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Abstract

Recently, the Dutch government has joined numerous other countries around the world by adapting and implementing Open Standards and Open Source Software (OSOSS) policies with the intend to increase interoperability, reduce its dependence on software suppliers and to introduce a level playing field and promote innovation in the software market. As IS plays a major part in today's agencies, this switch can have a large impact on its operations and the software vendor market as a whole. This thesis aims to explore some of the cases of early adapters of OSOSS and find out what their lessons learnt are through performing an interpretive case study. Also, the practicalities of the Dutch policies and the future of OSOSS in the agencies are explored. This paper concludes that user acceptance, information about alternatives and interoperability with proprietary IS are important lessons learnt, and agencies are still supporting this policy and plan to increase the use of OSOSS applications. Whether these conclusions still hold in the future and whether the software market will significantly change are some interesting topics for future research.

Contents

1. Introduction

In the September 2007, “Actieplan Heemskerk” (Dutch, Action plan Heemskerk in English) (Ministry of Economic Affairs, 2007) was accepted by the Dutch Cabinet, speeding up the use of Open Standards and Open Source Software (OS and OSS, respectively, or OSOSS when combined) at Dutch governmental agencies. This was a major policy change and might affect the nature of the software requested by the Dutch government, as well as the skills of its own ICT employees. Heemskerk, the current Secretary of State of Economic Affairs, created this project plan with the following objectives in mind:

1. Increasing interoperability between and with the different building blocks and forms of service provision of e-Government by accelerating the use of open standards;
2. Reduction in dependence on suppliers in the use of ICT through faster introduction of open standards and open source software.
3. Promotion of a level playing field in the software market and promotion of innovation and the economy by forceful stimulation of the use of open source software and by giving preference in contracts to open source software if equally suitable.

The policy objectives are achieved using a three-fold strategy:

1. A “comply or explain, and commit” policy will apply to standards used when building new applications as well as for redoing current ones. This means that a governmental body either has to use open standards, or provide a good explanation to choose closed alternatives (among these are: no availability of open standard for this application, security considerations, and international agreements). The commit part of the policy states that open standards are preferable to closed ones. A framework to support this policy has been developed by the Standardisation Board.
2. All ministries and subsidiary government agencies need to create implementation strategies for open standards.
3. The ODF open standard will be used alongside existing closed ones by all ministries and subsidiary agencies by January 2009. This is a way of popularizing one open alternative by force, in order to ease the way for others.

Since April 2008, all central government agencies are required to comply with this policy, and the others followed in December of that year. Since this new policy has just been implemented and most applications have a lifetime of at least a couple of years, little is known about its effects.

This thesis aims to assess some OSOSS projects recently executed in Dutch governmental organizations. These findings can then be compared with the effects which form the motivation behind the new legislation. In-depth interviews with managers in the field provide the necessary information.

In all likelihood, The Netherlands will directly profit from a switch to open standards and software at the government (Baarsma, 2004) as a result of the lack of license fees. Furthermore, it identifies other advantages, such as local knowledge development and less capital spent abroad. However, that research also suggests that the better part of the government must make use of open standards for the effect to be positive.

(MarketCap, 2007) suggests that OSOSS is very well established in the government. However, most attention is given to it at the operational level. More attention to OSOSS at the strategic IT level of agencies could lead to better use of it. This report was used as a source for the compilation of Plan Heemskerk, which in turn implemented this suggestion.

Importance of Research

Although exact numbers are not available, the Dutch government is a major consumer of IT services and products (Lessen uit ICT-projecten bij de overheid; Deel B, Court of Audit, 2007). It contracts lots of suppliers for its application development, audits, support services and consultancy. By forcing or encouraging the use of OSOSS in its software projects, the market could change dramatically as a result. For instance, many IT-supplying companies have specialized themselves in a few technologies by forming strategic partnerships with certain application developing suppliers, which do not necessarily ship both open and closed alternatives of the same type of application. This may create opportunities for new IT suppliers and form a threat to others. Furthermore, the savings generated from the lack of paid licenses are still credited to the agency (MINEZ, 2007), and they might be used to increase other aspects of IT projects. Lastly, as one of the largest demanding organizations of IT services in The Netherlands, a major change in policy could change the sector far beyond the

numbers indicate due to network externalities. Increased innovation, increased trust and popularity of OSOSS are all to be expected should the majority of governmental IT systems be converted to OSOSS alternatives.

Chapter Summary

A recent policy change directly restricts the kind of information systems the Dutch government will be using in the near future. The policy is intended to increase interoperability, reduce dependency on software vendors and promote a level playing field in the software market. The decision may greatly influence the software market, the government being one of the biggest Dutch consumers of IS. However little is known about the lessons learnt while the early adaptors are making the switch.

2. Related Work

Although OSOSS may not be one of the most popular of research areas, a great deal of work is available. This research includes comparisons of different takes on governmental intervention in the software market, economic discussions about the usefulness of intervention and technical discussions concerning the characteristics of open and closed software products and how they compare.

