their organisation. Two related observations are meaningful: first, the group of unaware FLOSS users indicates that ignorance of IT administrators towards the software used – which often seems to be caused by small IT budgets and a high PC-per-administrator ratio – is a very strong impediment towards the use of FLOSS. This group uses FLOSS, though unintentionally, and shows at the same time stronger reservations and prejudices towards FLOSS than actual non-users. Second, while our expectation of a preference for a combination of FLOSS and proprietary systems has been confirmed in the survey, the share of 22% of the respondents who want to replace proprietary software on their systems completely by FLOSS is

unexpectedly large. This figure demonstrates a strong dissatisfaction with proprietary software systems and high expectations towards FLOSS among a significant share of respondents.

The analysis of the (perceived or experienced) pros and cons of FLOSS in comparison to proprietary software shows that access to the source code, usability, and reliability are not seen as the most important advantages of FLOSS. Rather, ease of customisation (which is of course related to access to the source code) and combinability with proprietary software systems are the advantages that make IT managers of European local governments think of using FLOSS. Regarding the fears that are often expressed when FLOSS is considered, the survey revealed that a perceived lack of technical support for FLOSS and perceived time and expense costs of training are the most important. In contrast, the fear of being isolated through the use of FLOSS before other similar organisations appears to be less unimportant (though still significant), presumably because FLOSS has reached a critical mass of users in the public sector. These fears affect unaware users of FLOSS rather than aware FLOSS users or non-users, which implies that these fears diminish with growing attention towards and awareness of the types of software systems that are used in an organisation's own IT system.

The analysis of the organisational context of the use of FLOSS showed some important explanations for the differences that are observed between groups of respondents. The uncoupling of hardware and software purchases is a factor that works to the benefit of FLOSS as does a strong demand for interoperable software. Other important factors that increase the willingness to use FLOSS are the need for customisation of software and the perception of being too dependent on vendors. Budgetary constraints showed no impact in absolute terms, but a strong subjective impact: While the concrete size of the IT budget 2004 as well as the share of software license fees in this budget showed no significant correspondence to the use or non-use of FLOSS, a strong correlation was found between support for increased FLOSS use and the perception that present licence fee shares are too high. There is an unexpected and significant share of respondents who consider the share of software license fees in their IT budget too *low*. It turned however out that this feeling is mostly expressed by FLOSS users, so it must be interpreted as a direct outcome of FLOSS-related cost-saving effects (i.e. “too low” interpreted not as “we would like to increase this share” but “it used to be higher/is higher for others”). The desire to reduce the share of license fees in the IT budgets that was expressed by most respondents is a further factor that drives an increased use of FLOSS in the near future.

The strongest explanation for the observed differences in the use of FLOSS between different organisations and between the surveyed countries derives however from size-effects of the local

government organisation and the related IT departments, which seem to be strongly determined by different patterns of the organisation of work. The size of the organisation, as measured by the persons employed in the IT department and the number of PCs and laptops administered by the IT department, is positively correlated to FLOSS use. However, superimposed on this size effect is the effect of the PC-per-administrator ratio, which varies considerably between the different countries. Together these two factors have a two-sided effect on the use of FLOSS: In large organisations, high PC-per-administrator ratios are slightly against and low PC-per-administrator ratios slightly in favour of FLOSS use, but in small organisations it is just the other way round – low PC-per-administrator ratios works against and high PC-per-administrator ratios to the benefit of FLOSS. The cause of this ambiguity must however remain open to some degree, as the FLOSSPOLS survey was not intended and designed to examine details of software implementation policies and work organisation in local governments. Overall, however, PC-per-administrator ratios are much higher among FLOSS users than among non-users, and are also much higher among those who would like to increase FLOSS use, indicating that FLOSS use may allow a lower administrative workload per PC (i.e., FLOSS use may allow the same number of administrators to look after significantly more PCs).

Finally, the FLOSSPOLS local governments survey revealed a number of fundamental differences in the use of FLOSS between the ten countries that could be compared systematically. These country-related differences can be summarised in 'adoption profiles'. Such profiles allow us to distinguish different types of FLOSS usage that would not become visible (or only to a less detailed degree) if only our user typology (aware, unaware, and non-users of FLOSS) or the PC-per-administrator ration would be considered. The basic assumption thereby is that sample-based adoption-profiles still reflect to some degree underlying differences in work organisation, regulation, contractual issues, professional profiles, and other constraints that determine the use of FLOSS in European local governments. Thus, we understand our country-based adoption profiles as a means to identify different complex patterns that determine different ways of FLOSS usage. Although the adoption profiles were originally drawn from the respondents in our sample differentiated by country, each adoption profile results in a label that depicts these usage patterns independently of the country to which it relates. Overall this method reveals how differently and sometimes inconsistently organisations approach and adopt FLOSS.

