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A Study of the Deployment of Open Source Software – Finnish Experiences from Public and Private Sector

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Abstract — **The software development has become even more complicated for IT-companies and users of software. The rising popularity of open source in all areas of software development and usage is resulting in a need to evaluate more options in software procurement than before. This paper highlights some of the recent international and domestic research on open source deployment and gives some recommendations as to what official stand Finland should take.**

Keywords — **open source, deployment, public and private sector**

I INTRODUCTION

The software development has become even more complicated for IT-companies and users of software. In addition to normal business decisions, they have to decide nowadays whether all or parts of the development work should be done in-house, or outsourced, or off-shored or open-sourced.

By now, most technology executives realize that the open source paradigm shift is something that has to be taken seriously [1]. Until now, the most common strategy has been to deny that open source software exists, or one insists it is somehow inferior to the commercial offerings. Growing popularity of open source forces the companies to accept that open source is here to stay and look where it fits in organizations' strategy as it is proving to be a viable option for commercial development [2, 3].
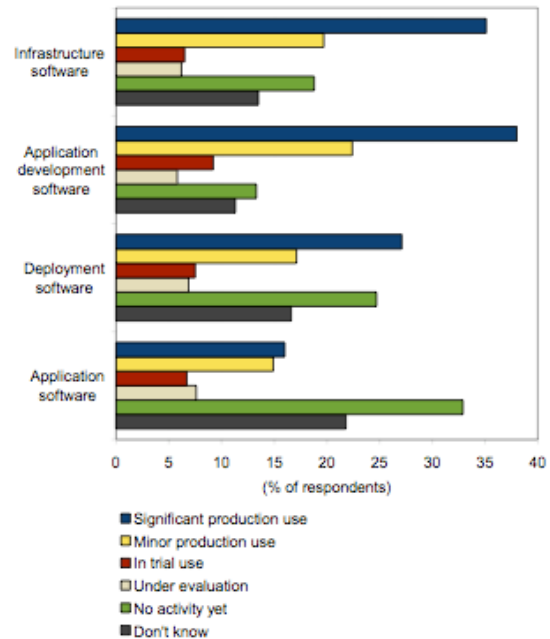

Figure 1. Current level of Open Source Software Adoption. (Adopted from IDC, 2006) (16)

The recent study by IDC illustrates this well going as far as stating that open source will hit all the parties in the value chain, makers, vendors and users of software [16]. The study analyzed over 5000 developers in 116 countries and found that developers worldwide are increasing their use of open source. Reading news and reports daily about how new companies are being formed and funded embracing the open source approach this is relatively easy to accept. However, for instance the largest pure open source vendor RedHat Inc. only counts its revenues in hundreds of millions rather than billions that many of its proprietary software vendors do.

So far open source has been making ways into infrastructure and developers who need tools to build their own applications have been happy to use the tools found in open source. Surprisingly, the data from IDC (

Figure 1) notes that even on the application side, which were supposed to be hard for open source to reach roughly fifteen percent out of 5000 developers worldwide saw open source in significant production use.

The trend has been noted also among the software users. Especially the public sector has been quick to endorse open source as a way to get equal or better productivity with less money. The proprietary software model is therefore under severe distress. An example of how traditional software companies are trying to cope with this change:

At LinuxWorld 2006, Scott Handy (Vice President of Open Source at IBM) said that: ''IBM will begin to invest more heavily in open source client-side middleware, development tools, Web application servers, data servers, systems management, open hardware architecture, grid computing and technology services businesses. We plan a major expansion beyond Linux into open source. It's poised to be a more disruptive force in the industry in the next three years than Linux has been in the last 15 years. With open source beyond Linux, we'll be as aggressive and leapfrog right to the injection stage.
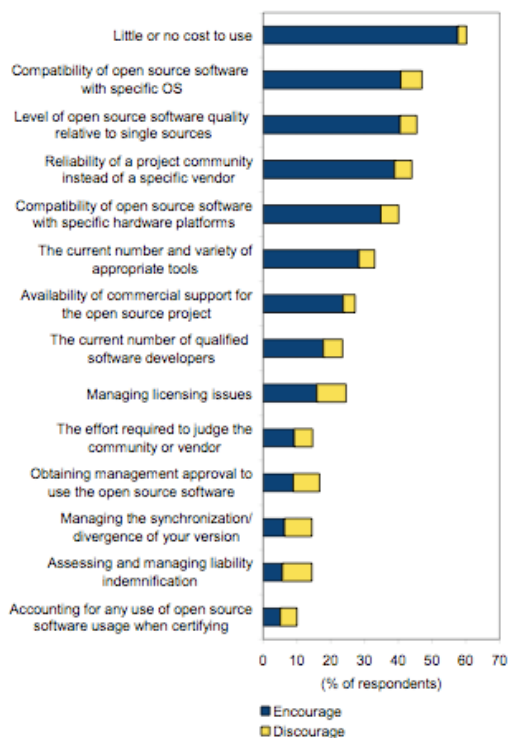