About Open Standards and Open Source Software

Open standards are standards that are publicly available and has various rights associated with it. One popular definition is given by (Tiemann, 2006): “The standards must be available to anyone, may not contain any secrets, royalties, required associated technologies or license agreements.” An open standard is by definition a part of open source software, but it’s not required to use open source software in order to use open standards. Open standards are about the interoperability of information between systems, not about application implementations. Well-known open standards are PDF and ODF, while Microsoft Word’s DOC is a typical example of a closed file format standard.

Open source software is software of which the source code (the human-readable form of the software) is freely available for everyone to examine, alter, and distribute as they see fit, as long as the original copyright notice is kept intact. This places a lot of power in the hands of the public, since anyone is able to modify and extend the software to his needs without being dependent on the original author. This has an important implication for business models based on open source software: it’s not possible to charge license fees normally seen in proprietary software agreements, since the code, and thus all of the application’s functionality, is freely available to anyone to modify. It’s important to note that not all open source software is created equal, and there are multiple licenses a developer can choose to release his or her work under. The popular GPL license requires all derived work to be released under the GPL as well, preventing proprietary software vendors from incorporating GPL code in their closed applications (this is called a viral license). Another popular license is BSD, which is not nearly as strict and only requires a copyright notice to be placed in the code, acknowledging the original author. Many other licenses are available, providing a wide variety of choices for the open source software vendor (Fitzgerald, 2006).

Popularity of Governmental Intervention

The Netherlands is one of many countries that are implementing policies that favor open source software over proprietary alternatives when choosing software for their own organizations, and it is certainly not one of the first neither the most strict. Countries like France ("France Towards Open e-Government -- Government Agency to Enforce Open Standards and Promote Open Source / Free software," 2001), Germany ("German Government Signs Deal With IBM,"), Brazil and Singapore (Hahn, 2002) are among the early adapters, while numerous are working on pending legislations ("Taiwan to start national plan to push Free Software," 2002), (Hahn, 2002).

Different types of Governmental Policies

As there are multiple parallel initiatives in as many countries, several (proposed) forms of intervention exist. An overview of the different forms of governmental intervention is given by (Hahn, 2002). A discussion of the different forms of intervention is given in (Comino, 2004). Three types of policy seem to be the most popular:

1. Mandate adoption through policies. This is the approach taken in The Netherlands and several other countries.
2. Provide information to uninformed consumers and by that hoping to solve the (alleged) market failure that may be occurring (see next section). This is the least invasive type.
3. Subsidy the adoption of OSOSS by providing direct monetary benefits to agencies switching to open source.

When one of the types has been chosen, there is also the question of what level of strictness or coercion is to be applied. The Netherlands does have a policy that demands OSOSS adoption, but the auditing agency, the NOiV, has no authority to sue or otherwise coerce non-conforming agencies.

The Need for Governmental Intervention

There has been some debate whether governmental agencies should intervene in the software markets by creating legislation that favors open source software over 'closed' alternatives. In most open economies, most markets are generally left alone in order to let the market

economy do its job. In recent decades, many plan economies have been converted to open economies (most notably in former communist Eastern European countries), and support for governmental interventions into markets has decreased in countries that have had open economies for some time. In economics, a market failure is the term used to describe a market which is inefficient, meaning there is an opportunity to increase its added value. If a market failure exists in an industry, it can be a reason for governments to intervene in that market in an attempt to correct the inefficiency.

There has been some discussion about whether such a failure exists in the software markets. A thorough examination of the US software market is discussed in (Evans & Reddy, 2002). This examination suggests that the software industry boomed in the last two decades while its products and services became ever more powerful and capable, which is by no means an indication of market failure. Furthermore, metrics such as firm concentration and changes in the top 10 of firms supported this assessment.

Additionally, (Smith) also argues against government policy favoring open source software, stating that the marketplace has been doing a fine job the last decades and will likely continue to do so in the future. He suggests governmental attention be directed to the support of research and software innovation in general, to be used for creating new products. Also, he mentions the GPL to be a threat to the industry when utilizing government-funded GPL research in commercial applications, because of the 'viral' nature of GPL it is unusable as part of proprietary software, and thus can only be used by few organizations willing to forgo any claim to the exclusive right to modify or distribute their own created code.

(Schmidt & Schnitzer, 2003) have contributed research which has looked for evidence of a market failure in the software industry using a simple economic model. Their conclusions point to a dismissal of government intervention in the software market. Valid points are made about the social impact of a developer who is motivated by profit and aims to implement the needs of *all* consumers, as opposed to the private benefits of an open source developer developing software for his particular needs or those of a number of sophisticated users and IT professionals. Furthermore, governmental intervention in the market is ill-advised and may even have an opposite effect. The reasoning in the probably most realistic model, the one with weak network externalities, a mandatory adoption of OSS could lead to a decrease of the competitive part of the market (the part which is not under the direct influence of the government), which could lead to an increase in price since the competition for a proprietary

software vendor decreases. For all markets, having externalities or not, the research advises against intervention because it's stated that picking out winners or losers is not a government's job. From an economic perspective, these conclusions can be understood very well.