The first adoption profile in our sample is characterised by a large share of FLOSS use in local governments, although tempered by an extremely large share of unaware FLOSS users. Though ease of customisation and combinability are highly valued, fear of a lack of technical support and the

related first mover problem play an important role as perceived disadvantages of FLOSS as does the fear of cost and time efforts related to training. Further to this ambivalent attitude towards FLOSS, which is largely determined by fears of possible disadvantages, the demand for an increase of FLOSS in the local governments as well as the demand for interoperable software remain low. We would like to call this type of FLOSS adoption in local governments "*uninformed and reluctant use*".⁵⁷ The PC-per-administrator ratio indicates that this type seems likely to appear in small organisations. A variant of this type is that in some (also small) organisations the advantages of FLOSS are less noticed than the disadvantages. As a consequence, the demand for an increase of FLOSS remains relatively low and the demand for interoperable software remains below average.

The *second adoption profile* is characterised by an average share of FLOSS users and a comparatively high share of unaware users. Advantages of FLOSS are noticed more than disadvantages, but the demand for an increase of FLOSS and for interoperable software is about the average. We would like to call this type of FLOSS usage in local governments "*interested but reserved use*". It seems to be typical for quite large organisations.

The third adoption profile is characterised by an average share of FLOSS users and a very small share of unaware FLOSS users. Advantages of FLOSS are valued higher than disadvantages, of which cost of training, in particular, is not seen as important. The demand for an increase of FLOSS use as well as for interoperable software is high. We would like to call this type of FLOSS adoption, which appears to be typical for medium-sized (i.e. average) organisations, "*informed FLOSS demand*".⁵⁸

The fourth adoption profile was typified by very low shares of FLOSS users and very low shares of unaware users, too. Advantages as well as disadvantages of FLOSS are not highly remarked upon. Nevertheless, there is a very high demand for an increase of FLOSS use. In contrast, the demand for interoperable software remains very low. This kind of attitude towards the usage of FLOSS appears to be determined by negative experiences with proprietary software more than by practical experience of FLOSS. We therefore like to call this type "*uninformed alternative seeking*" because this adoption seems typical of users looking for an alternative to the software they have, although they are not sure

⁵⁷ The term "uninformed" refers only to the large share of unaware FLOSS users and does not imply that all users of this type are uninformed about FLOSS. All the labels that will be used in this section serve only the aim to pinpoint unique aspects of each type of FLOSS adoption. Other attributes, which may also apply to a type but do not help to distinguish it from other types, must be disregarded to a certain degree

⁵⁸ The term "informed" refers only to the fact that the share of unaware users is very low and does not imply that other types of usage are generally based on a lack of information.

what advantages and disadvantages this alternative would bring. Across our sample this attitude was typically found in very small organisations.

The *fifth* adoption profile is characterised by very large shares of FLOSS users and very low shares of unaware FLOSS users. Ease of customisation is valued highly. The disadvantages of FLOSS play no significant role in this case. The demand for an increase of FLOSS is very high and the demand for interoperable software is also clearly above average. This type seems to be correlated to IT managers who are skilled in programming and wish to adjust their IT systems to the specific needs of their organisation, which usually is medium-sized. We would therefore like to call this type "*software customisation*".

The sixth adoption profile is characterised by somewhat low shares of FLOSS users and very low shares of unaware users. The attitudes towards pros and cons of FLOSS do not provide a distinctive picture in comparison with the other types described here, but demand for an increase of FLOSS and for interoperable software is very high. We would like to call this type, which again seems to be found among medium sized organisations, "*informed interoperability demand*".

The seventh adoption profile is determined by a very large share of FLOSS users, whereby the share of unaware users is below average. While ease of customisation is not much valued, combinability with proprietary software is valued very highly. Fear of a lack of technical support for FLOSS and of being a first adopter, as well as fear of training costs are significant. Despite these fears there is however a very strong demand for an increase of FLOSS use, whereas the demand for interoperable software is low. We would like to call this type "*risk-taking FLOSS adoption*" because despite perceiving risks associated with FLOSS, these organisations use it extensively and still want to increase its use. According to our sample this type appears also to be typical for small organisations.

The eighth adoption profile is characterised by average shares of FLOSS users as well as of unaware FLOSS users. Respondents from local governments that fall into this profile did not identify very much with advantages of FLOSS, whereas they supported statements on disadvantages of FLOSS, especially fear of training costs. Consequently the demand for an increase of FLOSS use is low. In contrast to this, the demand for interoperable software is very high. This type seems to be determined by the negative aspects that are sometimes associated with FLOSS, therefore we would like to call this adoption pattern "*fearful reluctance*". The respondents of this type typically belonged to very large organisations.

