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2. Abbreviations

EPA(s): European Public Administration(s)

PA: Public Administration

FOSS: Free / Open Source Software

IT: Information Technology

OSEPA: Open Source software usage by European Public Administrations

FUD: Fear, uncertainty, doubt

SME: Small or Medium sized Enterprise

3. Introduction

The function of this document is to describe the general issues and conclusions derived from a survey of FOSS experts on the needs and requirements of European public administrations. The survey queried the needs and requirements of public organizations when selecting between FOSS and proprietary software in terms of societal, economic and policy factors.

This document will briefly describe the survey and then proceed to discuss the results and make some conclusions. Quotes have been used throughout the document; they are representative of the theme in order to illustrate the point being made and do not represent all the comments relating to that theme. This is due to the fact that there is a lot of repetition in the comments made and if all comments were included this document would be too long and unwieldy.

4. Focus of the survey

Many of the factors that influence the choice of software are technical but other factors need to be taken into account; in the case of proprietary software they are often a given. These factors include societal, economic and policy factors and in the case of FOSS, perhaps they need to have a more prominent position when selecting the appropriate solution.

The primary objectives of this survey are:

- To investigate how European, national, regional and local policies, strategies and actions can affect the adoption of FOSS in PAs
- To identify societal, economic and policy requirements related to the adoption of FOSS

The secondary objectives are:

- To clarify strategic issues, criteria and needs that could influence the selection between FOSS and proprietary software
- To elucidate the main framework conditions (political, social, organisational, technical, financial and any others) that could affect the adoption of FOSS by PAs.

The focus of this survey is to utilize the knowledge of experts in the field to collect data relating to these less technical factors relating to the needs and requirements of software selection. The analysis of this data will be focused on understanding aspects of the needs and requirements that relate directly to FOSS. This will help the FOSS community to compete more directly with proprietary solutions and provide software that fulfils those needs and requirements.

The survey is required to collect meta-data. The experts that will be chosen should have the knowledge that will allow them to provide, not primary low-level data, but secondary data on sector trends and characteristics across a range of PA sources.

5. Background

5.1. Previous research

Much of the research into FOSS has concentrated on the development of FOSS solutions and less about the implementation of FOSS into organizations (Fitzgerald, 2009). However, looking at implementations of FOSS it can be possible to extract some of the issues that are important when looking at evaluation of software for a business purpose.

5.2. Organizational and societal factors

A study by Fitzgerald (Fitzgerald, 2007) looked at a migration to an OS Office Suite and found that as a result of migration resistance, 80 people from the staff opted out of the migration due to fears of being deskilled if they didn't have skills in popular proprietary software packages. Rossi et al. (Rossi, Russo, & Succi, 2006), reporting on a study, suggested that document conversion, training, and support are of key importance to overcome resistance to change in the implementation of OpenOffice. Ven (Ven & Verelst, 2006) surveyed the use of OSS in 332 organizations in Belgium and found that often an employee within the organization recognizes the potential of open source and suggests it to the organization.

Risk is one important factor when choosing to implement FOSS in an organization. Nash (Nash, 2010) suggests that those who work in PAs are often risk averse and that unfamiliar products such as FOSS are perceived as risky. Often organizations want to see other successful

examples of FOSS usage before they will consider FOSS implementation but of course this demands that some PAs lead the way (Cuddy, 2009).

Sharing and giving back to the community are important factors present in a FOSS environment that are not present in the proprietary software paradigm. A study by Conley (Conley & Kung, 2010) looked at the motivations behind the sharing concepts of FOSS. They found that different sized organizations have different motivations for sharing, including personal benefit and reputation.

5.3. Cost factors

Many studies focus on the cost savings relating to the implementation of FOSS and this is measured in varying ways. Fitzgerald (Fitzgerald, 2007) found a cost saving of 88% in the Beaumont Hospital study and Karjalainen (Karjalainen, 2010) quotes a study (Russo, Braghin, Gasperi, Sillitti, & Succi, 2005) that developed a framework to evaluate the transition to FOSS in terms of returns and losses. The goal of this framework is to identify costs that are not easy to trace or that are not usually collected like user acceptance. Many studies cite perceived cost savings as the drivers for implementation to FOSS solutions (Ven & Verelst, 2006), (Glott & Ghosh, 2005), (West and Dedrick, 2008 cited in Karjalainen, 2010) (Cuddy, 2009).

The EU-funded COSPA-project3 has produced several studies on organizational open source adoption. The COSPA project (Consortium for Open Source Software in the Public Administration) lasted from January 2004 to June 2006 including altogether 15 European partners coordinated by the Free University of Bolzano-Bozen, Italy. The project aimed at analyzing the effects of the introduction of open data standards and OSS for personal productivity and document management in European public administrations.

A study on the economic impact of open source software on innovation and the competitiveness in the European Union (Ghosh, 2006) looked at user-level productivity and relative costs of open source and proprietary software. They reported that there were no extra costs due to lack of productivity arising from the use of the OpenOffice.org.

Considering challenges facing user organizations in the adoption of OSS, the FLOSSPOLS survey (Glott & Ghosh, 2005) identified the factors of cost and technical support to be crucial factors in adoption by European PAs. They recommend increasing awareness of costs and

benefits, build experience and skills, and share information to reduce the fears relating to training and support.

However, these cost savings are potentially not as clear as they seem. Calculating costs in an IT environment is notoriously difficult and can vary across organizations and studies. Some of the factors that have to be taken into account are software including software, acquisition and maintenance, hardware purchase and maintenance, personnel training, user support, application integrations, and document conversions, integration and development, and administrative costs (Russo, et al., 2005). This does not take into account softer factors such as job satisfaction, personnel turnover, resistance to change and changes in work processes. Russo et al suggest a cautious approach when comparing costs across organizations.

5.4. Evaluation of software

When evaluating a number of software solutions for any business a number of questions have to be asked relating to technical, societal, economic, political, business and organizational issues. It is apparent that the questions differ for FOSS and proprietary solutions and this can cause problems for FOSS solutions to compete in the same arena as proprietary solutions. The challenge for the FOSS community is to minimize the difference in the questions that have to be asked when evaluating software solutions.

De Silva (De Silva, 2009) suggested 10 questions that should be asked when evaluating FOSS:

1. Are the open source license terms compatible with my business requirements?
2. What is the strength of the community?
3. How well is the product adopted by users?
4. Can I get a warranty or commercial support if I need it?
5. What quality assurance processes exist?
6. How good is the documentation?
7. How easily can the system be customized to my exact requirements?
8. How is this project governed and how easily can I influence the road map?
9. Will the product scale to my enterprise's requirements?
10. Are there regular security patches?

Most of these questions would not be asked in an evaluation process for proprietary software. A similar list relating to FOSS evaluation suggested by Berg (Berg, 2005) probably fits more closely with a general software evaluation process. It included: Community, Release activity, Longevity, Licensing, Support, Documentation, Security, Functionality and Integration, however this may not be specific enough for those organizations that are considering FOSS solutions.

A paper by Gallego et al. (Gallego, Luna, & Bueno, 2008) has looked at a number of factors relating to the diffusion of FOSS in the marketplace. They suggest a number of factors that may indicate or measure the levels of success of the spread of FOSS:

Personal:

- Trust about OSS Continuity
- Interest of end users
- No fear of the unknown OSS
- Cultural change oriented to accept OSS as a feasible alternative
- Perceive OSS as a software of quality
- Possibility of participating in the OSS community
- A substantial number of end users are programmers

Organizational:

- Promoted/Supported by management
- Relevant perception of the benefits of OSS
- Consideration of OSS as a competitive advantage

Cost:

- Possibility of cost-benefit analysis
- Initial awareness about cost to change from proprietary software to OSS
- Performance measure of OSS
- More financing for the development of OSS projects
- Information on basic requirements for implementing an OSS

External factors:

- Skills to adapt the OSS software to organizational needs
- OSS compatibility with other software
- OSS compatibility with hardware
- Knowledge of the potential of OSS application
- Possibility of making a complaint to OSS vendors

Again, these are very relevant to a FOSS environment but of limited relevance when evaluating proprietary solutions.

6. The experts survey

This OSEPA survey aimed to identify the needs and requirements for the successful selection of FOSS solutions but also to identify a simple set of needs and requirements that can be successfully utilized.