There has also been research that favors governmental intervention. In (Lessig, 2002), the argument is made that there actually exists a market failure in the open source software industry. The main argument is the notion that a government has a greater interest in externalizing benefits of open source software than the private sector. Furthermore, Smith's argument about the GPL is responded to with the notion that proprietary code is only accessible to the owner and therefore is usable for even fewer organizations. Furthermore, not all open source software is written in the GPL.

A more economically based rationale was provided by (Camino & Manenti, 2003). Schmidt's and Schnitzer's earlier model is extended to include the existence of uninformed consumers as part of the total consumer population. These are the consumers who are not aware of open source software and thus will always choose either closed source software or do not spend capital at all. The consumers in the original model are split into an informed and an uninformed part. Then, an analysis is performed to see whether a market failure may exist in this derived model. This analysis shows that subsidizing consumers who opt for open source software can only lead to a loss of welfare, while less intrusive methods such as promotion will always increase it. Mandating adoption is a popular policy too, and this option can also lead to an increase of welfare if the circumstances are right. The most important of which is that the portion of uninformed consumers must be at a certain level. When network externalities are applied to the model the conclusions hold, given that the policy is effectively implemented among most consumers. It is suggested by (Camino & Manenti, 2003) that while closed source vendors have an incentive to advertise their products in order to reach a maximum profit, open source developers are often driven by other motivations such as recognition and fulfilling their own software needs. This could in turn lead to a large number of uninformed consumers.

Open Source vs. Proprietary Software

The debate of the capabilities of both software types has been going on for many years. Numerous sources are available citing success stories of one and failures of the others. To the

writer's knowledge, there are no recent sources of thorough secondary research at this subject. Most available sources take more or less a stance against one side by advocating for the other.

A perspective of the advantages and disadvantages of both types of software is given in (Evans & Reddy, 2002). This paper takes a rather critical stand towards open source, concluding that the only advantages of open source are the ability for the "technical adept" to modify the software to their needs, and the fact that privacy may be theoretically better handled in OSS for there are is no hidden functionality in the code. The main disadvantages of OSS mentioned by this paper are reduced usability as a result of the product being made primarily for a technical audience, the limited opportunities for individuals and companies to earn rewards for their time or investments, and the risk of fragmentation of software (fragmented software products are different, but have common ancestor. An example is the many Linux distributions that are available today. Often, the software written for one variation is incompatible with another). Advantages of closed source software are control over the code and reduced fragmentation which provide power and efficiency for the software vendor.

The same research is also critical of the power of open source software projects to innovate. It notes that the claim that OSOSS software is more innovative as a result of rapid feedback and numerous developers that have access to the source code is often not true in practice. According to this view, a majority of OSOSS applications must be qualified as being imitative, rather than innovative.

As mentioned earlier, there are also publications that favor OSS. (Wheeler, 2007) is a thorough and regularly updated paper on some metrics of OSS, as well as a number of non-quantitative issues. This paper provides a large amount of references citing the success stories of OSS in both server and desktop applications. Although certainly not a very objective source on all counts, the business and government cases concerning performance, costs, scalability and security cannot be ignored. Furthermore, (Boulanger, 2005) discusses reliability and security issues, concluding that although there is no clear winner in practice, open source software has the potential to be more secure and more reliable than its closed source opponents.

Consistency of OSOSS Success

Several sources, whether in favor of open source information systems or not, do acknowledge the success of particular open source projects (Evans & Reddy, 2002), (Lessig, 2002), (Wheeler, 2007). Examples include the operating systems Linux and the BSD flavors, the MySQL database server and the PERL programming language. However, open source software products like games, OpenOffice (a Microsoft Office rival) or Linux (for PCs, not servers) have not been able to make a big impact on the desktops of most consumers according to this research.

Chapter Summary

The literature raises several interesting questions. First, there is the question of whether there is a market failure that would justify an intervention by the government. One possible justification of a failure is the existence of uninformed consumers. We are also interested in the motivations and expectations of the consumer prior to the project. Secondly, there is still a debate going on about the effects of open source software. Next, it will be interesting to know what kind of software projects we are studying in these cases. Open source software has a reputation of being very well applicable in certain application domains, but perform much worse in others. Finally, it is interesting to know what the future of OSOSS is in the organization, and the way the new legislation is handled in practice.

3. Research Methodology

For this research, a number of interviews were held with managers in the Dutch government. The central, state, local and semi-governmental agencies are all relevant sources for this research, since the legislation applies to all of them. However, since lower parts of the organization have received some lenience in the form of a seven month delay (MINEZ, 2007), it may prove to be more difficult to find suitable examples of finished projects in these governmental layers.

Since the OSOSS projects themselves are be the main point of focus, a case study is appropriate. The writer's main point focus is the people at the agencies, and the way they perceive and evaluate these developments in IT projects. The interpretive research philosophy best fits these facts.