Finally, the ninth adoption profile is characterised by low shares of FLOSS users, but also an absence of unaware users. Pros as well as cons of FLOSS are not significantly rated – respondents are quite neutral – and so is the demand for an increase of FLOSS or for interoperable software. We would like to call this type "*indifferent reluctance*". According to our sample it seems to be found also in medium-sized organisations.

The adoption patterns described above, while based on country differences within our sample, may be found across country barriers. What is common to them all is that indifference and lack of awareness leads to fear of possible disadvantages and a reluctance to adopt FLOSS, while FLOSS use tends to be driven by awareness and experience, demands for customisation and interoperability, and a certain amount of willingness to take risks especially in relation to support and training (although respondents with actual experience of FLOSS do not report problems with support and training). Policies designed to increase take-up of FLOSS in the public sector should therefore focus on increasing awareness of FLOSS, its costs and benefits, encourage pilot projects and experimentation to build experience for organisations to better make decisions, and foster the exchange of best practices to assuage fears related to support availability and training costs.

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8 Annex 1: Questionnaire (English)

1. Do you use open source software systems in your organisation?

Yes, we use open source software	<input type="checkbox"/>	1
No, we do not use open source software	<input type="checkbox"/>	2
I don't know	<input type="checkbox"/>	9

a) If answer is **yes**: In which situation(s) uses your organisation open source software mostly? [**Note**: multiple answers are possible)

On the desktop we use open source software (almost) exclusively.	<input type="checkbox"/>	1
On the desktop we use open source software partially.	<input type="checkbox"/>	2
On the servers we use open source software (almost) exclusively.	<input type="checkbox"/>	3
On the servers we use open source software prtially.	<input type="checkbox"/>	4
We experiment with open source software in pilot projects.	<input type="checkbox"/>	5

2. Which if any of the following software systems do you use in your organisation?

Apache	<input type="checkbox"/>	1	KDE	<input type="checkbox"/>	1
GNOME	<input type="checkbox"/>	1	Mozilla	<input type="checkbox"/>	1
Linux	<input type="checkbox"/>	1	OpenOffice	<input type="checkbox"/>	1
MySQL	<input type="checkbox"/>	1	PHP	<input type="checkbox"/>	1
Perl	<input type="checkbox"/>	1	Squid	<input type="checkbox"/>	1
Samba	<input type="checkbox"/>	1	Zope	<input type="checkbox"/>	1
FreeBSD/OpenBSD	<input type="checkbox"/>	1	Others	<input type="checkbox"/>	1

3. Which operating systems are the basis of your IT system?

Windows NT	<input type="checkbox"/>	1	BEOS	<input type="checkbox"/>	1
Windows 2000	<input type="checkbox"/>	1	BSD	<input type="checkbox"/>	1
Windows XP	<input type="checkbox"/>	1	NETWARE	<input type="checkbox"/>	1
MacOS	<input type="checkbox"/>	1	SOLARIS	<input type="checkbox"/>	1
Linux	<input type="checkbox"/>	1	something else	<input type="checkbox"/>	1
UNIX	<input type="checkbox"/>	6	I don't know	<input type="checkbox"/>	9

4. Would you find it useful to increase the share of open source software in your organisation?

Yes	<input type="checkbox"/>	1	
No	<input type="checkbox"/>	2	
I don't know	<input type="checkbox"/>	9	

a) **If answer is YES:** On the long run, what would you prefer: to replace some proprietary software components by open source software or to replace all proprietary software components by open source software?

To replace SOME components	<input type="checkbox"/>	1	
To replace ALL components	<input type="checkbox"/>	2	
I don't know	<input type="checkbox"/>	9	

5. What do you think: Would it be a substantial improvement for your IT Department to have access to the source code of the software you use?

Yes	<input type="checkbox"/>	1	
No	<input type="checkbox"/>	2	
I don't know	<input type="checkbox"/>	9	

6. Would you please indicate whether you agree strongly, agree, disagree, or disagree strongly with the following statements? Please let me also know when you have no opinion about a statement.