6.1. Research questions

The research questions arising from the survey objectives are the following:

Primary

- How do European, national, regional and local policies, strategies and actions affect the adoption of FOSS in PAs?
- How do societal, economic and policy requirements relate to the adoption of FOSS?

Secondary

- What strategic issues, criteria and needs influence the selection between FOSS and proprietary software?
- What are the main conditions (political, social, organizational, technical, financial and any others) that could affect the adoption of FOSS by PAs?

6.2. The survey questions

1. Please comment on whether FOSS should be considered a potential viable alternative for public IT infrastructures compared to proprietary software.

2. Please describe up to 5 expected benefits that could lead public administrations to opt for FOSS instead of proprietary software solutions.

3. Please describe up to 5 barriers that may prevent public administrations from adopting FOSS solutions.

4. What, in your opinion, are the most critical socio-economic issues affecting the selection between FOSS and proprietary software in public agencies & administrations?

5. Please describe any financial or market-related factors that prevent public administrations from considering FOSS a viable solution.

6. Please comment on whether the existing legal framework is sufficient in covering various aspects of FOSS usage in European public organisations. If not, please describe main weaknesses.

7. Please comment on whether any current national policies significantly support public administrations in adopting FOSS solutions.

8. What national regulatory measures could promote the use of FOSS by European public administrations?

9. In what ways could policies developed by European Institutions (European Commission, European Council, European Parliament), in particular, encourage FOSS adoption by European economies and public organisations.

10. What other European actions (beyond regulation) could be envisaged in order to facilitate the usage of FOSS among European public administrations?

11. What are the main obstacles in formulating an effective European or national policy consensus for facilitating the integration of FOSS solutions in public IT infrastructures?

12. What are the main prerequisites for adopting policies that encourage FOSS usage by European public administrations?

13. What -if any- are the main biased public procurement practices that favour proprietary software over FOSS?

14. What are the main issues regarding software procurement policies to be addressed by public organisations aiming to promote FOSS adoption and sustainable use?

6.3. Participant selection criteria

The participants of the survey on the needs and requirements of European Public Administrations on FOSS were required to be experts in the field of Public Administration and FOSS. There were relatively few respondents who were each expected to deliver a detailed response to the survey delivered to them.

The following personal criteria were used for the selection of the expert participants:

- An extensive and comprehensive knowledge of FOSS in terms of the strategic, financial, technical, managerial and legal aspects of FOSS in European PAs.

- They were likely to be researchers, professors, consultants or PA managers. Other experts may have been selected based on a deep and specialised knowledge of the societal, economic and strategic issues in this area.

- The experts were expected to have wide and practical experience of Public Administration as either an employee or an external consultant, preferably with experience in FOSS projects for the Public Sector.

The following geographical criteria will be used for the selection of the expert participants:

- Each of the partners in the OSEPA consortium were represented at least once in the experts that responded to the survey.

- The participants also represented a diverse range of types of geographical regions.

6.4. Analysis methodology

The vast majority of the information provided by the experts will be textual with complex themes and arguments. The methodology for analyzing this will be a widely used procedure known as thematic analysis.

While the findings from the thematic analysis will be interpreted in terms of the research questions it is possible that additional findings will be salient in addition to the questions asked.

7. Results

7.1. Overview

A number of themes were drawn out from the answers to the questions and these were then grouped into a small number of organizing themes. They are itemized below and the following chapters outline the results of the survey and are arranged by the organizing themes. Each chapter outlines the content of the responses and inevitably there is some overlap in a number of the themes with many of the responses covering more than one theme.

Organising theme	**Theme**
People	FUD (Fear, Uncertainty, Doubt)
	Ignorance and disinformation
	Skills/Education/Training
Organisations	Use FOSS
	Migration to FOSS
	Procurement
	Financial
	Management
	Proprietary software vendors
	Supporting FOSS

Legal/Regulatory	Corruption
	Government
	Licensing
FOSS community	FOSS community
	FOSS marketing and promotion
Technical	Disadvantages
	Advantages / benefits
	Now
	Future
	Adaptability
	Open data standards and interoperability
	Quality
	Security
	FOSS Development
Collaboration	Sharing development
	Local initiatives
	Encourage use of FOSS
	Sharing experience

7.2. People

The ‘people’ element of any software installation or migration is of utmost importance and from the answers that the experts gave this is recognized in the FOSS environment as well.

7.2.1. FUD

FUD (Fear, Uncertainty, Doubt) was referred to on a number of occasions in relation to the barriers up against the uptake of FOSS solutions. Many of the experts believe that users have a fear of change and this results in a resistance to change and in some cases some hostility, particularly to desktop FOSS solutions.

> “Many employees in public sector are familiar with certain kinds of software and show a great denial in using new ones. Furthermore, the vast majority of employees in public sector consider that they do not have the knowledge to use new kind of software and have ignorance about FOSS applications and their adoption and use.”

Part of the manifestation of this fear of change is due to

> “..the narrow minds of public administration that do not fully understand the potential and benefits of FOSS. The users fear a possible increase of operational work, although without justification, as it derives from a poor knowledge of the existence of a viable support online.”

The main problem is the traditional conservative mentality, where IT personnel of public administrations fear that FOSS might bring insecurity and they prefer a field-tested solution. They want to be assured that there is someone they can hold to account in the event of problems. A regular exchange of information between staff working for IT procurement is necessary to create more confidence in this area. They also believe that the users are accustomed to a certain type of software (proprietary) and hesitate to resort to the less widely used FOSS solutions.

The role of the leaders and decision makers is also acknowledged with a reticence to undertake the responsibility of making the decision to move to FOSS. There is perceived to be a fear of

change and an aversion to risk among leaders and decision makers in PAs resulting in poor morale, hostility to change and poor approaches to change management.

Another issue is the lack of trust and confidence in FOSS products, which are erroneously considered more difficult to adopt, with a lack of support compared to commercial software.

> "Current policies do not efficiently promote a culture of trust and awareness on open source that is still lacking among public administrations and should be promoted through active policies on training and education."

On a more passive note one of the reasons perceived for the lack of adoption of FOSS is disinterest or laziness.

> "Nobody gets fired for buying IBM or SAP"

This lack of interest in FOSS can be seen at all levels, from politicians through to IT staff who do not seem interested in the ethical and economical advantages of FOSS solutions.

Finally, some respondents blame commercial vendors for FUD as they are concerned that their revenue streams will be interrupted by cheaper and higher quality solutions. Thus

> "..they will spend marketing money to downplay FOSS and claim that it is unsafe, untested, illegal etc."

7.2.2. Ignorance and disinformation

It is thought that one of the barriers to the uptake of more FOSS solutions is ignorance of the positive aspects of them. There is a lack of knowledge and understanding of FOSS, it is not in focus, and in many cases there is simply a complete unawareness of FOSS and its philosophy at all.

There is often the poor knowledge of FOSS solutions by IT management and also top management. Not only are users and managers often unaware of FOSS solutions but where there is awareness of FOSS there is often a lack of knowledge, skills and other aspects of a FOSS implementation.

> “IT managers are often not aware that they don’t necessarily have to handle every aspect of implementing open source software themselves. They can obtain support from open source software firms in their local area.”

> “The main problem that exists is not the legal and political framework, but the level of knowledge and experience of the public organizations about the available software solutions that exist.

Also, software selection can be biased due to a lack of information on training for FOSS solutions, support solutions, backup and security. Other areas where there is a lack of knowledge relate to copyright resulting from the acquisition of proprietary software and of EUPL licenses.

In addition to ignorance in PAs there is a lack of knowledge and awareness in Government. Often Government ministers do not understand what Free Software is, how it differs from Open Source, what licenses are available (and what they mean), and how other IP concerns such as trademark and copyright influences these things.

> “Some even believe that creating their own licenses is a good idea, rather than using commonly known and accepted licenses, for their own projects.”

Politicians do not know the benefits and the possibilities of FOSS and how it will benefit PAs and this extends from a national level upwards to a European level.

In addition to unawareness or a poor knowledge of FOSS there is the problem of inaccurate information. Many of the respondents believed that proprietary software vendors were the origin of disinformation relating to FOSS.

> “Disinformation about FOSS stored up over time biased the perception of FOSS: Some commercial software operators have provided consumers (and PAs) with a biased image of FOSS to pursue instrumental purposes (to pursue their own commercial interests)”

This can be explained by the fact that manufacturers of proprietary software are able to engage in extensive marketing and lobbying activities, while open source software providers, who are

mostly small and medium-sized businesses, only have small marketing budgets. Often proprietary software vendors propagate the misperception that there are no other solutions than the traditional commercial ones.