The targeted number of interviews to be held for this research project is three to five. Subjects of interest are CIOs, Project Leaders, IT project consultants, all working at a Dutch governmental agency in an IT customer role.

The questionnaire consists of a few but very open-ended questions that structure the interview. Then, information probing was done by tailoring the questions to the case at hand. An interactive communication method is necessary for the in-depth questions, so interviews are held using either telephone or on-site meetings.

Research Questions

Project plan Heemskerk is meant to transform IT in the Dutch government and has a clear set of hypothesized advantages. If the government is to switch to OSOSS, early adapting agencies can help others to prevent making the same mistakes themselves. Also, since this policy is not as strict as law, support from the agencies is a very convenient thing to have when trying to implement such a policy. To the writer's knowledge, there has not been any qualitative research done that focuses on lessons learnt at early adapters and their take on the future of OSOSS in their own organizations.

The central research question then, is:

What are the lessons learnt at early adopters of this new policy?

A number of sub questions have been formulated about whether the government is doing the right thing and the future of IS.

- **What are the issues which arose while executing the OSOSS project(s)?**
- **Are the motivations for this policy change actually taking place?**
- **What is the perspective on the new policy?**
- **What is the future of OSOSS in these agencies?**

Validity

Since all qualitative data analysis revolves around interpretations, validity needs to be addressed. This begins with a mention of the views of the researcher on the subject at hand. In the opinion of the researcher, open source and open standards can greatly benefit the Dutch government. Openness and collaboration should be second nature to administrative agencies, more so than in the commercial sector. However, the researcher is skeptical about the approach of the Ministry of Economic Affairs. A free market should be able to eventually seek out and prefer the highest value available, unless there is some disruptive force at work, which has not been proven by current literature in the opinion of the researcher. Naturally, great effort was made to prevent personal opinions to influence any results.

Furthermore, careful attention must be given to the answers of the interviewees in light of their positions, knowledge, and personal opinions. Open-ended questions encourage the interviewee to explain his or her answers, and probe their own thoughts to find a justification. This is why qualitative data can lead to more validity than quantitative data. However, the interviewees own personal opinions have to be taken into account as well. The researcher is confident about the empirical research data because it was gathered with in-depth questions and information probing, while the stance of the researcher has constantly be critical towards the input he was given. To an economist, financial data such as Total Cost of Ownership can provide solid evidence to support a perspective. However, the amount of such data that was available was unsatisfactory.

Project Selection

Examples of recently completed OSOSS projects are numerous. First, there is a list of OSOSS projects that the NOiV publishes. Also, the Ministry of Foreign Affairs published speeches where recently completed OSOSS projects are mentioned by government officials. Although these sources provide a decent number of projects, one mustn't allow for the government's own publications to dictate the target organizations for research. Web searches and cold-calling government agencies were eventually used to compile a target list, of which a number of projects were used in the research. Sometimes, the researcher was referred to an organization by another agency.

Under the constraint of the limited number of interviewees, the broadness of the type of governmental agency was an issue: the researcher wants to make sure we are not focusing on just one corner of the playing field. Effort was needed to assure a variation of organization sizes, application domains, project sizes and organizational culture. By having a city, a States-Provincial (the provincial administration agency) and an agency of a ministry, different sizes, application domains and types of agencies were interviewed. If there is any consistency of culture among agencies, this selection of agencies on different governmental levels which are also geographically separated was designed to avoid that risk.

Other constraints unfolded themselves while compiling an agency list. Firstly, the public nature of this research made it difficult for certain agencies to participate in these interviews. Time also played a vital part, since the deadlines for this research combined with the summer holidays resulted in the inability for some organizations to participate. Other constraints were availability of public project results and overall willingness to disclose any information, and finally fitness of the OSOSS projects (for example: size, organizational impact).

Data Sources and Collection Methods

A number of communication methods were used to gather the interview data, including on-site visits, phone and e-mail. Sometimes more in-depth questions were handled after the main interview took place. Once, certain questions were held to be answered by a different interviewee. Recording aids were used where applicable.

While the main source of data is open-ended interviews, documents also played a vital role. On occasion, the researcher was referred to public documents with detailed experiences, previous interviews, or previous research.

Data Analysis Techniques

The data was analyzed using lists of key sentences which were extracted from the interviews. Out of these key sentences, categories of sentences were formed and then conclusions were drawn from the data that was available within each of these categories, independently from the research questions or interview questions. In this phase, optional document sources such as government reports and Web pages were consulted that could provide more information. The conclusions were finally used to search for answers that are of value in answering the research questions.

Chapter Summary

Interviews were conducted with Dutch governmental officials working in OSOSS projects. From the existing literature, a list of interview questions was formed which acted as the basis for the interviews. Furthermore, the issue of validity was discussed. Then, the process of project selection was explained, concluding with data collection and analysis techniques.