	strongly disagree	disagree	agree	strongly agree	No opinion
a) Open source software is easier to use than proprietary software.	[]	[]	[]	[]	[]
b) Open source software is easier to customise than proprietary software.	[]	[]	[]	[]	[]
c) Open source software is more reliable than proprietary software.	[]	[]	[]	[]	[]
d) Open source software can very easily be combined with proprietary software within the same IT system.	[]	[]	[]	[]	[]
e) If open source software would only provide access to the source code, but would not be cheaper than proprietary software, my organisation would not use it!	[]	[]	[]	[]	[]
f) It is too hard for my organisation to find companies that provide technical support for open source software.	[]	[]	[]	[]	[]
g) Migrating to open source software makes sense only if other organisations like mine do it first.	[]	[]	[]	[]	[]
h) Training people in my organisation to use open source software will be too expensive or take too much time.	[]	[]	[]	[]	[]

7. Normally, how do you buy your software: together with the hardware or separately?

together with the hardware	<input type="checkbox"/>	1
separately	<input type="checkbox"/>	2
both to the same degree	<input type="checkbox"/>	3
I don't know	<input type="checkbox"/>	9

8. When you buy software, what is more important for you: that the new software is compatible with other software from the product family you already use or that the new software is compatible with software from other producers and product families, so that it can be used independently from the system requirements of your IT infrastructure?

That the new software is compatible with other software from the same family	<input type="checkbox"/>	1
That the new software is compatible with other software from other families	<input type="checkbox"/>	2
I don't know	<input type="checkbox"/>	9

9. Who is most important for decisions on software purchases in your organisation, the IT manager (i.e. yourself), the users, the financial department, other management, or external consultants?

(NOTE: not more than 2 answers, please ask the respondent to rank them!)

IT Manager (yourself)	<input type="checkbox"/>	1
Users	<input type="checkbox"/>	2
Financial department	<input type="checkbox"/>	3
Other management	<input type="checkbox"/>	4
External consultants	<input type="checkbox"/>	5
Others	<input type="checkbox"/>	6
I don't know	<input type="checkbox"/>	9

10. How many vendors do you mostly rely on to buy software for your organisation?

Answer: _____ (number)
I don't know 9999

11. Would you say that your organisation is too dependent on your vendors?

Yes	<input type="checkbox"/>	1
No	<input type="checkbox"/>	2
I don't know	<input type="checkbox"/>	9

12. How often do you have to customise software after you have bought and implemented it in your IT system: never, sometimes, regularly, often, or very often?

1[] never 2[] sometimes 3[] regularly 4[] often 5[] very often
9[] I don't know

13. How often do you use external suppliers for software maintenance: never, sometimes, regularly, often, or very often?

1[] never 2[] sometimes 3[] regularly 4[] often 5[] very often
9[] I don't know

14. Roughly speaking, how large is the IT budget of your organisation in 2004?

roughly _____ EUR (number)
I don't know [] 9

15. Roughly speaking, what is the percentage of the share of licence fees for software in your IT budget?

roughly _____ %
I don't know [] 999

16. What do you think: Is this share of license fees too high, too low, or reasonable?

1[] too high 2[] too low 3[] reasonable
9[] I don't know

17. Do you see a need for reducing the expenditure for software in your organisation within the next two years?

Yes [] 1
No [] 2
I don't know [] 9

18. How many people work in your IT department?

roughly: _____ (number)
I don't know [] 9999

19. How many PCs (including Laptops) do you have in your organisation?

Number of PCs: _____ (number)
 I don't know 9999

20. And how many Servers do you have in your organisation?

Number of servers: _____ (number)
 I don't know 9999

21. We keep of course any information you give strictly confidential and will not reveal it to persons or organisations outside our project team. As you may know, the Open Source Observatory of the European Commission is intended to encourage the spread and use of best practices in Europe. We would therefore like to ask whether you would be interested in participating in the Open Source Observatory and allow us to pass your name and email address to the European Commission for this purpose?

Yes 1
 No 2

22. Would you be interested in getting informed about the results of our survey?

Yes 1
 No 2

THANK YOU VERY MUCH, GOOD BYE!!!

9 Annex 2: Frequencies of all variables

Country Number

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UK	28	2,9	2,9	2,9
	SWE	116	12,1	12,1	15,1
	SPA	40	4,2	4,2	19,3
	POL	19	2,0	2,0	21,3
	NL	141	14,8	14,8	36,0
	ITA	47	4,9	4,9	40,9
	GR	37	3,9	3,9	44,8
	GER	277	29,0	29,0	73,8
	FR	76	8,0	8,0	81,8
	DK	10	1,0	1,0	82,8
	CZ	24	2,5	2,5	85,3
	BEL	84	8,8	8,8	94,1
	AUT	56	5,9	5,9	100,0
	Total	955	100,0	100,0	

Use of OSS in Organisation (subjective)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	472	49,4	49,4	49,4
	no	445	46,6	46,6	96,0
	I dion't know	38	4,0	4,0	100,0
	Total	955	100,0	100,0	

