

BRINGING OPEN SOURCE SOFTWARE TO THE
DESKTOP: AN IN-DEPTH STUDY OF THE
IMPLEMENTATION AND USE OF STAROFFICE

Patrick Joseph Wall

Dr. Séamas Kelly

Introduction

Open Source software (OSS) is coming to the attention of individuals, organisations, and governments' worldwide, and is increasingly being adopted by firms for specific business purposes (Overby, Bharadwaj et al. 2004). Organisations such as Beaumont Hospital Dublin have claimed cost savings in excess of €8m over 5 years as a result of migrating to OSS desktop systems (Fitzgerald and Kenny 2003). However, the uptake of end-user desktop OSS applications to date has been modest, and Microsoft products remain the de-facto standard on the corporate desktop (BusinessWeek Online, January 2005¹). This brings into sharp focus the most challenging question faced by the Open Source community today. If organisations value low acquisition costs, low total cost of ownership of software, potentially plentiful support, free access to source code, and the wish to avoid proprietary software vendor lock-in, why have more organisations not adopted OSS?

There is currently much interest amongst researchers in the area of OSS. However there is currently little research on the adoption and use of OSS at the desktop level. This paper attempts to contribute to the existing research by reporting on an in-depth, interpretive, processual study of an attempt by a large Irish Trade Union (referred to in this paper as "Irish Union") to replace Microsoft Office with an Open Source alternative, StarOffice. The migration to StarOffice was problematic and less successful than hoped, and it became clear during the research that there existed within Irish Union almost universal opposition to StarOffice. This raises an interesting question. If cost savings of the magnitude of those in Beaumont Hospital can be achieved by migrating to OSS, and if the claims of the Open Source community that OSS is more stable, secure and customisable than its proprietary counterpart are to be believed, why did Irish Union reject StarOffice in favour of a return to Microsoft Office? This paper describes how StarOffice was implemented and used in Irish Union, and examines why the initiative ultimately failed.

The main objective of this paper is to attempt an understanding of OSS adoption on the desktop. We attempt to make sense of why the StarOffice initiative within Irish Union failed, and examine the difficulties associated with OSS implementation on a broader scale. We also explore the social and political dynamics of Irish Union's migration to StarOffice in an effort to discover if different social and political stances taken by relevant stakeholders can ultimately affect the success or failure of any OSS initiative. This focus on the cultural, social and political dynamics

¹ <http://images.businessweek.com/mz/05/05/linux/linux15.htm>

at work in Irish Union affords an opportunity to look at OSS adoption in a different light. This is a unique approach as few studies have thus far examined the process of adoption of end-user desktop OSS applications at an organisational level. An in-depth analysis of these aspects through an interpretive lens will lead to a more comprehensive understanding of why the StarOffice initiative ultimately failed in Irish Union. We endeavor to understand the actions and motivations of the various stakeholders within Irish Union, and the ways in which arguments both for and against StarOffice were framed and advanced. We also attempt to understand how these attitudes were sustained or changed over time. Our objective is to attempt an explanation of these effects with a view to understanding the issues involved, and to theorise why the difficulties occurred. We conclude that various social and political dynamics and cultural interpretations of technology can have a powerful effect on the adoption and use of desktop OSS, and may have ultimately decided the faith of StarOffice in Irish Union. We also suggest that these effects can be mitigated to some extent if the adoption process is managed appropriately.

Open Source Software and StarOffice

OSS is generally recognised as software that is distributed under a license that complies with the Open Source Definition². OSS is required to have its source code freely available to everyone and generally licenses its users to access, modify and distribute the software's source code freely, provided that they do not redistribute the derived work under a more restrictive license, i.e. as long as the modified version is distributed under the same Open Source license.

StarOffice began life in 1994 as a commercial program developed by the German company StarDivision. StarDivision and the rights to StarOffice were acquired by Sun Microsystems, who donated the source code of StarOffice to the Open Source community under the General Public License (GPL)³. Sun also offered StarOffice 5.2 as a free download for personal use at this time. The resultant Open Source codebase is developed as OpenOffice.org and is contributed to by both Sun programmers and the Open Source community. StarOffice uses the same code base as OpenOffice.org, with a few proprietary additions. Since 2000 the proprietary StarOffice has co-existed with the free, Open Source OpenOffice.org. In May 2002 Sun announced its plan to discontinue free downloads of StarOffice 5.2. StarOffice 8 was released in September 2005 costing approximately €70.