4. Ministerie van Justitie (Justice Department)

Interviewees:

Patrick Laimbock, Project Leader ICT at the DJI

Erick Borsboom, Project Member ICT at the DJI

Interview date: July 2009

The “Dienst Justitiële Inrichtingen”, or DJI, which translates to Custodial Institutions Service. This agency has jurisdiction over all custodial institutions, including prisons, juvenile detentions centers and detention hospitals in The Netherlands. The DJI has its own IT department, the Shared Service Center ICT, or SSC-I, located in Gouda. The SSC-I has over 700 employees who handle DJI's 19.000 employee-strong ICT needs. Most of the work, including software development, is not outsourced to external suppliers. In recent years, SSC-I has drastically altered the organization of ICT within DJI, for instance removing old frameworks, redesigning internal software, and switching more applications to OSOSS.

Mindset and User Acceptance

The biggest problems in making the switch are directly related to the users and, in a somewhat less extend, lower IT staffing like system administrators. While project leaders and management are well aware of the superiority of open applications, the end-users sometimes have a hard time adapting to their new environment. At the moment, the effort has primarily focused on server infrastructure, development environments and internal tooling. As we are planning to switch desktop PCs to open source, user acceptance will be even more important in the future.

Another issue that DJI has to deal with, is the mindset of some of their IT staffing. System administrators who have been working with and have been educated to work with particular (proprietary) applications may resist a switch to other software. It's worth mentioning that this fact has nothing to do with the nature of the software at hand, but the fact that workers are expected to switch to a completely different technology that requires extra schooling and practically diminishes their certification level they have enjoyed for the past few years.

Expansion of OSOSS Activities

The main reason for switching to OSOSS was the policy of the government. The switch started three years ago after the motion which would later lead to the policy was formulated in the Dutch Senate. The switches lead them to identify other advantages as well. A cost savings is claimed (although hard financial data was not available), as well as increased security. Another big advantage is the increased flexibility to deploy and configure software to the organization's exact needs, something not possible with most closed applications. Furthermore, the lack of vendor lock-in and increased interoperability, especially between OSOSS applications, are all valid reasons to prefer open over closed software.

The interviewees are now agreeing with the policy set out by the government, in fact it should be coerced.

Obstacles Formed by Proprietary Software

The value of open source in enterprise organizations is widely known and acted upon by executive managers and IT staff. This ongoing development has increased the usage of OSOSS in their organization as well. In implementing projects, they experience some problems related to proprietary systems. Since not all of their requirements can be filled with open software, proprietary systems still form part of the infrastructure of DJI. Combining open and closed systems in one organization has caused them some problems: Technical difficulties can hinder the integration and interoperability of systems, especially when open and closed solutions must interact. Also, they are facing a strong lobby from some large proprietary software suppliers that makes the switch to open software more difficult.

Chapter Summary

The DJI has greatly increased its use of OSOSS in the last three years, running only a minimum of proprietary systems on their infrastructure. DJI is convinced of its advantages and wants the whole infrastructure of the agency to be switched to open systems in the future. While there are issues, the interoperability, costs and power are well worth it. Their obstacles are in the form of user acceptance, IT staff and political lobbies.

5. Provincie Groningen (The province of Groningen)

Interviewee:

Jaap Bouma, External Project Leader for the province of Groningen

Interview date: July 2009

Groningen is a rural province in the north of the Netherlands. This organization is responsible for quality of living & working, and focuses on a wide variety of activities such as tourism, culture, security and transport. As an ICT customer, the province is an administrative organization with lots of desktop machines running more or less standardized applications as the bulk of their ICT infrastructure. They have recently completed a pilot project in which they deployed the OSOSS alternative to Microsoft Windows, OpenOffice.org, on fifty of their desktop PCs. Clearly, as end-users are directly affected by this transition, the success of such a project weighs heavily on their experiences.

Political Decision

The main reason for Groningen to commit to a pilot leveraging OSOSS is political. In 2007, a strategic document mentioned the position on OSOSS, stating that “the decision for a solution must be made on business-economic grounds” (Groningen, 2007). This led to another document that further discovered the advantages that the use of OSOSS would have (Groningen, 2007). Finally, the decision to execute a pilot project was made. More evidence is provided during the interview, in which it is stated that the IT staff was not very well informed about the aspects of OSOSS.

Integration Issues

There were some technical difficulties in integrating open and closed systems with each other. Specifically in the field of file formats and maintaining all documents in one format while using two different applications to access these documents.

Future Plans

Groningen is seeing a bright future for OSOSS now that they have successfully completed a pilot. Improved integration as a result of open standards and new vertical solutions specifically for government agencies are on the horizon. Just as with Vught, the idea of a complete switch is not expected by this interviewee. Instead, open source will be more and more business as usual and will have to keep operating in an environment with closed applications. Also just as with Vught, costs had nothing to do with the choice for OSOSS.

Chapter Summary

The province of Groningen has had its first taste of open source on the desktop. Advantages like improved interoperability and open products out-way issues related to conversion. Groningen is likely to increase their OSOSS activities voluntarily in the future, but is skeptical towards the idea that all systems can eventually be made open.