Figure 2. Factors encouraging/discouraging the adoption of open source software among worldwide developers. (Adopted from IDC, 2006)

Interestingly nowadays you can find mentions and even aggressive push towards open source from most companies in the software industry, including e.g. Nokia, Oracle Sun Microsystems and HP.

This is also increasingly true in Finland, which has been trailing the rest of the world after the glorious start with Linux. To date the Finnish Center for Open Source Software, COSS has attracted about hundred annual due paying members ranging from large multinationals to small enterprises and universities. Some young companies offering integration services, such as Movial, Nomovok and Reaktor Innovations have even managed to grow quickly to 50+ employee companies on natural growth without outside funding.

II OBJECTIVE AND METHOD

The objective of the paper is two-fold. Firstly, we clarify what is the official opinion of utilization of open source software in Finnish business environment. We explore what is the current situation in Finnish IT-environment regarding open source business, and estimates based on official reports and analyses what may (and also may not) be happening in the near future. The data utilized is official reports, descriptions, and statements of the representatives of government, municipalities and companies of private sector. Secondly, we compare the empirical results to existing theories about technology adoption. Pertaining to the public sector, we utilize also the economic theory of regulation. For private sector we will use the technology adoption lifecycle theory [4].

III ROLE OF THE PUBLIC SECTOR IN OPEN SOURCE IT PRACTICES IN FINLAND

The interest in open source and open standards has sharply risen during the last year in the Finnish public sector. So far the discourse has not happened on political level but instead among the IT-decision makers. However there is some anecdotal evidence that the politicians are also paying increasingly attention to the theme. The main apparent reason is the examples from abroad and especially the promising estimates of cost savings. For example, the Danish parliament has decided that Denmark will only use open standards:

"Parliament imposes on the government a duty to ensure that the public sector's use of IT, including use of software, is based on open standards.

The Government should adopt and maintain a set of open standards by January 2008, or as soon as technically possible, which can serve as an inspiration for the rest of the public sector. Open standards should be part of public IT and software procurement with the object of promoting competition.

The Government should ensure that all digital information and data that the public sector exchanges with citizens, companies and institutions, are available in open standards based formats." [5]

In addition, there is some research in Denmark that strongly backs the move. In so called Rambøll-report the estimated savings were up to 550 million kroner if the government moves to Open Office. The report included three possible scenarios:

"1. A transition to the Office Open XML documentation standard in the existing Microsoft Office versions would, in itself, result in the cost of approximately DKK 105 million. If it is assumed that the central government follows its current practice and, over a period of five years, updates its current Microsoft Office licenses (primarily Microsoft Office XP and 2003)

to the new 2007 version, the total costs would amount to approximately DKK 380 million.

2. The costs of implementing the ODF standard while simultaneously switching office packages OpenOffice.org are evaluated as involving costs of approximately DKK 255 million.

3. The costs of implementing the ODF standard in the Microsoft Office packages are estimated as being marginally higher than the costs of scenario 1 (primarily due to greater conversion and support costs)." [6]

In Finland the Ministry of Finance has been studying the use of open source and it is also involved in some EU projects to support open source but there are not concrete results. Moreover, the Ministry of Justice completed an evaluation, where it compared its software expenses [6]. By conducting a remarkable shift from proprietary desktop software toward open source, its software expenses would lessen sixty percent. The governmental IT development plan does not address open source directly but instead supports open standards and open interfaces.[7] Julkisen hallinnon neuvotteluryhmä (JUHTA; Public sector's IT-negotiation group) has also decided that it will cease developing it's own XML-based document format and instead rely on ODF. [8]

It should be also noted that there have been some large-scale adoptions, which have not been really publicized, especially in Ministry of Labor and Finnish Meteorological Institute. Also, the Finnish army is using open source products in its IT-infrastructure but the exact details are (not surprisingly) public.