² http://www.opensource.org/docs/definition_plain.php

³ <http://www.gnu.org/copyleft/gpl.html>

Literature Review

Introduction

There currently exists a lack of research into the organisational adoption of StarOffice and other OSS. Relatively few studies have been undertaken which look at the consequences and outcomes of adoption of OSS in organisations. The rarity of such studies can be gauged by Fitzgerald and Kenny's (2003) statement in their study of an OSS implementation in Beaumont Hospital, *"To the best of our knowledge, this is the first study of a large-scale implementation of an overall information systems infrastructure using Open Source software. While a great deal of research has now been conducted on the OSS phenomenon across a range of disciplines, the vast bulk of this research has focused inwards on the OSS phenomenon itself, for example identifying the characteristics of OSS projects, the motivations of developers etc. However, there has been little focus outward on the consumers of OSS, and the manner in which OSS and proprietary software can be co-deployed in an overall IS infrastructure."* Overby et al (2004) also claim *"there are currently no empirical studies to investigate firm level OSS adoption."*

Most of the current research available in the area of OSS has tended to focus on one of three categories as suggested by Von Krogh and Von Hippel (2003) as follows:

- 1) Motivations of programmers to contribute to Open Source projects,
- 2) The process by which OSS is developed, and
- 3) Market dynamics of OSS.

Recently, a fourth category of research has begun to look at the reasons organisations either adopt or reject OSS. Goode (2005) found that a number of factors were relevant when firms made the decision not to adopt OSS. The study found that managers rejected open source software because they could not see that it had any relevance to their operations, perceived a lack of reliable ongoing technical support, and also appeared to see substantial learning costs or had adopted other software that they believed to be incompatible with open source software. Dedrick et al (Dedrick and West 2004) conducted a study into the factors influencing the makeup of an OSS adoption policy. They found that while the relative advantage of Linux was clearly defined in terms of cost, the willingness and ability of organisations to adopt this lower cost technology depended on a range of factors consistent with some of the key predictions of diffusion of innovation theory. These include compatibility with current technologies and skills, organisational resources and tasks, and the availability of external technological resources. Kwan and West (2005) suggest a framework that considers the tradeoffs between features, risk, and cost in IT adoption, and show how it can be applied to explain the adoption of OSS.

One of the main studies in the area of organisational adoption of OSS was carried out by Fitzgerald and Kenny (2003) in Beaumont Hospital Dublin, a large Irish public sector hospital that embarked on the implementation of StarOffice and various other OSS in 2000. Fitzgerald and Kenny's (2003) study is very relevant when compared to what happened in Irish Union. Although the Beaumont IT manager was a key champion who ensured the initiative did not lose momentum, the move to OSS in Beaumont was not welcomed by everyone. Financial savings were not universally appreciated, and there was a sense in which some stakeholders within the hospital felt that the cheap cost of OSS was undervaluing their work as their counterparts in other hospitals were using proprietary systems costing several million euro. There was also significant resistance from administrative staff who feared being deskilled though not having experience of popular commercial software packages. Despite this however, the overall conclusion was that the OSS experience in Beaumont was "*very satisfactory*" (Fitzgerald and Kenny 2003).

The existing research is interesting and useful but, with the exception of the Beaumont study, gives no indication of what factors contribute to the success or failure of OSS in an organisation once the adoption decision has been made. We believe this lack of academic research reflects a limited capacity within the OSS movement to document, compare, and draw lessons from these adoption processes. Because of this we now examine research relating to the issues associated with non-OSS organisational IS adoption in general. This research is well established in the IS field, and we attempt to relate some of the more established concepts and principles to the organisational adoption of OSS.

Diffusion of Innovations and Barriers to Adoption

Rogers (1995) describes an innovation as an idea that is perceived to be new to a particular person or group of people. Rogers (1995) defines diffusion as "*the process by which an innovation is communicated through certain channels over time among the members of a social system*".