New: Use of FLOSS (objective)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	197	20,6	20,6	20,6
	1	758	79,4	79,4	100,0
	Total	955	100,0	100,0	

Awareness of FLOSS usage in organisation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	aware user	472	49,4	49,4	49,4
	unaware user	286	29,9	29,9	79,4
	non-user	197	20,6	20,6	100,0
	Total	955	100,0	100,0	

Use of OSS on the PC - almost complete

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	803	84,1	98,3	98,3
	yes	13	1,4	1,6	99,9
	I don't know	1	,1	,1	100,0
	Total	817	85,5	100,0	
Missing	-1	89	9,3		
	System	49	5,1		
	Total	138	14,5		
Total		955	100,0		

Use of OSS on the PC - partially

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	683	71,5	83,6	83,6
	yes	133	13,9	16,3	99,9
	I don't know	1	,1	,1	100,0
	Total	817	85,5	100,0	
Missing	-1	89	9,3		
	System	49	5,1		
	Total	138	14,5		
Total		955	100,0		

Use of OSS on the server - (almost) complete

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	785	82,2	96,1	96,1
	yes	31	3,2	3,8	99,9
	I don't know	1	,1	,1	100,0
	Total	817	85,5	100,0	
Missing	-1	89	9,3		
	System	49	5,1		
	Total	138	14,5		
Total		955	100,0		

Use of OSS on the server - partially

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	487	51,0	59,6	59,6
	yes	329	34,5	40,3	99,9
	I don't know	1	,1	,1	100,0
	Total	817	85,5	100,0	
Missing	-1	89	9,3		
	System	49	5,1		
	Total	138	14,5		
Total		955	100,0		

Experiment with OSS in pilots

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	650	68,1	79,6	79,6
	yes	166	17,4	20,3	99,9
	I don't know	1	,1	,1	100,0
	Total	817	85,5	100,0	
Missing	-1	89	9,3		
	System	49	5,1		
	Total	138	14,5		
Total		955	100,0		

usage of apache

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	437	45,8	48,8	48,8
	yes	299	31,3	33,4	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of gnome

		Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	no	687	71,9	76,7	76,7
	yes	49	5,1	5,5	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of linux

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	323	33,8	35,7	35,7
	yes	422	44,2	46,6	82,3
	I don't know	160	16,8	17,7	100,0
	Total	905	94,8	100,0	
Missing	-9	10	1,0		
	System	40	4,2		
	Total	50	5,2		
Total		955	100,0		

usage of mysql

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	435	45,5	48,5	48,5
	yes	302	31,6	33,7	82,2
	I don't know	160	16,8	17,8	100,0
	Total	897	93,9	100,0	
Missing	-9	10	1,0		
	System	48	5,0		
	Total	58	6,1		
Total		955	100,0		

usage of perl

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	645	67,5	72,0	72,0
	yes	91	9,5	10,2	82,1

	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of samba

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	584	61,2	65,2	65,2
	yes	152	15,9	17,0	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of free / open bsd

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	709	74,2	79,1	79,1
	yes	27	2,8	3,0	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of kde

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	645	67,5	72,0	72,0
	yes	91	9,5	10,2	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	

Missing	-9	10	1,0
	System	49	5,1
	Total	59	6,2
Total		955	100,0

usage of mozilla

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	503	52,7	56,1	56,1
	yes	233	24,4	26,0	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of openoffice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	544	57,0	60,6	60,6
	yes	193	20,2	21,5	82,2
	I don't know	160	16,8	17,8	100,0
	Total	897	93,9	100,0	
Missing	-9	10	1,0		
	System	48	5,0		
	Total	58	6,1		
Total		955	100,0		

usage of php

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	520	54,5	58,0	58,0
	yes	216	22,6	24,1	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		

	Total	59	6,2
Total		955	100,0

usage of squid

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	610	63,9	68,1	68,1
	yes	126	13,2	14,1	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of zope

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	694	72,7	77,5	77,5
	yes	42	4,4	4,7	82,1
	I don't know	160	16,8	17,9	100,0
	Total	896	93,8	100,0	
Missing	-9	10	1,0		
	System	49	5,1		
	Total	59	6,2		
Total		955	100,0		

usage of other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	407	42,6	53,6	53,6
	yes	257	26,9	33,9	87,5
	I don't know	95	9,9	12,5	100,0
	Total	759	79,5	100,0	
Missing	-9	10	1,0		
	System	186	19,5		
	Total	196	20,5		
Total		955	100,0		

Operating System: WIN NT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	584	61,2	63,5	63,5
	yes	328	34,3	35,7	99,1
	I don't know	8	,8	,9	100,0
	Total	920	96,3	100,0	
Missing	System	35	3,7		
Total		955	100,0		