6. Gemeente Vught (The city of Vught)

Interviewee:

Frank Schaap, New Media Consultant at the City of Vught

Interview date: July 2009

The city of Vught started to look at OSOSS alternatives to proprietary software a few years ago. Leveraging the open source content delivery system Drupal, the city replaced all of their Internet and intranet websites on the next major overhaul. Being the first city in The Netherlands to switch to this particular platform, the unique information needs of a city administration caused the city to be ahead of the curve. In the spirit of open source, Mr. Frank Schaap is now demonstrating the solution to other Dutch cities in close co-operation with the software supplier (Madcap, 2009).

OSOSS Affiliation, Knowledge and Resistance

A few years ago, there was a lack of knowledge of OSOSS in the organization of Vught. While IT staff was certainly familiar with the term, there was a lack of experience and in-depth knowledge about its capabilities. Their experience with OSOSS in the form of this project turned out to be very positive. The main advantages over proprietary solutions were the evasion of vendor lock-in and the freedom to compile their own set of requirements given a budget. Since competing products are standard off-the-shelf applications which did not fulfill all requirements, choosing either of these meant giving up some functionality.

Today, after the project, there is practical experience at hand. While the management is considered to be well informed, there is still a fair amount of skepticism and resistance towards OSOSS on lower organizational levels. This partly has to do with user acceptance. Clearly, not all actors are convinced.

Issues of Being an Early Adapter

The city of Vught calls itself an early adapter to the central government's policies. As far as they and the researcher are aware, there is no open product available for their application

domain. So for this project, some of the main advantages of open source, lowering costs through the sharing of application code, were partly diminished. As a result, the project experienced some issues in the areas of cost and time. Still, the budget is the same now as it was using proprietary systems, so there is no cost saving as well.

Vught experienced technical difficulties as well. Switching to open systems after decades of numerous closed source applications were developed, a switch like this is unlikely to proceed without obstacles. Legacy systems are still around in the organization, which are not designed to operate in our connected world. Furthermore, unwillingness of proprietary software vendors to co-operate with the new open systems is mentioned.

No Revolution

While the results of this one project were positive, when asked whether all of the governmental information systems are going to be OSOSS eventually, Vught remains very skeptical. It is hypothesized that not all application domains are evenly suitable to be adapted by OSOSS developers who are partly volunteering their own free time. Vught certainly expects OSOSS to grow in the future, but will eventually mature and find a balance in co-existence with proprietary information systems.

As for the strength of the policy, Vught is a proponent of the current but also even stricter legislation. There is a clear understanding of the problems that the transition will have, but its ultimate goal is found to be more valuable still.

Chapter Summary

Vught experienced issues while executing their project, but the power to tailor the application to their exact needs was considered more valuable. Vught is looking forward to expand their OSOSS activities, while it remains skeptical about the role an open software development community would play in governmental software.

7. Total Data Analysis

Barriers

The main question this research is trying to answer, is what are the lessons learnt at the early adapters of this policy. When asked about their experiences, a number of issues came up.

A categorization was made to be able to better understand the different types of problems that the projects have run into. A simple categorization of the different aspects of software engineering is available in the 4P categorization: People, Product, Process and Project (Hawker, 2002). Although this categorization is adapted from a software engineering model and thus more likely to be applied to the inner workings of a software supplier – which is not the side this research is about - it can be of use in our situation since the categories cover all actors and activities associated with software development from a client's perspective too, with the exception of Process which is a category specifically used for supplier-side methods such as architecture, programming style, modeling techniques, etc.

People

One thing that is clear from the data, is a lack from users to accept a (new) solution. Both DJI and Vught have encountered situations in which the users found it difficult to get used to the new environment and do the same tasks as they did before. This has to do with general desktop applications, whereas servers are mostly operated by IT staffing and of which its operations are less visible to the user.

Furthermore, the same two projects have had troubles with awareness of open source. This is found mainly at the organization's management level where OSOSS is not always treated as a viable alternative to closed software.

Finally, DJI has mentioned some problems in the political category. This has nothing to do with public policy though. In this context the word is used to express lobbies and bogus public tenders which clearly specify not the functions of an application but its name, dismissing competing systems beforehand. By developing most applications in-house and strictly controlling all acquired IT products and services, DJI has been able to control this problem but only due to its large IT department.

Project

Although there were problems with the execution of the projects, there was no mention of them having anything to do with the nature of the software being OSOSS.

Product

Most OSOSS applications can be directly mapped to closed competitors. While some open software does look and feel like their closed counterparts, almost none of them are the same in the sense of functionality and design. An interesting fact is that all of the interviewees have had problems with inter-operating with closed source software. These problems are found using desktop software like office suites, but also while trying to make legacy systems interconnect with OSOSS applications.

Reduced into a simple table, the lessons learnt of the different projects are summarized and categorized in Table 1. Although issues in the Project category were mentioned, there were no issues in the Project category specifically related to the application being OSOSS. There are no lessons learnt executing this project that wouldn't be expected to find in proprietary implementations.