7.2.3. Skills, education and training

Firstly, as the vast majority of businesses use a small selection of proprietary products the majority of users are trained, skilled and familiar with using the same software. This makes allows easy mobility of users to the benefit of both users and employers, however, this causes a problem for FOSS solutions.

> "Old habits (they die hard, you know..)"

Secondly, IT staff are not trained in FOSS so therefore cannot support any FOSS initiatives easily. Also, IT staff have to have a minimum level of skill to support FOSS and this may be possible if there are enough good FOSS companies available to give support if necessary.

> "Staff working in public administrations with responsibility for IT procurement often don't have sufficient IT expertise and are worried if the manufacturer cannot guarantee liability. They prefer to stay on the safe side and want to be assured that there is someone they can hold to account in the event of problems. A regular exchange of information between staff working for IT procurement is necessary to create more confidence in this area."

The opinion of the experts is that people do not have any exposure to FOSS software even before they enter the world of work. There is no exposure of FOSS in schools and further education and a very low occurrence of FOSS in the home.

> "Total absence of teaching FOSS at schools"

Users and students would benefit from education on what FOSS is, and that it includes a wide spectrum of software.

There is also a feeling that there are misconceptions about the difficulties of training users in FOSS and that it is expensive. In fact it was posited that:

> “Users are not that stupid, and will pick up a new system, without the need for training”

If users are given the software to use they will pick up sufficient skills by using it without being trained. This may be counter to the cultural limits and training procedures in the training of public administrations’ personnel. The general opinion was that public administrations should build up expertise in the use of open source software.

7.3. Organizations

7.3.1. Use FOSS

One very simple theme that came across from the experts was that for FOSS to gain some momentum, it must simply be used.

> "Moreover, PAs can play a unique role in demonstrating the value of FOSS and in removing legal and organisational obstacles and inhibitors by acting as adopters. We should take in mind that there are resources that can help public stakeholders to understand the technical/social/organizational environment and reach informed decisions when selecting the appropriate software."

> "All European Institutions should set a good example by using FOSS themselves (and propagate this)"

It is believed that by supporting local FOSS projects, FOSS teams and local initiatives, this will help with the promotion of FOSS products.

The organization of seminars where successful cases of innovative open source solutions for regions and local communities should be supported and transferred to more regions or replicated in similar contexts. It is necessary to keep up the pace of progress of FOSS among European countries.

European policy making on software also suffers from certain weaknesses particularly in putting forward and implementing road-maps and unified mechanisms to specifically support and further integrate open source in public IT infrastructures as a means towards social inclusion, innovation and development.

7.3.2. Migration to FOSS

With the historic use of commercial software there is a high cost for the migration to FOSS solutions. This manifests itself in a number of areas, namely, format transformation and other legacy problems resulting in a:

> "Tedious migration process"

This can mean that IT decision makers have difficulty in justifying the efforts required for switching for the advantages that may come.

Underestimation of the organizational impacts can result in the "sinking" of FOSS adoption projects.

> "The example of the open source project in the Swiss canton of Solothurn shows that when an open source project fails, the reason given in the media and the political sphere is that it was an "open source" project. But if an IT project based on proprietary software fails, more general reasons are cited, such as IT systems being complex, etc. Consequently, failed open source projects always receive much more publicity than successful open source projects."

To this end there have been reports of false starts. Some departments have tried using FOSS without commercial backing, ended up having a terrible experience due to lack of support and upgrade management, and thus are reluctant to try again. Knowing when to choose FOSS options, who to work with for implementation, and what the issues are related to acquisition and operations, are crucial.

Another issue relating to the migration to a FOSS product is project management. Running a FOSS project is socially and managerially different from running a government department, and technically there are a number of tools you need to know and understand in order to successfully create and run a FOSS project. If government wants to be actively involved in the development of FOSS, then it needs to invest not only in the software itself, but also in understanding how it is created, and how to run successful FOSS projects.

In addition IT managers are often not aware that they don't have to handle every aspect of implementing open source software themselves. They can obtain support from open source software firms.

7.3.3. Procurement

There was a general consensus that procurement in PAs does not encourage the use of FOSS but a range of reasons stated and a range of solutions provided. At the national level there is

also considered to be an inhibitory amount of bureaucracy in public procurement. Amongst the experts the problems with bureaucracy are Europe-wide.

> "The main weakness is the complexity of public procurement law. In general, procurement departments of public administrations need extra legal advice if the wish to pro-actively call for a FOSS solution. This goes along with extra costs as advice of an external advocate is needed."

Terms like "independence", "freedom", "open" etc. must not be used in a call for bids, but this makes it difficult to phrase calls for bids for "FOSS-friendly" solutions without excluding proprietary vendors. There are directives stating that open source and proprietary software should be treated equally in public tenders, however, these are consistently disregarded.

> "Product exclusion and software discrimination practices are not simply non-compliant with national and EU legislation but also constitute bad policy decisions in terms of competition fairness, software sustainability and the value-for-money factor. The most common excluding or discriminating factors that favor proprietary software over FOSS are:
>
> - Naming of specific software trademarks, product suites and families, or companies in calls for tender without providing a strong justification or equivalent options.
> - Requiring compatibility with currently in-use proprietary software systems and applications or closed, proprietary standards. Requiring specific software application functionalities that are met exclusively by proprietary suites and systems without strong justification.
> - Describing certain supplier profiles typically in favour of large-scale proprietary software companies thus excluding, with no sound justification, small and medium enterprises."

Another aspect that provides problems for procurement is the licensing of FOSS products that doesn't 'fit' with procurement law. One respondent succinctly describes this as follows:

> "FOSS licensing schemes are different than traditional licensing regimes in the sense that they do not pose restrictions on the scale and extent of software usage. Instead, they promote and encourage software distribution, copying and modification under certain conditions, the most common of which it to release any modified software under a same license type in order to maintain free code availability. The legal framework for public procurement in EU has been set on the basis of transparency, non-discrimination and fair competition. The main legal documents that reflect these principles regarding public procurement are Directive 2004/17/EC and Directive 2004/18/EC. While there are no EU-wide policy documents specifically referring to software procurement, these directives cover various procurement issues, some of which refer to IT. Directive 2004/18/EC in particular, addresses software procurement issues in the public sector (e.g. technical specifications, trademarks and patents). In article 2(a) it defines "public contracts" as: "contracts for pecuniary interest concluded in writing between one or more economic operators and one or more contracting authorities and having as their object the execution of works, the supply of products or the provision of services within the meaning of this Directive". Article 23 (8) of the Directive states that technical specifications that refer to goods of specific source and origin or trademarks and patents that tend to favor or exclude certain products are prohibited. According to the Directive any reference to trademarks is only permitted in exceptional cases where a full and precise description of standards or functional requirements for the desired products is not possible. Even in these cases, however, reference should be accompanied by the words "or equivalent"."

The public procurement requirements often lack the obligation to support the reuse of the software solution when the purchaser offers it to other PAs to use. Often in large-scale public procurements the supplier is given the role to define system requirements and not the PA. This creates a bias towards proprietary software. It should be in the hands of the public administration to define requirements and they should include those of re-use and sharing.

The particular benefits of open source software are not taken into account as a contract award criterion in tenders. As such the time frame for tenders often does not allow the benefits of open source software to be fully realized. Public tendering usually covers a maximum period of 3-5 years, but software systems are often in use for up to 10 years. It is in particular over this period of time that the cost benefits of open source software really become apparent.

A variety of opinions on the solutions to these procurement problems were posited ranging from mandatory actions to simple recognition of the problem.

> "PAs have to explicitly mention in the call for projects their preference for solutions based on FOSS. "

> "In Denmark we try to push the notion that open source should be considered for every procurement and chosen where it adds value."

> "It should be mandatory to consider FOSS as a viable alternative because of legal specifications in the procurement process. The latter say that FOSS should have the same chances as proprietary software in a call for bids."

In the UK most PAs commission systems from commercial suppliers and some might specify aspects of FOSS as part of the solution but the numbers are small. One problem for procurement of FOSS is that many PAs outsource the running of systems as well as their development meaning that the PA is not making the procurement decisions.