The National Technology Agency has taken a more pro-active position [9]. They are proposing a R&D development program for the years 2006-2010, with a 120 million Euros budget with one of the key areas being the development of open-source based technologies and products. The explaining factors are here most likely the success of Finnish OS-startups (e.g. MySQL, Innobase and Emic Networks) and also Nokia's increased interest in open source.

Municipalities are another large consumer of IT in the public sector, with annual purchases of IT, services and hardware of 600 Million Euros. They lack centralized IT-strategy, which means in practice that the IT-structures vary widely. A specific working group (KuntaIT) has been created to tackle that problem. It is unlikely that the group will address directly open source but instead approach the theme using similar open standards-approach as the government has done.

The study conducted in the winter of 2004-2005 about usage of open source in the municipal sector in Finland notes that the municipalities have mostly practical approach to open source e.g. it is used similarly (albeit less) as proprietary software. The biggest obstacle by far for wider adoption was the lack of support from vendors [5].

The most well-known case in Finland is the city of Turku Linux project in which Linux-based desktop package was tested in 2001. Functionality of Finnish version of OpenOffice and interoperability was tested against Microsoft Office. In the final report after test usage it was recommended that migration to Linux and OpenOffice should be made but the question got politicized in the city council and finally the decided against the recommendation. [11]

While analyzing the situation, we rely on public choice theory. The term public choice theory is a bit misguiding because there is no single theory but instead of a wide range of approaches, which aim to use different tools from economics to model the decision-making of the public bodies. The strongest common factor between the approaches is that the different actors (politicians, bureaucrats, voters, lobbyists etc.) are being seen as rational homo economicus, which aim to maximize their own welfare. As a consequence the governmental decision-making is as prone to failures as markets are.

In this case in the most relevant sub-theory is public rent seeking:

"Rent seeking consists of legitimate, non-voting actions that are intended to change laws or administration of laws such that one individual and/or group gains at the same or greater expense to another individual or group."[12]

The theory predicts that companies, which benefit from extensive profits made with closed solutions, should lobby aggressively against any move towards open solutions. Unfortunately, we cannot present any direct evidence of this. Still, this could explain why Microsoft has been hiring politicians from high level positions to work as lobbyist (e.g. Mikael Junger, who used to be advisor the prime minister and Max Mickelson, who was the general secretary of the parliamentary group of the Coalition Party).

On the other hand, the companies, which have an interest in favoring open solutions, should counter-lobby Microsoft and others. Again, we cannot present any direct evidence of this.

Finally, also civil servants may have personal interest, which is not aligned with the public interest. For example, they may have made personal investments for learning certain architectures and a change would require additional work. In this kind of situation a civil servant might try to prevent the change unless there are some benefits, which counter the added personal costs.

IV   ROLE OF THE PRIVATE SECTOR IN OPEN SOURCE IT PRACTICES IN FINLAND

The Research Institute of the Finnish Economy surveyed the usage of open source among Finnish software companies [8]. Companies using open source replied that 50% of their revenues is based on open source (32% in 2003 and 16% in 2000). The top three reasons for using open source were:

1) Independence from large IT-companies licensing and pricing policies,
2) Possibility for a small company to stay innovative, and
3) *The use of open source lowers production costs in new products.*

The survey concluded that the importance of open source has undoubtedly increased among Finnish software companies but as to what potential economic impact that has on the Finnish software industry is impossible to tell.

The size of Finnish software product business is still relatively small being 1.19 billion Euros in 2004 [9]. Representatives from this group claim that open source could destroy this potential industry segment in Finland [10]. Open source movement is challenging the license-based product business that many large incumbents (mostly US-based) have based their business on. Another well-known example of recent developments open source software area in Finland is Maemo.org. In the last year, Nokia launched a community to support the platform development for its tablet pc, Nokia 770. The platform is explained to be meant for developers with personal or commercial interests in developing software for handhelds. It is composed of open source software components which are deployed in the Linux desktop distributions. Various open source and creative commons licenses are used in distributing; however there are extensions which contain the non-free software [11].