Two out of three agencies have had problems with user acceptance, which is not illogical seeing as they are switching end-user applications with their project(s). On the other hand, the same two agencies mentioned a lack of awareness of OSOSS alternatives by decision makers, and that may be regarded as evidence that there is a lack of information in some agencies.

In the Product category there are clearly obstacles to be found, however they have to do with connecting open to closed source applications. When connecting two systems, the chances of a successful integration are best when both systems are open to integration. This is not the same as requiring the system to be OSOSS-compliant, it has to do with open standards.

	DJI	Groningen	Vught
People			
Difficulty with users acceptance	Yes	No	Yes
Political difficulties	Somewhat	No	No
Difficulty with awareness of OSOSS	Yes	No	Yes
Project			
Difficulty with project execution	No	No	No
Product			
Difficulty with general capabilities of OSOSS software	No	No	No
Difficulty in operating in with non-OSOSS software	Yes	Yes	Yes

Table 1: Experienced difficulties in OSOSS projects

Policy Perspective

To answer the question of what the interviewees' perspective on the policy is, their motivation to start using OSOSS in their projects was asked first. This data is summarized in Table 2.

	DJI	Groningen	Vught
Voluntarily	X		X
Non-voluntarily			

Table 2: Motivation to switch to OSOSS

Note: Groningen has clear data on its motivation, but what is clear is that there was a political decision which lead to the formation of some reports which in turn lead to the pilot which is being researched.

Although the motivation of Groningen remains unclear, the two other organizations voluntarily switched to open source foregoing the need for explaining their choice.

As shown earlier, there are practical examples of other countries having either weaker or stronger policies, with The Netherlands in the middle. Data on whether the policies should be weaker, stronger or kept the same is summarized in Table 3.

	DJI	Groningen	Vught
Should be weaker			
Should be kept the same			
Should be stronger	X		X

Table 3: Thoughts on future policy strength

Note: Groningen has no unified position on its preference towards policy strength.

As both the interviewees of this research with a clear answer to this question are early adapters, a preference for OSOSS and thus a stronger policy is to be expected. However, one mustn't ignore the many obstacles that have formed along the way. Despite of these obstacles, there is some evidence that the organizations themselves are willing to deal with these problems in order to be able to use OSOSS in their information systems.

Future Plans

Data was investigated to find out the organization's future plans for open source and open standards. They all indicate to have an increasing interest in OSOSS products. This data is summarized in Table 4.

	DJI	Groningen	Vught
Intends to increase OSOSS in organization	X	X	X
Intends to keep the level of OSOSS in organization the same			
Intends to decrease OSOSS in organization			

Table 4: Future of OSOSS in own organization

While not agreeing on the extent of the abilities of community-created software and the speed of its popularization, an increase in its use is expected across the board. Would this have been standalone data, the argument that this is simply the result of the policy could be made. However, in light of the voluntary nature of the switch which was mentioned earlier in this chapter, the researcher concludes that these organizations have a positive attitude towards OSOSS.

8. Conclusions

On the question what are the lessons learnt while executing OSOSS project at governmental agencies in the dawn of this new policy, we must look at the difficulties that have been playing a role while implementing it. These observations have been stripped of their not so interesting problems of which the interviewees have stated that they have nothing to do with the nature of the software being either open or closed.

What are the issues which arose while executing the OSOSS project(s)?

In the Product category, one can conclude that there have been problems with integrating open and closed applications. Making systems talk to each other can greatly benefit the effectiveness of information systems. These organizations have underestimated the difficulties of non-OSOSS to OSOSS integration.

There have also been some problems related to not the Product itself but the People in the organizations in the form of awareness of OSOSS. While the agencies sometime face uninformed decision makers which in turn leads to resistance to change, the eventual goal of having a more open government was found to be more important than the struggle it would take to reach that goal. The suggested lack of information in (Camino & Manenti, 2003) seems to be happening at least to some extent. Agencies were able to increase the effectiveness of there IS spending by being informed about their options.

Finally, there is evidence to suggest that user acceptance is lacking in some of the projects. This was not a topic in the literature review, and thus cannot be related to previous research. However, it can be concluded that it is important for agencies to consider the effect a change will have on user's experience and productivity, and that there have been problems in this area while making this switch.

Are the motivations for this policy change actually taking place?

“The Netherlands in Open Connection” is a plan of the Dutch government to increase the use of open standards and open source software in its own agencies. The documented expected effects are the following (MinEZ, 2007):

1. Increasing interoperability between and with the different building blocks and forms of service provision of e-Government by accelerating the use of open standards
2. Reduction in dependence on suppliers in the use of ICT through faster introduction of open standards and open source software
3. Promotion of a level playing field in the software market and promotion of innovation and the economy by forceful stimulation of the use of open source software and by giving preference in contracts to open source software if equally suitable

When one asks the question whether these effects are yet seen in practical implementations, there is some evidence that suggests effects one and two taking place as increased interoperability is mentioned by two out of three interviewees, among other advantages. The third effect is certainly interesting but outside the scope of this research and also would probably require a more mature implementation of this policy.