7.3.4. Financial

There is some disagreement relating to whether FOSS results in cost savings. While it is the licensing cost that is eliminated or dramatically reduced there are other costs relating to a migration to a FOSS solution. There are possible cost savings over propriety applications but not as great as some might imagine due to having to budget for:

- Initial cost of setting up the project
- Technical definition and design
- Customization
- Support
- Training

- Migration

While the initial costs of migrating to a FOSS solution may be high it is generally agreed that over the longer term, 5 to 10 years, the total cost of ownership is lower than with proprietary software.

However, any initial investment costs can be defrayed by sharing the development costs with other PAs. Any cost will be mainly focused on professional support and maintenance of the developed IT solutions.

However, this is hotly disputed with other experts maintaining that the cost is also much lower in the short term.

> "No or Low-cost: The lack of licensing fees can literally save hundreds of thousands to millions of Euros for the public sector. The total cost of ownership is comparable or a lot less than normal mainstream technical support fees (due to the high security, quality, reliability and stability of open source systems)"

One way that this low cost can be achieved is by reducing the hardware specs so the cost of hardware falls, and to relocate the amount previously devoted to licenses for additional services.

Of course the availability of low cost software is reliant on the software being developed and supported.

> "The obvious economical advantage of FOSS solutions is related to the licence costs, assuming similar development costs between proprietary and FOSS solutions. As per the management costs, there are pros and cons in FOSS solutions: the community plays a positive role in favour of FOSS, since one benefits of a massive, reliable, free of cost support of the community. The cons are related to the temporal schedule of the release of new facilities and enhancements of the product and sometimes also the schedule of some bug fixes. "

The key question is whether there are economic benefits to replacing existing software with a FOSS solution and this economic benefit must provide value for money not only now but in the future.

> “In the economic model for software, there are financial and market related ’ties’ that increase costs when software and hardware are replaced. The relevance of the individual factors depends on the environment for which software is procured. If a tool for IT support without an end-user interface is concerned, there is only expenditure on the training of operating personnel. In the case of a new ’desktop’, there may be expenditure on both end-users and operating personnel. The key question in a FOSS software solution is whether there are economic advantages in choosing replacement or new procurement now or at a later time. It is economically essential that there will be debugged versions later on so that losses of up-time are minimal, without it being necessary to pay a higher price for the improved software. It is therefore necessary to set a time frame of six years, for example, so that the value of the options can be analyzed.”

In some European countries the tax practices, whereby enterprises can offset R&D expenses with corporate tax, can put FOSS at a disadvantage. Also, if government funding only goes into framework spending programs, without being able to sponsor individual projects, the possibilities that the FOSS community has to offer are fundamentally reduced.

Finally, in these straightened times, when funding for PAs is being reduced, many PAs are seriously considering open source alternatives.

7.3.5. Management

The decision to move to a FOSS solution in a PA is made by the management and this is often where the criticism is directed when FOSS solutions are not considered. The problem is the mentality at the level of the institution management. There is a feeling among the experts that PA decision makers have:

- A lack of flexibility in thinking
- A fear and hostility of change
- An aversion to risk
- No one to blame if it fails
- Lack of long-term strategy and vision
- Poor knowledge of the existing FOSS solutions’ quality

- IT staff with little or no experience of FOSS
- Poor morale
- Poor approaches to change management
- Lack of commitment to FOSS
- Distrust of FOSS
- Little involvement of users in decision making
- Lack of desire to hire IT professionals in the field of FOSS, preferring "Windows experts"

There is thought to be a lack of knowledge within PA management that relates to all aspects of a migration to a FOSS solution:

> "IT managers are often not aware that they don't necessarily have to handle every aspect of implementing open source software themselves. They can obtain support from open source software firms in their local area. "

7.3.6. Proprietary software vendors

This was a theme that seemed to touch a nerve with almost every expert questioned. There were many responses relating to the behaviour and actions of proprietary software vendors and of course one of the biggest problems for FOSS progression, that of vendor lock-in.

> "Locked-in syndrome (closed) is a common practice in public procurement, when buying a certain proprietary product determines the necessity of purchasing additional services or upgrade from the same producer or group of producers. The above is sometimes related to the initial sale of some rights to use the software that seem cost effective, but on long-term link the institution to a particular product."

Independence from a particular software vendor was one of the most prevalent responses to the question asking for five barriers to the adoption of FOSS. Not only is the lock-in determined from a technical perspective but often PAs outsourcing development or operational IT will be locked into a contract that will preclude them from making decisions to move to FOSS.

Another theme relating to proprietary software vendors is that of lobbying. They utilize a lot of resources to persuade PAs to use their products. This is compounded by the lack of marketing of FOSS solutions.

> "…and the misperception that there are no other solutions than the traditional commercial ones (provided directly or through partners by Microsoft, Adobe, Semantec and so on). The lack of a visible FOSS solutions market or of their advertising can lead to the impression that these solutions are inferior to proprietary software solutions. Meanwhile there is a visible pressure from the manufacturers of proprietary software to advertise towards the area of IT and management of local public institutions, these solutions sometimes seemed to be the only viable ones."

> "Large software vendors have well-established lobbyists working to influence government spending, which the FOSS community does not have. It is therefore intrinsically difficult for government representatives to get a balanced view of what the options are. By not having a good way to finance FOSS projects, which should in almost all cases be a better option compared to commercial alternatives, this drastically reduces the chance of getting access to all that FOSS has to offer, as outlined earlier. This is a systemic issue, which is solvable, but requires that government change policies on this, while realizing that current software vendors will fight it as much as they can. It is not in the best interest of current software vendors that governments save money and increase the quality of software they use."

This lobbying from the proprietary software vendors usually attracts the most attention from public administrations because they employ staff exclusively for lobbying activities/governmental relations. In contrast FOSS producers are mostly small and medium-sized businesses, so it is difficult for them to attract the same level of attention as large companies with big marketing and lobbying budgets.

A more extreme view was also put forward suggesting that the large proprietary vendors provide misinformation to governmental departments and PAs that will positively deter them from using FOSS solutions.

> "…the misinformation on FOSS induced by big actors of proprietary solutions."

> "Misinformation on FOSS induced by big actors of proprietary solutions. From one side the commercial interests of proprietary software companies and from the other

the little interest for pressure, due to the absence of relevant financial interest, in the field of FOSS."

7.3.7. Supporting FOSS

The experts identified one of the barriers to the adoption of FOSS solutions in PAs as the low number of companies that are able to support it.

> "There are not many companies supporting FOSS so the Public Sector Services can not find support for it. "

The companies that provide support for FOSS solutions are often local small to medium sized enterprises. For this reason the IT management find it difficult to find companies to support FOSS and they often feel that they are less credible and trustworthy in terms of:

> "Lack of guaranty for service deployment (not for all cases)
>
> Lack of service level agreements (not for all cases)
>
> Lack of certified human resources to support FOSS"

Most IT executives want a clear road-map for products so that they can better plan for their future. This also causes a problem when supporting FOSS as it often provides constant unscheduled upgrades and optional bug fixes instead of a planned schedule of upgrades.

It is believed by some experts that if PAs can use more FOSS solutions this will foster an ecosystem of new business offering services to the public sector.

This of course creates a chicken and egg problem. PAs cannot use FOSS without support and the FOSS support companies will not emerge unless PAs use FOSS. For this to happen financial support is required for start-up companies in FOSS support to emerge.

7.4. Legal/Regulatory

7.4.1. Corruption

Bribery and corruption were cited by a number of experts relating to the problems with the adoption of FOSS in PAs. Not a great deal of detail was provided but it is clear that at least in some European countries this is a genuine problem.

> “Bribes given by the companies that sell software licenses”

> “Corruption”

> “Last but not least, at least in <country>, elements of corruption and lack of transparency are important issues that affect the selection, preferring a proprietary solution whose verification is extremely difficult to do later, not having access to the source code.”

> “Bribes given for contracts. And I'm not referring only to <country>. To quote a friend who works in Brussels for a company that provides software solutions for EC, ‘Romanians don't even know how to steal’.”

> “Bribes given by the companies from which the software is purchased. I know so many cases from research institutes, educational institutions and city halls that I do not believe there is a solution that does not involve "decapitation" top down, starting from the ministries. The current system of public auctions is a joke, a facade. Major acquisitions in all areas are made through auctions gained "by whom it must". Whether the specifications are "already" made in order for a certain company to win, or by other methods.”