Operating System: WIN2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	257	26,9	27,4	27,4
	yes	672	70,4	71,7	99,1
	I don't know	8	,8	,9	100,0
	Total	937	98,1	100,0	
Missing	System	18	1,9		
Total		955	100,0		

Operating System: WIN XP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	345	36,1	37,8	37,8
	yes	559	58,5	61,3	99,1
	I don't know	8	,8	,9	100,0
	Total	912	95,5	100,0	
Missing	System	43	4,5		
Total		955	100,0		

Operating System: MacOS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	868	90,9	95,8	95,8
	yes	30	3,1	3,3	99,1
	I don't know	8	,8	,9	100,0
	Total	906	94,9	100,0	
Missing	System	49	5,1		
Total		955	100,0		

Operating System: LINUX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	669	70,1	73,7	73,7
	yes	231	24,2	25,4	99,1
	I don't know	8	,8	,9	100,0
	Total	908	95,1	100,0	

Missing	System	47	4,9
Total		955	100,0

Operating System: UNIX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	729	76,3	79,6	79,6
	yes	179	18,7	19,5	99,1
	I don't know	8	,8	,9	100,0
	Total	916	95,9	100,0	
Missing	System	39	4,1		
Total		955	100,0		

Operating System: BEOS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	897	93,9	99,0	99,0
	yes	1	,1	,1	99,1
	I don't know	8	,8	,9	100,0
	Total	906	94,9	100,0	
Missing	System	49	5,1		
Total		955	100,0		

Operating System: BSD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	886	92,8	97,8	97,8
	yes	12	1,3	1,3	99,1
	I don't know	8	,8	,9	100,0
	Total	906	94,9	100,0	
Missing	System	49	5,1		
Total		955	100,0		

Operating System: NETWARE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	720	75,4	79,5	79,5
	yes	178	18,6	19,6	99,1
	I don't know	8	,8	,9	100,0
	Total	906	94,9	100,0	

Missing	System	49	5,1
Total		955	100,0

Operating System: SOLARIS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	859	89,9	94,4	94,4
	yes	43	4,5	4,7	99,1
	I don't know	8	,8	,9	100,0
	Total	910	95,3	100,0	
Missing	System	45	4,7		
Total		955	100,0		

Operating System: other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	803	84,1	88,2	88,2
	yes	99	10,4	10,9	99,1
	I don't know	8	,8	,9	100,0
	Total	910	95,3	100,0	
Missing	System	45	4,7		
Total		955	100,0		

Useful to extend OSSin organisation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	491	51,4	51,5	51,5
	no	197	20,6	20,7	72,2
	I don't know	265	27,7	27,8	100,0
	Total	953	99,8	100,0	
Missing	System	2	,2		
Total		955	100,0		

To what degree would you replace proprietary SW by OSS?

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	replace	some	367	38,4	73,7	73,7
	replace	all	108	11,3	21,7	95,4
	components	components				

FLOSSPOLS: Government survey report**flosspols.org**

	I don't know	23	2,4	4,6	100,0
	Total	498	52,1	100,0	
Missing	-9	380	39,8		
	-1	56	5,9		
	System	21	2,2		
	Total	457	47,9		
Total		955	100,0		

Do you think it would be an improvement to have access to the sourcecode?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	262	27,4	27,5	27,5
	no	495	51,8	52,0	79,5
	I don't know	195	20,4	20,5	100,0
	Total	952	99,7	100,0	
Missing	System	3	,3		
Total		955	100,0		

OSS advantage: easier to use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	52	5,4	5,6	5,6
	I disagree	404	42,3	43,6	49,2
	neutral	328	34,3	35,4	84,6
	I agree	114	11,9	12,3	96,9
	I strongly agree	29	3,0	3,1	100,0
	Total	927	97,1	100,0	
Missing	System	28	2,9		
Total		955	100,0		

OSS advantage: easier to customise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	30	3,1	3,2	3,2
	I disagree	234	24,5	24,9	28,1
	neutral	238	24,9	25,4	53,5
	I agree	332	34,8	35,4	88,9
	I strongly agree	104	10,9	11,1	100,0
	Total	938	98,2	100,0	
Missing	System	17	1,8		
Total		955	100,0		

OSS advantage: higher reliability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	53	5,5	5,7	5,7
	I disagree	309	32,4	33,4	39,1
	neutral	350	36,6	37,8	76,9
	I agree	150	15,7	16,2	93,1
	I strongly agree	64	6,7	6,9	100,0
	Total	926	97,0	100,0	
Missing	System	29	3,0		
Total		955	100,0		