Rogers suggests that ideas are passed through conversation and social interaction among trusted peers. Certain individuals occupy positions of opinion leaders in social systems, whose views influence others. That does not always mean they are in an organisational hierarchical position. Each professional or social group may have their own opinion leaders. Tatnall and Gilding's (1999) view of the diffusion model posits that an innovation is propelled outward from a central source, for example an Open Source advocate. This enables the innovation to move through the organisation without the need for further explanation, and makes it unstoppable except by the most reactionary interest groups within that organisation. Once the innovation has been pointed

out to people, then it should just be a matter of time before everyone, except the most immovable, are converted. The key to innovation is the creation of powerful enough heterogeneous networks of actors to ensure that the idea or technology is adopted. This calls for strategies aimed at the enrolment of others, and perhaps even the blocking off of other possibilities. When an innovation fails to be taken up this may be considered to reflect on the inability of those involved to construct the necessary network of alliances amongst the other actors.

There is extensive research on barriers to the adoption of technologies, including work by Damanpour (1991) and Beattie and Gordon (1998). While perceived barriers were found to have a positive relationship to the adoption decision, perceived benefits did not. The finding supports Attwell's (1992) view that the adoption of complex technology is a process of reducing knowledge barriers. One primary obstacle to lowering these barriers is the fact that the technological innovation may not be compatible with the vested interests of the existing employees. The skill-set of the existing employees may not match what is necessary to operate and utilise the new technology to its full potential.

Barriers specific to the adoption of OSS may also exist. The fact that OSS is available free can act as a barrier. Zachary's 2003 research (referenced by Fitzgerald and Kenny (2003) in their study of Beaumont Hospital) of a failed attempt to initiate an OSS community in Ghana found that the indigenous software developers there could not accept that an initiative which was based on free software could have any value. They aspired to a software industry based on the same profit and market motives as in developed countries. Fitzgerald and Kenny (2003) suggest that staff Beaumont believed "*the low cost of OSS undervalues their work to some degree, and there is a perception that the OSS systems must be flawed in some way in comparison to proprietary systems*".

Technological Frames

As shown in the previous section, some theorists use diffusion models to explain how we integrate new technologies into the routine activities of our daily lives. Bijker (1989) builds on this to develop his theory of the social construction of technology. Bijker's studies show that an artefact assumes a stabilised form only when groups of users reach a consensus about that form, or when one group's needs or preferences dominate all others. Bijker (1989) claims that social processes assist in constructing technological artefacts in many ways, and new technological artefacts have high levels of interpretive flexibility. Whether artefacts "work" or "don't work"

depends entirely on who uses them and how they use them. Relevant social groups interpret and redefine the artefact as they adapt it to their purposes and apply their understandings of what it is. Each group understands the artefact based on what they already know about related technologies, i.e. within their own preexisting “technological frame” of reference. If an individual belongs to more than one relevant social group, that person may see the artefact in new and innovative ways by integrating two or more technological frames.

Davidson and Pai (2004) argue that “*Technological frames of reference provide a flexible approach to explore interpretive issues in information technology design, implementation, and use*”. Because individuals act towards technology on the basis of their understanding of it, a person’s technological frame of reference often needs to be changed to accommodate a new technology. Where people do not appreciate the premises and purposes of a technology they may use it in less effective ways. Technological frames of reference may therefore provide a useful lens for IS researchers to understand how people might react to new technologies and software. Orlikowski and Iacono (2001) suggest that the functionality of information systems are negotiated locally under conditions that allow for considerable interpretive flexibility. Their view of interpretive flexibility recognises that it is not possible to explain technology solely by considering an artefact’s intrinsic properties. The researcher must try to include the meanings attributed to an artefact by the relevant social groups within the organisation. The focus must be on people, how they interact with a technology in their ongoing practices, and how they enact structures which shape their emergent and situated use of that technology.

Orlikowski and Gash (1994) have used technological frames to understand organisational information systems. They posit technological frames to be frames of reference for structuring experience about the nature and use of technology, or technical artefacts such as computer systems and software. Specifically, Orlikowski and Gash use the term “technological frame” to identify that subset of members’ organisational frames that concern the assumptions, expectations, and knowledge they use to understand technology in an organisation. Such frames include not only the technology itself but also the conditions and applications of the technology as well as the consequences of its use. Orlikowski and Gash (1994) claim that “*to interact with technology, people have to make sense of it, and in this sense-making process, they develop particular assumptions, expectations, and knowledge of the technology, which then serve to shape subsequent actions toward it. While these interpretations become taken-for-granted and are*

rarely brought to the surface and reflected on, they nevertheless remain significant in influencing how actors in organisations think about and act toward technology."