7.4.2. Government

It is thought that generally politicians and the European leadership are ignorant of the existence of FOSS and its benefits. There is no real support on the European level, Federal level and Regional level, to FOSS where legislation favours proprietary solutions.

In the cases where there is some knowledge there is a lack of interest and commitment on the ethical and economical advantages of FOSS solutions, which is often propagated through misinformation on FOSS induced by big actors of proprietary solutions.

One of the reasons for ignorance and disinterest in FOSS is that large software vendors have well-established lobbyists working to influence government spending, which the FOSS community does not have. It is therefore intrinsically difficult for government representatives to get a balanced view of what the options are. By not having a good way to finance FOSS projects this drastically reduces the chance of getting access to all that FOSS has to offer. This is a systemic issue, which is solvable, but requires that government change policies on this. Proprietary software vendors will fight it this as it is not in their interest that governments save money and turn to FOSS solutions.

Some other problems relating to the barriers to FOSS are:

> "Bureaucracy of the processes for formulating an effective policy – too many, too long-lasting discussions without results -> "just formulate a policy" and discuss afterwards"
>
> "Absence of national/EU policy and education policy for using FOSS in public sector"
>
> "Bad FOSS policy especially on governmental level "
>
> "The current tax practices, whereby enterprises can offset R&D expenses with corporate tax, also puts FOSS at a disadvantage."

There are conflicting views relating to whether legislation and government policies restrict or prevent the use of FOSS:

> "We don't believe that the current legislation would prevent the use of FOSS in the public organizations of the EU Member States, proof being also the many examples of good practice in this respect."
>
> "Governmental policies MAINLY NEUTRAL in all countries. There is a need for more CLEAR REGULATIONS because only a few EU Member states have explicit open

source software policies and many initiatives and have not defined yet a clear policy line regarding this issue, because they seem to have other priorities"

European policy making on software also suffers from certain weaknesses particularly in putting forward and implementing road-maps and unified mechanisms to specifically support and further integrate open source in public IT infrastructures as a means towards social inclusion, innovation and development.

It is clear that legislation and policy regarding FOSS varies across Europe and different governments have different views on promotion of FOSS. For example the UK Government ICT strategy emphasises the benefits of the uptake of FOSS, open data standards, the use of Cloud (G-Cloud) and an open app market, however, there is no legal framework to enforce or implement this policy.

"We do not lack a legal framework, we indeed lack in terms of application of the existent legal framework. For example articles 68 and 69 of the Italian "code of digital administration" have a great potential for FOSS, whether correctly applied. On the details of the single rules, still exists a margin for improvements. Another example is that institutional administration for "reuse" (among them in Italy DigitPA) have such rigid models and such inelastic requirements, that often do not allow to see the full potential of FOSS."

It is true that further political action could strengthen the dissemination and exploitation of FOSS in PAs and this would be enhanced by the support and effective implementation of the legislative framework of open data. There are a number of issues that encumber an effective European or national policy consensus:

"There is a lack of homogeneity and coordination between national and EU policy frameworks for open standards and open source software"

"There is a lack of clear institutional frameworks on a national level (e.g. national agencies, monitoring mechanisms) to ensure that requirements, mandatory standards and objectives on open standards and open source are fully implemented by all stakeholders"

> “Current policies do not efficiently promote a culture of trust and awareness on open source that is still lacking among public administrations and should be promoted through active policies on training and education”

> “Existing policies have not ensured efficient public procurement monitoring mechanisms to eliminate software discrimination practices in PAs “

> “Lack of cooperation among EU governments (influence of business)”

> “There are differences (or absences) in national policies”

A number of experts suggested improvements that would enhance the use of FOSS in PAs. It was generally agreed that regulations that require FOSS to be considered by PAs when commissioning new or extended systems, and to be selected where there is no difference in functionality, would be a good idea. It was suggested that pressure be exerted on relevant Government departments to consider changing regulation to favour FOSS with an emphasis on communication between countries and agreement between them.

In addition it is felt necessary that education and communication are vitally important with many suggestions for the dissemination of information and resources to both Government agencies and other PA departments. A number of the suggestions for improvements in Governmental involvement with FOSS are below:

> “Agreement of political decision makers on necessary action in the area of FOSS”

> “Pressure of municipalities on the national level to create a single national policy to support FOSS”

> “Law to favour FOSS instead of proprietary software (in case of equal functionality)”

> “Organize presentations to Schools, Ministries, Municipalities and other Public Services”

> “Inform people in key positions about FOSS: (Commission for the Protection of Competition, House of Representatives, Ministries, Regional authorities)”

"Creation of an open platform where all the PAs could have access and download / upload FOSS applications and be informed on general FOSS issues"

"Creation of portals of information, where the PAs can be informed on new software applications (proprietary or FOSS) and they can find tutorials and instructions about the setup and learning process"

"Organization of seminars where successful cases of innovative open source solutions for regions and local communities should be supported and transferred to more regions or replicated in similar contexts and implementation fields"

"Specified reference to objectives and priorities for FOSS by most high level (e.g. the European Commission) policy documents"

"Creation of policies for software and R&D to fully reflect the realities of the software industry and Europe's competitive advantage in FOSS development"

"Defining EU policy schemes such as the European Interoperability Framework"

"Monitoring on a EU level through dedicated observatories and networks"

During the last years Europe has intensively engaged in developing policies and implementing initiatives on open source whether on a regional, national or EU-wide level.

"European interest in the field is still doing much to promote the adoption and interest of FOSS by public administrations"

"Research and Development has been widely supported into framework Programmes. Significant research projects have favoured the share of good practices, technological deepening, creation of situations of excellence and creation of a reference Community."

7.4.3. Licensing

There was general agreement that the legal framework is sufficient with respect to licenses (EUPL).

“A huge effort has been made to adapt the European regulation in favour of FOSS (i.e.: the EUPL licence scheme). I think the legal framework is fine.”

“One important aspect is that any legal frameworks around FOSS needs to cover all three aspects of IP (licensing, trademarks, copyright), and not only licenses. In particular, trademarks are currently used by some “FOSS” vendors to circumvent some of the benefits with FOSS. As an example, even though I am one of the founders of Jboss, one of the most popular FOSS application servers on the market, I can not provide support or consultancy for it, as I would then violate the “Jboss” trademark that RedHat Inc. has, and they would sue me if I tried. If EU is to adopt FOSS as a strategic choice for IT infrastructure, I therefore strongly suggest that legislation is put in to make it impossible for one vendor to use trademarks to stop other vendors from providing support for FOSS products. If not, the whole argument of “vendor choice” falls away. Specifically, if there is strategic support for FOSS products within EU, products that have trademarks owned by vendors (rather than communities), should be disqualified from selection. One option might be to create a foundation specifically for hosting FOSS trademarks, to avoid predatory acquisition of trademarks for FOSS products.”

7.5. FOSS Community

7.5.1. FOSS community

One of the major advantages of FOSS identified by the experts was access to the large community of users, experts and developers and the possibility to receive support from this community. Often these are professional individuals who give their time and expertise for no financial reward.

> "The Open Source community guarantee. The development and maintenance of FOSS products"

FOSS is typically backed by a combination of community and commercial vendors, and this community can be used to source service vendors for FOSS software, which are often local to the customer.

In addition to the large support services that are provided by the large FOSS community, one of the strengths is the vast resource providing innovation. It was suggested that it is particularly hard to hire a small group of developers for a commercial project but FOSS development is carried out by large numbers of excellent developers from all over the world working together.

> "The amount of innovation that goes on in today's FOSS community is absolutely amazing, and difficult to match by proprietary companies."

For this reason there are many emergent practices that have contributed to high quality software being developed. FOSS developers believe in reusing ideas, sharing code and not reinventing the wheel. Ideas and code are rapidly shared and reused in a variety of similar and different projects. This makes for robust tested solutions.

> "Due to the nature of community development, documentation and instructions are often written from a variety of viewpoints creating well-rounded information, instruction and tutorials. In addition, open source projects can't hide usage techniques, due to the free availability of the code. "

Although, free technical support is often available in the form of mailing list or newsgroup discussions, some background research, knowledge or experience is often required.

7.5.2. FOSS marketing and promotion

Where the strength in having a distributed community of developers creating innovative FOSS solutions works well, this is a distinct disadvantage in other areas. There is a lack of an adequate marketing and promotional infrastructure for FOSS in comparison to proprietary software. This results in reduced marketing and it is detrimental to the corporate identity of FOSS.