OSS advantage: combinability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	48	5,0	5,1	5,1
	I disagree	230	24,1	24,6	29,7
	neutral	266	27,9	28,4	58,1
	I agree	293	30,7	31,3	89,4
	I strongly agree	99	10,4	10,6	100,0
	Total	936	98,0	100,0	
Missing	System	19	2,0		
Total		955	100,0		

OSS disadvantage: only access to source code not enough, price is also important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	43	4,5	4,8	4,8
	I disagree	152	15,9	16,9	21,7
	neutral	278	29,1	31,0	52,7
	I agree	256	26,8	28,5	81,2
	I strongly agree	169	17,7	18,8	100,0
	Total	898	94,0	100,0	
Missing	System	57	6,0		
Total		955	100,0		

OSS disadvantage: difficult to find technical support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	73	7,6	7,8	7,8
	I disagree	228	23,9	24,4	32,2
	neutral	265	27,7	28,3	60,5
	I agree	249	26,1	26,6	87,2
	I strongly agree	120	12,6	12,8	100,0
	Total	935	97,9	100,0	
Missing	System	20	2,1		
Total		955	100,0		

OSS disadvantage: others must migrate first

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	83	8,7	8,9	8,9
	I disagree	275	28,8	29,4	38,2
	neutral	234	24,5	25,0	63,2
	I agree	222	23,2	23,7	87,0
	I strongly agree	122	12,8	13,0	100,0
	Total	936	98,0	100,0	
Missing	System	19	2,0		
Total		955	100,0		

OSS disadvantage: expensiveness of training (cost, time)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	60	6,3	6,4	6,4
	I disagree	278	29,1	29,6	36,0
	neutral	236	24,7	25,2	61,2
	I agree	237	24,8	25,3	86,5
	I strongly agree	127	13,3	13,5	100,0
	Total	938	98,2	100,0	
Missing	System	17	1,8		
Total		955	100,0		

How do you usually buy your software?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	together with the hardware	136	14,2	14,3	14,3
	separated from the hardware	447	46,8	46,9	61,1
	both to the same degree	351	36,8	36,8	97,9
	I don't know	20	2,1	2,1	100,0
	Total	954	99,9	100,0	
Missing	System	1	,1		
Total		955	100,0		

What is more important when you buy software?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	compatibility with product family compatibility	317	33,2	36,2	36,2
	with other software	559	58,5	63,8	100,0
	Total	876	91,7	100,0	
Missing	I don't know	77	8,1		
	System	2	,2		
	Total	79	8,3		
Total		955	100,0		

Decisions on SW purchases: IT manager

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	most important	252	26,4	41,9	41,9
	second important	150	15,7	24,9	66,8
	3	9	,9	1,5	68,3
	4	1	,1	,2	68,4
	5	1	,1	,2	68,6
	8	2	,2	,3	68,9
	I don't know	187	19,6	31,1	100,0
	Total	602	63,0	100,0	
Missing	0	333	34,9		
	System	20	2,1		
	Total	353	37,0		
Total		955	100,0		

Decisions on SW purchases: user

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	most important	90	9,4	23,6	23,6
	second important	83	8,7	21,8	45,4

	3	14	1,5	3,7	49,1
	4	5	,5	1,3	50,4
	5	4	,4	1,0	51,4
	6	1	,1	,3	51,7
	I don't know	184	19,3	48,3	100,0
	Total	381	39,9	100,0	
Missing	0	536	56,1		
	System	38	4,0		
	Total	574	60,1		
Total		955	100,0		

Decisions on SW purchases: financial department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	most	18	1,9	6,8	6,8
	important				
	second	34	3,6	12,8	19,6
	important				
	3	13	1,4	4,9	24,5
	4	9	,9	3,4	27,9
	5	6	,6	2,3	30,2
	6	1	,1	,4	30,6
	I don't know	184	19,3	69,4	100,0
	Total	265	27,7	100,0	
Missing	0	647	67,7		
	System	43	4,5		
	Total	690	72,3		
Total		955	100,0		

Decisions on SW purchases: department head or other higher management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	most	111	11,6	28,7	28,7
	important				
	second	70	7,3	18,1	46,8
	important				
	3	8	,8	2,1	48,8
	4	11	1,2	2,8	51,7
	5	3	,3	,8	52,5
		I don't know	184	19,3	47,5
	Total	387	40,5	100,0	
Missing	0	531	55,6		
	System	37	3,9		
	Total	568	59,5		
Total		955	100,0		