Orlikowski and Gash (1994) focus their study on monitoring changes in the technological frames of organisational IT users, and introduce an understanding of how the technological intervention, in this case IT, changes pre-existing technological frames. According to Orlikowski and Gash (1994), the interpretive flexibility of technology allows it to be open to different interpretations by multiple groups who construct different technological frames or assumptions, meanings and cognitions used to understand the nature and role of technology. Since technological frames strongly influence the views held about the function, value and role and hence the choices made regarding technology, IT enabled change can therefore be understood in terms of shifts in technological frames over time. Problems in developing and implementing technology occur when incongruent frames exist. Incongruent frames can exist for a number of reasons including lack of communication about project goals or objectives or technologies that shift practices of work (Orlikowski and Gash 1994). Routines are thus thought to provide a source of resistance to organisational change.

However, Davidson and Pai (2004) warn of the difficulties of using technological frames. They suggest that *"technological frames of reference analysis requires eliciting deeply held assumptions, expectations, and knowledge and assessing incongruence and inconsistencies in frames thus described. These methods are well suited to the interpretive assumptions underlying the research framework, but are labour intensive, difficult to specify, and hard to replicate"*.

Organisational Culture

It is through the medium of culture that we are able to make sense of our world. Organisational culture gives us a basic theoretical foothold to understand our experiences of working life.

Brown (1998) summarises this point succinctly, *"Our basic assumptions give us guidelines for understanding why individuals and groups behave the way they do, and our beliefs and values allow us to give explanations for actions and events which would otherwise perplex us"*.

Culture can be molded by many factors, such as the history of the organisation, the influence of a dominant individual, the education of the workers, and the market in which the organisation operates. This also applies to information systems. Information systems are not simply static, technical artefacts, but are influenced by the social and political environment into which they are

placed. New purposes and roles for the technology emerge, are debated, and may replace the original purposes because they are perceived as more technically suitable or appropriate to the organisation in which they are being used. The dynamic nature of the IT artefact depends on its ongoing engagement in social and political practices. Hence we must understand how information technology needs to change to “*accommodate a diversity of evolving interests, values, assumptions, cultures and other new technologies*” (Orlikowski and Iacono 2001). This also requires an understanding of how and why IT artefact’s have become “*stabilised in certain ways at certain times and places*” (Orlikowski and Iacono 2001) depending on the social and political view associated with different social contexts which exist within the organisation. Wilson and Howcroft (2000) also posit that technologies are “*socially shaped*”. They stress the negotiability of technology, highlighting the scope for particular groups to shape technologies to their ends, and the possibility of different kinds of “*technological*” and “*social*” outcomes.

Robey (1995) regards applications of information technology as artefact’s that reflect social values and assumptions. From this cultural perspective, even the same technologies can acquire diverse meanings depending upon the particular cultural setting in which they are implemented. As a consequence, the social meaning of the technology, and not the technology itself, is where we should focus. Robey (1995) thus sees organisational change as a process in which transformative actions must overcome persistent structures. New information systems may be met with political, social and cultural opposition, as well as existing organisational memory.

Methodology

Research Methods and Data Collection

This paper attempts to examine the implementation and operation of StarOffice in Irish Union through an interpretive lens. We adopt an in-depth, interpretive, processual case study approach in this paper. The research concentrates on the collection and analysis of qualitative data.

Because of the fact that research into OSS adoption of the type undertaken by Irish Union is relatively new, it is our belief that research of an exploratory nature is required in order to explain and describe what actually happened. During the research phase of the paper, we attempted to collect data from as many sources as possible. Most of the data collected was qualitative as opposed to quantitative, but during the course of the research some quantitative data was accumulated. Most of the primary data was collected from unstructured interviews which were

carried out over a seven month period between March 2005 and September 2005. Other supplementary interviews were conducted between February and July 2006. Relevant data was also collected from a variety of other sources.

Research Design

Interpretivists believe that only through the subjective interpretation of, and intervention in, the world can that reality be fully understood. The study of phenomena in their natural environment is key to the interpretivist philosophy, together with the acknowledgement that scientists cannot avoid affecting the phenomena they study. Robey (1995) suggests that interpretive inquiry posits that objective reality can only be studied through the subjective meanings ascribed to it by human actors.

Interpretive research starts out with the assumption that access to reality, either given or socially constructed, is only through social constructions such as language, consciousness and shared meanings. Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them and interpretive methods of research in information systems are *"aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context"* (Walsham 1993).