> "This can be explained by the fact that manufacturers of proprietary software are able to engage in extensive marketing and lobbying activities, while open source software providers, who are mostly small and medium-sized businesses, only have small marketing budgets."

Because there is a lack of a visible FOSS solutions market or of any advertising this can lead to the impression with PAs that FOSS solutions are inferior to proprietary software solutions. In addition there is visible pressure from the manufacturers of proprietary software to advertise to PAs and so these solutions sometimes appear to be the only ones available.

FOSS developers (both individuals and enterprises) are mainly technical and this means they often have the inability to conceive either a business model, or a marketing strategy. Also, as FOSS developers do not work within a traditional commercial environment they often have no budget for either development or other usual business practices such as marketing and promotion. This is exacerbated by the distributed nature of FOSS developers, which means they also lack a shared and common direction.

Many solutions have been suggested for the resolution of these problems and to assist with the marketing and promotion of FOSS solutions to allow them to compete with proprietary vendors of software. These are discussed elsewhere in this document so will be briefly listed here:

- National Reference Centres for the distribution and education of FOSS in order to provide resources and promote the understanding and use of open source software.
- Build strategies and policies that will deal with software and give space to open source initiatives.

- Promotion of a culture of trust and awareness on FOSS that is still lacking among public administrations
- Promotion of FOSS through active policies on training and education
- Support FOSS in education (spread FOSS in Universities, Schools)
- Legislation to consider FOSS alongside proprietary software
- Promotion of FOSS initiatives such as OSOR and OSEPA

7.6. Technical

7.6.1. Disadvantages

There were very view disadvantages identified by the experts but some pitfalls are explained below.

> "It must be taken into account that free/open software does not mean free"

Traditionally Free Software has been a bad option for desktop software, with bad user experiences and hard to use UIs. It is expected that this trend will continue. It is likely that desktop software will be less and less relevant however, with web-based services becoming the norm for many of the tasks that need to be performed. In these cases the business model is quite different, as there is no license to be paid for installed software, and instead a subscription model will typically be used.

Finally, there was some concern that FOSS solutions are a viable alternative to proprietary solutions but they are not sufficiently explored for IT public projects.

7.6.2. Advantages/Benefits

Many of the advantages and benefits are discussed elsewhere in this document so the advantages will be simply itemised here.

- Independence from a particular software vendor
- Large community of users and the possibility to receive support from this community
- Access to the source code
- Re-use of software and development between PAs
- A clear and open copyright system on the implemented IT solution
- Using local/national knowledge from the IT area.
- High interoperability with other applications
- Easier backups, testing and clustering
- The use of a free Operating System could reduce the hardware specs so the cost falls
- Bypass bureaucratic procedures
- Better security
- Multiple solution providers

- Multiple platforms
- Multilingual Environment
- Quality of available solutions
- Open data formats
- No (or very low) cost for software licenses
- No cost for software support and updates
- Competition
- Control and self-determination
- Development and innovation
- Maximum value for money irrespectively of the type of software
- Faster procurement
- Accelerate the move to cloud based infrastructure

7.6.3. Now

FOSS is a valid alternative to proprietary software and many administrations already use this software both for their infrastructures, servers, information systems and web systems.

> "For quite a lot of infrastructural purposes FOSS already provides the main, or only, alternatives, such as DNS, sendmail, Apache HTTP Server, and similar. Data storage solutions, and other areas which are heavily standardized and which require highly skilled developers to create and lots of "eyes on the problem" are traditionally better executed in FOSS rather than closed source alternatives. With commercially backed FOSS it provides a more transparent, responsive, and cheaper solution, both in the short term and long term."

In terms of desktop software the story is not so good. There are pockets of successful use of FOSS desktop software but it has been less successful with bad user experiences and hard to use user interfaces.

Another current problem for the adoption of FOSS is that many PAs commission systems from commercial suppliers many PAs outsource the running of systems as well as their development.

7.6.4. Future

There is no doubt that FOSS will grow in the future but perhaps in ways that are not immediately obvious. There are a number of mixed solutions in existence that combine both proprietary and open source portions. Because of the increased competition in today's market it is going to be difficult for 100% proprietary software vendors to get access to the kind of highly skilled developers needed.

> "With a mixed model this becomes substantially easier, as parts of the solution can be Open Source, and developed by specialists for the particular purpose the library or component is solving. PDF handling, free text search, or UI libraries are typical examples."

Desktop software is an area where FOSS solutions have been less successful. This trend is expected to continue and for such software the mixed model works better. It is much more likely that with the development of cloud services desktop software will become less and less relevant with web based services becoming much more prevalent.

> "In these cases the business model is quite different, as there is no license to be paid for installed software, and instead a subscription model will typically be used. This type of software will mostly be developed with a mixed model, where parts of the software is FOSS, and some is custom."

With the increasingly stressed economic environment in which PAs have to function FOSS is likely to become more popular. One of the reasons for this is that software development effort and cost can be shared and reused.

> "….. because public administrations should invest in software development that other public administrations can also benefit from. Furthermore, public administrations should build up expertise in the use of open source software."

It is clear that the way that software is delivered is changing and this will allow business models to adapt.

> "At this point in the evolution of open source, it's too early to divine when and how the various obstacles will be overcome. But, it's clear that software development and

business models are changing as a result of open source code. The future is interoperable, modular components based on standards that will include both open and proprietary code. “

7.6.5. Adaptability

One of the fundamental tenets of FOSS is the ability to have access to the source code and to adapt and customise the software to one’s own requirements. This strength was listed by almost every expert as one of the main benefits of FOSS. In fact it is more than a benefit, it could be said to be one of the ‘raisons d’etre’ of the FOSS philosophy.

> “Access to the source code for further development of the product, its customization to the needs of the institution or the possibility to be verified by any third party for the quality checking.”

> “The possibility of accessing the source code of applications is crucial for PAs: The investments can be preserved enabling the PA to modify/extend/update an existing application and once a product is acquired by a PA, someone may verify the code developed/customized for it. Products based on FOSS are easily reusable and easy to customize.”

Read the explanation in the document found at: http://en.itst.dk/it-architecture-standards/open-source/open-source-and-the-public-sector.

7.6.6. Open data standards and interoperability

Another fundamental tenet of FOSS is open data standards and interoperability. This allows the easy integration with other applications and is a crucial advantage for PAs, from a business, an operational and an ethical point of view.

> “Among commercial packages there is a tradition of locking in customers with weird proprietary formats and APIs. FOSS solutions are typically much better in this regard, having a culture of adopting open standards and APIs wherever possible, thus making it much easier to enter, integrate and leave products. Considering that integration costs today are absolutely massive, this is one of the key reasons in favour of FOSS.”

One of the problems with being locked into a proprietary software solution is that the data is often held in a secret proprietary format causing problems if the PA wishes to move to another software solution. So holding data in an open format allows development of applications that can access that data and also the ability to access that data in the long term.

> "… public administrations retain control over data; they are not subject to any external pressure to install updates. Public administrations are thus able to manage their IT processes themselves."

> "The increasing awareness of rights referred to the so-called "digital citizenship" can promote the adoption of open standards and FOSS among public administrations to foster an active participation."

This community approach of FOSS and digital citizenship can be seen at: http://www.unarete.it/ "la nostra proposta"/ "open government".

Some governments are encouraging the concept of transparent data and are working towards adopting all government data in open formats. This is considered to be conducive to the adoption of FOSS solutions.

> "…the obligation to adopt open standards in public interest records. Obligation to release as Open Data any public data, in non-proprietary formats and on FOSS platforms."

If tenders put bigger focus on support for open standards, support for running apps in private or public cloud, and vendor choice, this will naturally favour FOSS options. It should be easier to enter and exit products by regulation, preferably by supporting open standard formats for data transfer. Proprietary software vendors tend to do the opposite, whereas it is common practice in FOSS to focus on open standards for interoperability between systems. Currently there is a lack of standards for cloud systems but this will develop in time as cloud technology becomes more mainstream.