V DISCUSSION AND CONCLUSION

While Finland had a glorious start into the world of open source with Linux, the adoption of Linux and other open source software has followed similar adoption patterns as with most new technology. Fifteen years has passed since the introduction of Linux and it is only now becoming a serious contender for business among conservative buyers who require not only technology, but also turnkey solutions with large companies providing support [4].

Open source utilization development both in public and private sector can be described as increasing enthusiasm. Enthusiasm has also transformed to concrete action in both sides, as above examples illustrate. When considering different areas of software industry, we may propose that these areas are positioned very differently in the S-curve of maturity (Figure 2).
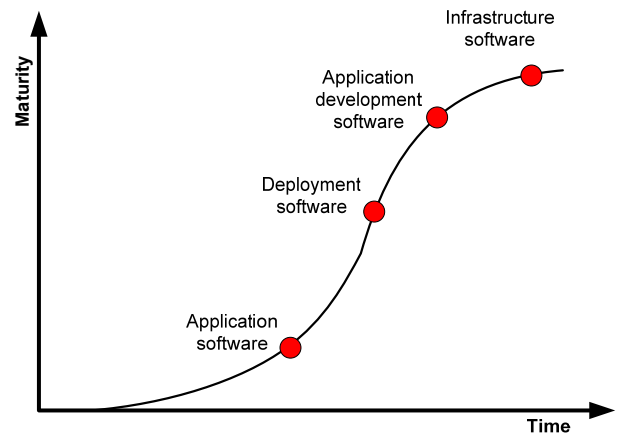

Figure 3. Levels of software adoption.

Looking at Finland's experience with open source from public (government and municipalities) and private sector view we may suggest the following:
1) Public debate is similar to what is taking place internationally.
2) Open source is growing in importance in Finland's private sector as companies' are increasingly basing their business on it.
3) Finland seems to be taking an aggressive approach into building new open source based businesses through new government grants and training programs in 2006, even as there are still only early indications as to how sustainable and profitable open source businesses will be as there are only few companies that have managed to find and execute profitable business models in open source.
4) Finland's public sector has so far tried open source desktop applications in small scale, that the impact and potential cost issues of larger deployment can only be estimated.
5) Finland's public sector is reluctant to test new software environments as a user until conclusive evidence about its benefits can be seen elsewhere.
6) While open source has gained a lot of ground in the public sector on the server side, desktop applications still have long way to go to reach popularity that would threaten the popularity of applications of Microsoft's etc.

As a comparison, the United States has defined its defense organization (DoD) to take in a way a selfish approach to software acquisition; firstly they look after their own interests and secondly at the interests of the U.S. domestic software industry.

U.S. National Interest

DoD has two competing interests:
1) Provide for the defense of the U.S., and;
2) Support and grow the U.S. industrial base, which provides materiel and systems so that DoD can accomplish its mission.

These trade-offs are well understood for physical goods and services, but not as well understood for digital ones. DoD can easily calculate the cost difference between developing or acquiring a physical good or service by simply comparing make or buy costs. There is however a fundamental difference between physical and digital products. Digital goods (software code, music, movies, etc.) once created can be copied perfectly with relative ease: limiting distribution enforces scarcity, but that scarcity is arbitrary and negotiated, rather than an innate property of the product. Software's ability to be replicated also means it can be incorporated into other software systems without "using up" the original component, as one would with physical components.

The business model of purchasing physical goods and services has served DoD well in the past; but it falls short when applied to software acquisition. By treating DoD-developed software code as a physical good, DoD is limiting and restricting the ability of the market to compete for the provision of new and innovative solutions and capabilities. By enabling industry to leverage an open code development model, DoD would provide the market incentives to increase the agility and competitiveness of the industrial base.

Currently within DoD, there is no internal distribution policy or mechanism for DoD developed and paid for software code. By not enabling internal distribution, DoD creates an arbitrary scarcity of its own software code, which increases the development and maintenance costs of information technology across the Department. Other negative consequences include lock-in to obsolete proprietary technologies, the inability to extend existing capabilities in months vs. years, and snarls of interoperability that stem from the opacity and stove-piping of information systems.

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