Decisions on SW purchases: external consultants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	most				
	important	14	1,5	5,8	5,8

	second	18	1,9	7,5	13,3
	important				
	3	8	,8	3,3	16,7
	4	4	,4	1,7	18,3
	5	9	,9	3,8	22,1
	6	3	,3	1,3	23,3
	I don't know	184	19,3	76,7	100,0
	Total	240	25,1	100,0	
Missing	0	671	70,3		
	System	44	4,6		
	Total	715	74,9		
Total		955	100,0		

Decisions on SW purchases: others

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	most important	24	2,5	10,2	10,2
	second important	13	1,4	5,5	15,7
	3	2	,2	,9	16,6
	4	1	,1	,4	17,0
	5	3	,3	1,3	18,3
	6	8	,8	3,4	21,7
	I don't know	184	19,3	78,3	100,0
	Total	235	24,6	100,0	
Missing	0	674	70,6		
	System	46	4,8		
Total		720	75,4		
Total		955	100,0		

Number of vendors - dummy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	small (1-4 vendors)	348	36,4	52,7	52,7
	large (more than 4 vendors)	312	32,7	47,3	100,0
	Total	660	69,1	100,0	
Missing	System	295	30,9		
Total		955	100,0		

Do you think your organisation is too dependent from vendors/suppliers?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	420	44,0	44,0	44,0
	no	464	48,6	48,6	92,7
	I don't know	70	7,3	7,3	100,0
	Total	954	99,9	100,0	
Missing	System	1	,1		
Total		955	100,0		

How often do you have to customise software after implementation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	97	10,2	10,2	10,2
	sometimes	487	51,0	51,0	61,2
	regularly	225	23,6	23,6	84,8
	often	78	8,2	8,2	93,0
	very often	39	4,1	4,1	97,1
	I don't know	28	2,9	2,9	100,0
	Total	954	99,9	100,0	
Missing	System	1	,1		
Total		955	100,0		

To what degree do you deploy external maintenance services?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	69	7,2	7,2	7,2
	sometimes	421	44,1	44,2	51,4
	regularly	285	29,8	29,9	81,3
	often	76	8,0	8,0	89,3
	very often	79	8,3	8,3	97,6
	I don't know	23	2,4	2,4	100,0
	Total	953	99,8	100,0	
Missing	System	2	,2		
Total		955	100,0		

IT Budget 2004 - grouped

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	lower than 100,000 EURO	164	17,2	33,3	33,3
	100,000 - 800,000 EURO	163	17,1	33,1	66,5
	more than 800,000 EURO	165	17,3	33,5	100,0
	Total	492	51,5	100,0	

Missing	System	463	48,5		
Total		955	100,0		

Share of Software license fees in IT Budget 2004

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	up to 15%	179	18,7	33,9	33,9
	15 to 40%	245	25,7	46,4	80,3
	more than 40%	104	10,9	19,7	100,0
	Total	528	55,3	100,0	
Missing	System	427	44,7		
Total		955	100,0		

How do you perceive the share of software licence fees in your IT budget?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	too high	440	46,1	62,0	62,0
	reasonable	54	5,7	7,6	69,6
	too low	216	22,6	30,4	100,0
	Total	710	74,3	100,0	
Missing	I don't know	243	25,4		
	System	2	,2		
	Total	245	25,7		
Total		955	100,0		

Do you think it's necessary to reduce the share of software licence fees during the coming 2 years?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	472	49,4	49,5	49,5
	no	344	36,0	36,1	85,6
	I don't know	137	14,3	14,4	100,0
	Total	953	99,8	100,0	
Missing	System	2	,2		
Total		955	100,0		

Number of employees in IT department - grouped

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	199	20,8	21,6	21,6
	2 - 3	271	28,4	29,4	50,9
	4 - 10	258	27,0	28,0	78,9
	11 thru 30	121	12,7	13,1	92,0
	more than 30	74	7,7	8,0	100,0
	Total	923	96,6	100,0	
	Missing System	32	3,4		
Total	955	100,0			

Number of PCs and laptops in organisation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	up to 25	103	10,8	11,4	11,4
	26 - 50	130	13,6	14,4	25,8
	51 - 100	173	18,1	19,1	44,9
	101 - 200	158	16,5	17,5	62,4
	201 - 500	140	14,7	15,5	77,9
	501 - 1000	91	9,5	10,1	87,9
	more than 1000	109	11,4	12,1	100,0
	Total	904	94,7	100,0	
Missing System	51	5,3			
Total	955	100,0			

server_num2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 2	164	17,2	18,0	18,0
	3 - 5	226	23,7	24,8	42,7
	6 - 10	187	19,6	20,5	63,2
	11 - 25	166	17,4	18,2	81,4
	more than 25	170	17,8	18,6	100,0
	Total	913	95,6	100,0	
Missing System	42	4,4			
Total	955	100,0			