> "In most discussions on software procurement four underpinning principles are included: interoperability, flexibility, transparency and supplier-independence. These principles refer not only to software features and functionalities but also to basic

rules and regulations of public procurement and they are the main prerequisites for adopting policies that encourage FOSS usage. Interoperability, in all its technical, semantic and organisational aspects, is a decisive factor, particularly for public administrations that due to their role are expected to collaborate and exchange information despite working under different internal structures, IT architectures and procedures. Moreover, public administrations should keep public information accessible to citizens at all times in open file formats that do not require specific or additional software applications. Open source systems and applications however, being, from the moment installed, highly scalable and customisable, can be directly adjusted according to organisational needs either by in-house staff or by seeking external service suppliers through a tendering process. Software procurement, selection and integration procedures should be documented and kept open and transparent at all stages in order to promote competition fairness, public information accessibility and accountability. FOSS, providing, by definition, access to its source code and allowing public stakeholders to assess specific software modules and features fits well within this requirement. Open source can greatly contribute in fulfilling this requirement by providing various alternatives against a single supplier scenario. If opted for FOSS, public stakeholders could either rely on in-house resources or use the competition of multiple external suppliers to choose from a range of provided services."

There is further explanation in the document found at: http://en.itst.dk/it-architecture-standards/open-source/open-source-and-the-public-sector.

7.6.7. Quality

Again, many of the experts had the opinion that FOSS software was of high quality.

> "Software Quality, Reliability and Stability: Software that has freely-readable and usable source code can be modified, improved, reviewed, tested, and sampled. Experienced developers and even beginning programmers can add ideas, take ideas and improve code in many ways. This improves quality and, in the long run, improves reliability and stability."

7.6.8. Security

As previously, many of the experts were of the opinion that FOSS software exhibits better security than proprietary software.

> “No Spyware/Better Security”

> “Improved Security: Open source code encourages review. It encourages users and programmers to find bugs and security flaws. And when problems are found, a variety of developers can share ideas and quickly fix and distribute fixes. Open source code can have bugs just like closed-source, proprietary software. Although some problems are harder to find in proprietary, no-available-source software, these problems usually take a lot longer to be announced, fixed and the updated software distributed.”

7.6.9. FOSS development

Due to the distributed nature of the development of FOSS software there is often scarcely predictable development of FOSS solutions and also different communities may influence software solutions in different directions. This fragmentation of FOSS stakeholders about the promotion and commercialization of FOSS and relative services can contribute to a lack of a shared and common direction.

So many enterprises are overwhelmed with patches and handling vulnerabilities, as well as the consequences associated with introducing new software into an infrastructure. The fact that the open source community is constantly tweaking its software is a reasonable concern for IT executives. Open source software introduces more complexities in software maintenance, but also promotes more secure and reliable code through rapid bug and vulnerability fixes. Given that enterprises (and the public sector) don't want constant upgrades and optional fixes, rather than just continuous, releases via subscriptions as well certification of the software to alleviate this problem.

Another problem that affects FOSS developers is the lack of access to proprietary standards and software, which prevents SMEs from developing systems to integrate with existing proprietary systems.

7.7. Collaboration

7.7.1. Sharing development

For FOSS development to be shared there must be mechanisms in place to allow dissemination to take place efficiently and easily. It is necessary, not only to share code, but to share best practice and experience.

There are already some collaborative efforts between public administrations for sharing code, programs and ideas like the Open Source Observatory (http://www.osor.eu/), OSEPA. It was suggested that there is a requirement for central European coordination of National Centres of Open Source.

> "Creation of a coordination among National Centers on Open Source, with the exchange of common experiences and the management of repository of open solutions developed by European public administrations. Development and release with FOSS licenses ALL software developed with/with European projects."

It was also suggested that this was taken further and set up a European competence Centre like http://www.oscc.org.my/ and even extend this to a central community/website for ordinary people who want to adopt FOSS.

> "Building a portal for ordinary users, which will in an easy manner present alternatives to FOSS products"

However, sharing of FOSS development is not without its problems.

> "Dr. Stürmer cites this example from Switzerland: The Swiss federal government has an open source strategy. This states that open source software should be placed on an equal footing with proprietary software. Furthermore, public administrations should be encouraged to release the code of any software that has been developed.
>
> A strategy of this kind is an important initiative. But the strategy is not being implemented consistently. In addition, public administrations are challenging the

strategy to the effect that they don't understand why they should spend money on development while others benefit from it without paying."

In any event, to share development and experience there needs to be communication for maximum benefit to be realised. The dissemination of information relating to sharing FOSS was a common theme with the experts. They suggested a number of mechanisms:

- Disseminate the role of software repositories such as OSOR.eu
- Disseminate case studies related to the adoption on a large scale basis of FOSS solutions
- Organize presentations to Schools, Ministries, Municipalities and other Public Services
- Creation of portals of information, where the PAs can be informed on new software applications (proprietary or FOSS) and they can find tutorials and instructions about the setup and learning process
- Organization of seminars where successful cases of innovative open source solutions for regions and local communities should be supported and transferred to more regions or replicated in similar contexts
- Higher promotion of FOSS at schools (seminars, lessons) with distribution of CDs
- Promotion of FOSS conferences
- Promotion of incubator IT companies dealing in FOSS
- Support local FOSS projects and FOSS teams

7.7.2. Local initiatives

A number of European countries have legal frameworks, policies and strategies relating to FOSS and in others there are simply local, regional or national initiatives that have adopted FOSS without Governmental intervention. Some are descried below.

“I do not know to exist in Romania any national policies supporting PAs in adopting FOSS. All I heard to be made in this domain was based on local initiatives and support of some enthusiasts.”

“There appear to be no official open source software policies in Cyprus nevertheless a few initiatives exist. Some Public Officers they choose to use FOSS but on their own initiative. FOSS is being widely used in the island mainly from educational institutions.”

“Currently national Italian politics doesn’t support at all with policies any public administration in the adoption of FOSS. Some interesting past experiences, as the Open Source group in DigitPA, have been closed down. Only at the Consip level there’s an attempt to include Open products into MEPA (i.e. Electronic Market Public Administration). A deep hole into national policies for innovation and FOSS in particular is perceived.”

“We do not lack a legal framework, we indeed lack in terms of application of the existent legal framework. For example articles 68 and 69 of the Italian “code of digital administration” have a great potential for FOSS, whether correctly applied. On the details of the single rules, still exists a margin for improvements. Another example is that institutional administration for “reuse” (among them in Italy DigitPA) have such rigid models and such inelastic requirements, that often do not allow to see the full potential of FOSS.”

“Several countries have adopted national policies in favour of FLOSS. In particular Italy released very important laws in favour of FOSS adoption. Several Italian Regional administrations adopted specific laws in favour of FOSS. In particular Umbria Region adopted the Legge Regionale 11/2006 “Norme in materia di pluralismo informatico sulla adozione e la diffusione di software a sorgente aperto e sulla portabilità dei documenti informatici nell'amministrazione regionale”. The named law established the Centro di Competenza Open Source (CCOS) of the Umbria Region (http://www.ccos.regione.umbria.it) and financed small projects to facilitate the adoption of FLOSS solutions in municipalities, school, universities, provinces and the regional administration too. One million of Euro was spent to

finance such projects in the various years. The obtained results are really amazing. A book will be published in the next months telling the whole story of CCOS."

"Policies on OpenDATA, which have been implemented both at the national and at the regional level (for example Piemonte Region), are particularly innovative and significant at this stage. National governments should support public administrations in using open source in effective and sustainable ways providing guidance, resources and reusable software tools and components through national reference centers and repositories. They should also establish clear legal and institutional frameworks to eliminate software discrimination in public tenders and monitor the implementation of certain principles and requirements such as openness, reusability and interoperability of data, software and systems in full compliance with the European frameworks and guidelines. Several national policies relating to these issues have been defined in the last years and are constantly revised and updated to meet current development in the European software market and industry ("Open Source Software for the Development of the Spanish Public Administration. An overview" in Spain, "Open Source Software and the Public Sector" in Denmark and "Open Source, Open Standards and ReUse: Government Action Plan" in UK). Although being highly active, national policy making on software also suffers from certain weaknesses particularly in putting forward and implementing road-maps and unified mechanisms to specifically support and further integrate open source in public IT infrastructures as a means towards social inclusion, innovation and development."

7.7.3. Encourage the use of FOSS

As with other themes there were a variety of opinions on how to encourage the use of FOSS. They varied from mandatory measures forcing the use of FOSS to more gentle persuasive actions just encouraging the use of FOSS.

As a minimum many experts proposed the mandatory imposition of open standards and others went further with proposing law to favour or even force the use of FOSS products. This of course could be proposed at a National or European level, however, it is difficult to see this

happening at least at a European level as it is unlikely that the UK, for one, would adopt any legal measures to force the use of FOSS as each PA in the UK is independent.