On the future of open applications in these agencies, they all plan to further increase their use in favour of closed systems, despite the obstacles. However, this is to be expected at least to some extent, since the policies are gently pushing them in this direction. However, combined with the thoughts on the type of policy that should be enforced by the government, one can easily conclude that these organizations are convinced OSOSS has more to offer than it is now.

What is the perspective on the new policy?

From the data, it can be concluded that most of the interviewed agencies are advocating for a stronger version of the policy that is in effect. This leads the researcher to conclude that there is little resistance towards this policy. Furthermore, it indicates that their initial switch to OSOSS was voluntary, not coerced. However, this conclusion is slightly weakened by the fact that the agencies were fully aware of the upcoming policy and may just have switched early in order to gain experience.

What is the future of OSOSS in these agencies?

From the data, it is easily concluded that all interviewed agencies are expecting the use of OSOSS to increase in their respective organizations. Whether this is voluntarily or a logical effect from the policy can be deduced from other data that indicates that most of these agencies have voluntarily switched to OSOSS before the “commit or explain” policy was

implemented, and also indicates these agencies would like to see a stronger policy instead of the current one. It is concluded that this increase is voluntarily. This leads the researcher to conclude that the benefits as seen by the agencies are greater than the barriers they have experienced.

Lessons Learnt

This thesis marks the first individually completed qualitative research of this researcher, and the first Bachelor level thesis. As for learnt lessons, a great start was made doing the research area selection and literature review. The research questions were formed relatively late, which led some of the literature review to be rendered useless which was a waste of time. Furthermore, the data gathering in the form of conducting interviews was a process which started some weeks after schedule, leading to uncomfortable deadlines and stress. However, executing the data analysis and concluding chapters proved to be doable within schedule. I would like to thank Mr. Guah for his consults and support while doing this research.

Thesis Conclusions

The central question to answer is:

What are the lessons learnt at early adopters of this new policy?

There are some types of barriers in implementing OSOSS projects at government agencies that are seen in all or most of the agencies interviewed for this thesis. These common barriers are user acceptance, awareness and integrating OSOSS with non-OSOSS applications. All agencies indicate there are problems related to the information available on OSOSS products. This is an indication that there is indeed inefficiency in the software market in the form of misinformed consumers, however this cannot be concluded from this research. Furthermore, some of the motivations that the government used to justify this policy are actually seen in practice in some of these cases. Then, it is concluded that these agencies are moderately pleased by their switch to OSOSS, and they do not feel coerced by the policy but rather encouraged. All of them are advocating a stronger policy than the one which is in effect now, and this leads the researcher to conclude there is not enough resistance for these agencies to slow down the march that OSOSS is taking in the Dutch government. Finally, it is clear that they expect the level of OSOSS activities in their organizations will increase in the future.

Suggestions for Future Research

The interviews were conducted in Q3 of 2009. The research field is very dynamic and changing rapidly. It is likely that there is more data and thus a better understanding of OSOSS in the government in the near future. Next to new projects, the proposed network externalities can play a bigger role in the next couple of years.

As far as obstacles and learned lessons, they happen throughout the ICT sector. It would be interesting to compare both closed and open projects side-by-side in order to assert their relative performance.

As for the misinformed market, it is indicated this may be the case. More research is needed in order to determine whether there is an inefficient software market in The Netherlands.

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Appendix A: The Interview Questions

As discussed, the interviews were semi-structured as not all questions are known upfront. However, certain main questions are used to guide the interviews, which are listed below. Whenever needed, the questions are to be reformulated or explained to get the data. Also, the researcher aims to probe for more data with follow up questions as the interview progresses.

1. Please state your name, organization, function, project function and a description of the project. If you have a publicly accessible description of the project's details, you may refer to that.
2. Did you consider your organization to be informed about OSOSS prior to the start of the OSOSS project(s)? Do you consider your organization to be an informed consumer now?
3. Upfront, what were your motivations for choosing OSOSS over proprietary software? Some specifics that are of interest are expected quality, interoperability, code ownership, security and privacy, functionality, vendor lock-in, legacy systems.
4. When implementing your project(s), what were the obstacles you encountered? Please also provide the impact, importance, resolution and priority details of these obstacles. Which do you consider lessons that you have learnt?
5. What open source project(s) have you done recently, and what your findings? Topics of interest include Total Cost of Ownership (TCO), product quality and project quality.
6. From your organization's perspective, has the government's intervention been beneficial? Did you receive and/or require it? What kind of policy do you think leads to the best outcome?
7. What are the plans for IS in your organization, specifically OSOSS? Topics of interest include plans to contract or expand the use of OSOSS, opportunities for increased interoperability, absence of OSOSS alternatives, legacy systems, changes in software suppliers, expected results.

While the interviewees' answers are the primary source of information, all of them were asked for documents that can provide more information as well.