However, an interpretative approach also has its weaknesses. Such an approach draws heavily on participants' experiences and interpretations, and hence is very dependant on these interpretations. To the extent that individuals are confused, unaware, or deceptive, these findings may be misleading (Orlikowski and Baroudi 1991). Sustained engagement with a research site can overcome this shortcoming. An interpretative approach focuses on uncovering existing political and cultural outlooks that preexist or are emergent within the organisation. By analysing the social context of any organisation, the meanings assigned to various technologies by different stakeholder groups can be discovered. An interpretative approach to research will also emphasize the importance of the subjective experience of individuals, with a focus on qualitative analysis.

Research Presentation

Introduction

Irish Union is one of the largest trade unions in Ireland representing over 200,000 workers from virtually every category of employment across all sectors of the Irish economy. At the beginning

of 2000, Irish Union was using a variety of different versions of Microsoft Windows and Microsoft Office. This situation arose as a result of the piecemeal upgrading of IT systems as finance became available, and the differing requirements of various departments and branches within Irish Union. This mix of software was causing compatibility problems, and it was decided to upgrade all computers to Windows 98 and to adopt StarOffice version 5.2 as the Office productivity application.

The Vice President and IT Manager in Irish Union were both primarily responsible for making the decision to migrate from Microsoft Office to StarOffice. For Irish Union, IT plays an important supporting role in strategic areas, but the IT itself is not a source of strategic advantage. StarOffice offers no important or strategic performance advantages over Microsoft Office. This is not surprising, as StarOffice represents only a slight variation in a mature technology. Instead, the two most important factors in the StarOffice adoption in Irish Union were the cost savings the software would bring (including reduction in license costs, operating costs, upgrade costs, and hardware costs), and the beliefs and ideologies of the main StarOffice advocates.

Irish Union staff were told about this decision immediately, and a three day StarOffice training programme for all staff was put in place. Both the Vice President and IT Manager explained that because StarOffice was available as free download, staff could now legally take home and use copies of StarOffice for their home computers. This was something they could not do with Microsoft Office. It was made clear to staff that the decision to migrate to StarOffice was made for a number of reasons, and the overall IT budget was not going to be reduced. Money not spent on proprietary software would be spent in other areas, e.g. improving hardware and network infrastructure. The initial idea was to have staff return from their training programme to see StarOffice newly installed on their computers. The Vice President requested that all Microsoft Office software be removed from Irish Union computers by the time staff returned from the StarOffice training sessions. The IT Manager disagreed with this approach. Her belief was that both Microsoft Office and StarOffice should be available on all computers, and staff would gradually migrate to StarOffice by themselves given time. Irrespective of the differing views of the two main advocates, the reality of the situation dictated that it was not going to be possible to remove every version of Microsoft Office from Irish Union computers. An example of why some Irish Union staff needed access to both software packages existed in “Branch A” where a database written specifically in Microsoft Access 97 is used on a daily basis.

The research would suggest that the current situation in Irish Union is that anyone who has a version of Microsoft Office or Microsoft Works on their computer is using that in preference to StarOffice. The Vice President claimed, *“After we removed Microsoft Office from some of the computers, those users could not even remember Microsoft Word after about two weeks. But anybody who still had Microsoft Word or Microsoft Works on their machines has never fully transferred to StarOffice”*. He also stated that Irish Union staff who have been employed since the migration to StarOffice have had few problems adapting to the StarOffice software.

Technical Issues with StarOffice

In theory, there are high levels of interoperability between Microsoft Office and StarOffice. Documents in StarOffice Writer are saved in a special format, signified by the file extension .swx, and while StarOffice Writer can open reasonably complicated Word .doc documents, Word cannot automatically open .swx files. If you attempt to open such files, the result will be a series of gibberish characters on the screen. This led to problems for Irish Union staff, and these problems were exacerbated by the different look and feel of the StarOffice 5.2 user interface.

Almost every Irish Union staff member interviewed during the research encountered difficulties when emailing StarOffice attachments. When emailing to persons outside Irish Union who use Microsoft Office, StarOffice attachments have to be saved within StarOffice Writer as a Microsoft Word document. One staff member in “Branch B” was having particular difficulties. She explained, *“Most of the emails sent out with StarOffice attachments are sent back to me... my members just can’t open them because a lot of them are old and have very little knowledge of computers”*. I asked her if she had ever tried saving some of the StarOffice files as Microsoft Word documents and emailing those to the “Branch B” members. Her response was *“I didn’t know you could do that”*, even though this person had completed, in her own words, at least “some” of the Irish Union StarOffice training course. When I asked her if she would be more willing to use StarOffice now that she knew this was possible she replied, *“I would still use Microsoft Word if I had the choice... when I used Word there were never any problems”*.