> "1. Use FOSS alternatives for public administrations
>
> 2. Obligatory use of open format in public sphere
>
> 3. Policy for public sector which force EPA's to use FOSS solution"

> "Obligation to release as Open Data any public data, in non proprietary formats and on FOSS platforms"

> "If tenders put bigger focus on support for open standards, support for running apps in the cloud (private or public), and vendor choice, this will naturally favour FOSS options, and is simply good anyway for the EU. Since any government will naturally outlast any company providing software, there needs to be regulation stating that it must be easy to enter and exit products, preferably by supporting open standard formats for data transfer. Proprietary software vendors tend to do the opposite, whereas it is common practice in FOSS to focus on open standards for interoperability between systems."

A number of experts preferred the milder option of a law that required FOSS to be considered and favoured in the event of equal functionality.

> "A European Union Direction to all members states to prefer FOSS instead of proprietary solution whenever possible. Also the adoption of Open Document Format (ODF) as the mail document format from EU public administrations"

Most EU member states either have or have are developing software strategies that include open source as a key factor of policy making. This will be expressed in most countries on a national level to support open standards and adopt open data policies and schemes. This is expected to facilitate a further integration of open source solutions by public administrations. There are some regulatory measures that can be taken in order to promote the adoption and use of FOSS. These include the definition of clear institutional frameworks on a national level to ensure requirements, mandatory standards and objectives on open standards and open source

are fully implemented by all stakeholders. In addition it was identified that not only are strategies required but also it is necessary to make a strategic plan on migrating FOSS to public services.

It was also suggested that a clearly defined open source strategy is needed for the EU. The OSOR platform is a good starting point. OSOR is a central contact point for information relating to open source software and is also an open source repository linked to national open source platforms. However, it should be given more financial support to enable a more professional open source repository to be established. This will include coordination between national and EU policy frameworks for open standards and open source software.

It is also proposed that funding is identified for initiatives that promote FOSS and to support FOSS start-up companies. There also need to be structured rewards for projects based on FOSS and Open Data and PAs should be rewarded if they design and implement or reuse FOSS applications. Additional rewards should be made available for business authorities and software vendors.

> "Given the principle of technological neutrality, as the principles of equidistance required in the area of public procurement, we do not believe that an express regulatory measure in favour of FOSS would be necessary or possible. Instead, there is a wide range of non-mandatory measures that can be adopted at national level"

Many suggestions were made for Competence Centres, Reference Centres and Centres of Excellence for FOSS.

> "Set up a National Reference Centre for the Application of Open Source ICT in order to promote the understanding and use of open source software."

> "Activation of a national centre for Open Source into Public Administration, aimed at coordinating the diffusion, at certifying the functionality and compatibility and at diffusing its best practices"

> "I see as necessary the set up of institutions made by temporary association of heterogeneous public administrations, each one characterized by variable composition according to the respective necessities for the development of FOSS.

> An example of such an association comes from UCVW (Union des Villes et Communes de Wallonie asbl) with the set up of “IMIO”, a public company co financed by Region and Municipalities involved, aimed at diffuse FOSS. In this respect the central authority should provide guidelines and main orientation, while local administrations, depending on their size, should contribute to the creation of transversal associations aimed at adopting FOSS and providing services. This will need the involvement and support of SMEs of the territory, when it is necessary and convenient, and should be encouraged through the adoption of open standards”
>
> “Launch an open source software working group to study the potential use of open source software”
>
> “Promotion of a culture of trust and awareness on FOSS that is still lacking among public administrations”

It was also suggested that large horizontal FOSS projects for public administration would be beneficial.

Finally, the subject of education and the promotion of FOSS in schools and universities was mentioned a few times.

> “Support FOSS in education (spread FOSS in Universities, Schools)”
>
> “Promotion of FOSS through active policies on training and education”

7.7.4. Sharing experience

It is just as important when considering the adoption of FOSS to look at aspects other than those technical. As important is attitudes, trust, best practices and to generally share experience. This can be achieved in a number of ways, many of which have already been mentioned including centres and repositories, changing attitudes, best practices, case studies, education, understanding licensing and experiences.

> “Actively using FOSS solutions by European institutions or other authorities from the EU”

> “Promoting European projects and partnerships in order to share experience in the field of FOSS”

> “campaign in schools to promote open source and distribute open source CD's for free among users.”

> “Setting up a European Competence Centre like: http://www.oscc.org.my/”

> “Enforcement of the role of the European OSOR. Creation of a coordination among National Centres on Open Source, with the exchange of common experiences and the management of repository of open solutions developed by European public administrations. Development and release with FOSS licenses ALL software developed with/with European projects”

A single point of orientation is required – a central location where users are able to obtain a full range of information about open source software. There are currently too many individual initiatives and projects relating to open source software that should be brought together under one roof. For example PloneGOV (www.plonegov.org) allows sharing of best practices.

Another idea was to create an independent assessment agency for evaluating FOSS solutions for PAs. This will give a better mechanism for sharing information and experiences amongst PAs and support for developing high quality FOSS for Cloud environments. The creation of a network of success stories in which FOSS played a strategic role was suggested. This would facilitate the access to FOSS repositories and best practices and identify all possible interesting projects based on FOSS.

Further work could be done on European policy making to specifically support and further integrate open source in public IT infrastructures as a means towards social inclusion, innovation and development. The main task is the dissemination of information and education of not only PAs but also the general public on the benefits of FOSS. This can be done in a variety of ways:

> “Creation of portals of information, where the PAs can be informed on new software applications (proprietary or FOSS) and they can find tutorials and instructions about the setup and learning process”

> “Organization of seminars where successful cases of innovative open source solutions for regions and local communities should be supported and transferred to more regions or replicated in similar contexts”
>
> “Disseminate the role of software repositories (e.g.: OSOR.eu)”
>
> “Contribute to increase the quality of the documentation of the FOSS based software solutions”
>
> ‘The need to inform consistently and accurately about FOSS advantages beyond the concept of "free".”

Most importantly there needs to be a general change in attitude towards transparency and sharing which will generate the cornerstone on which FOSS will gain momentum.

8. Discussion

It is important to point out that this survey was directed to experts in the field of FOSS so therefore the responses are likely to be very supportive of FOSS solutions. It gives an interesting view of pan European views of FOSS experts and how they perceive the issues surrounding the adoption of FOSS; however, it is missing views from experts from other fields who may have views on FOSS in Europe.

This report has only reported the views of the experts and has not extrapolated any opinion or decision based on those views.

Inevitably, when conducting a survey amongst 20 experts in a field there will be a variety of views, often conflicting, and this did not disappoint; however, there was general agreement on the benefits of FOSS and the conviction that it should be used in PAs in Europe. The disagreement related to the level of control and regulation that should be adopted.

The need for greater dissemination and education on the benefits of FOSS was prevalent as there is perceived to be a pervasive lack of knowledge regarding FOSS not only in PAs but also in general. The need for coordination across Europe and sharing of experience and best practices was also identified as a potential advantage in the encouragement to greater utilisation of FOSS in European PAs. The most popular mechanisms for this were cited as Central Repositories of development and experience, and promotion of FOSS in schools and Universities.

Another strength of FOSS is the vast international community of developers and supporters but the lack of coordination in marketing, promotion and other business activities was seen as one of the major pitfalls to the promotion of FOSS. This results in a lack of exposure of FOSS solutions in comparison to proprietary software.

Finally, there seems to be a large variation across Europe relating to Governmental policies and strategies, and the commitment of leaders at National and Regional level. Due to differing legal structures in each European Country it seems unlikely that a European regulatory structure will be implemented with regard to FOSS but European coordination on policy and strategy is

conceivable. With Europe currently experiencing fiscal problems, developing European strategy and policy relating to the use of FOSS may prove to be beneficial in order to maximise value for money in EPA IT departments.

9. Conclusion

This report gathers together the views of a number of FOSS experts from across Europe and has described the general issues and conclusions derived from a survey of FOSS experts on the needs and requirements of European public administrations. The survey queried the needs and requirements of public organizations when selecting between FOSS and proprietary software in terms of societal, economic and policy factors.

This document has reported their views on how European, national, regional and local policies, strategies and actions can affect the adoption of FOSS in PAs and the associated societal, economic and policy issues.

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