A staff member in “Branch C” was also experiencing problems emailing StarOffice attachments. She explained, *“I have to save everything as a Microsoft Word document in StarOffice before I email, because all the reps use Microsoft Office. This only takes a second, but I keep forgetting to do it, and it’s that little extra hassle that makes the difference. This also means that I often end up with two copies of the same letter; the Word version and the StarOffice version, and this is*

very confusing if I have to edit or change one of the documents. This also clogs up the computer, and everything gets very slow”.

Both the Vice President and IT Manager stressed at the time of the StarOffice migration if there was something that staff could not do in StarOffice, or if StarOffice lacked some functionality that was needed, then Microsoft Office would be immediately given back. The IT Manager stressed that no staff member has ever been able to identify any such lack of functionality in StarOffice. Both the Vice President and IT Manager individually expressed their belief that 100% of the functionality required by Irish Union staff members is available in StarOffice, and that there is an acceptable level of interoperability between StarOffice and Microsoft Office.

The question as to why Irish Union didn't take the opportunity to upgrade to a more recent version of StarOffice arose a number of times during the research. All staff members interviewed were using StarOffice 5.2, which was first released in 2000. The IT Manager was fully aware of the improvements in functionality and interoperability in successive releases of StarOffice, but she explained that the decision was made to stay with StarOffice 5.2 as all the Irish Union training had been geared to using that version of the software. She stated, *“We were afraid that changing to a significantly different version of the software would negate the training”*.

Attitudes Towards StarOffice - The General Officers and the Finance Section

The Irish Union General Officers include the President, Vice President, and General Secretary. The General Officers and their staff, with the exception of the Vice President, decided not to migrate to StarOffice, opting instead to keep using Microsoft Office. The reason for this according to the Vice President, was because their administration staff, *“didn't want to use StarOffice, and their bosses, the General Officers, didn't care what they were using”*. The administrative staff argued that because they dealt mainly with government departments who were using Microsoft Office, it would not be possible to email StarOffice attachments because the recipients of the emails would be unable to open them. The Vice President expressed the belief that no matter how many times he and the IT Manager explained that this wasn't an issue and interoperability concerns in relation to StarOffice could be easily addressed, the attitude of the administrative staff could not be altered. This attitude was accepted and supported by the General Officers because they didn't fully understand the software issues involved in the debate.

The Finance section also refused to migrate to StarOffice. Almost all of the computers in the Finance section have both StarOffice and Microsoft Office installed, but only one of the staff members interviewed actually uses StarOffice on a regular basis. The Finance section staff gave a number of reasons for not wanting to migrate to StarOffice. They claimed that both the wages software and accounting software needed Microsoft Office to operate effectively. The wages software is Quantum Payroll, and the accounting package is Exchequer 2002. Exchequer 2002 works by importing and exporting files to Microsoft Excel. One Finance staff member expressed her belief that the Exchequer system was set up to work with Excel, and no one has ever tried to change this or even experiment with using StarOffice and Exchequer. As part of our research, we spoke directly to a technical representative of Exchequer Software, and asked him if Exchequer 2002 needs Microsoft Office to operate effectively. He confirmed that the Exchequer software can be used effectively with StarOffice without loss of functionality.

Another contributory factor to the reluctance of Finance to move to StarOffice was the fact that staff in the Finance section made use of various Excel macros. They don't use "*very advanced*" macros according to staff in the Finance section, but they wanted to stay with Excel because they were comfortable with it.

Every staff member interviewed in the Finance section completed the Irish Union StarOffice course, and all expressed the belief that they learned a lot from the course. Upon completion of the course, they thought that StarOffice and Microsoft Office looked very similar, and believed that StarOffice could do everything that Microsoft Office could do. However, one staff member expressed the belief that, "*It was a different story when we got back behind our desks and started using StarOffice. I soon found out that StarOffice and Microsoft Office are not the same and they can't do the same things*". Another Finance staff member told me she had completed Irish Times courses in Microsoft Word and Microsoft Excel, and she claimed that she would be very reluctant to use StarOffice under any circumstances. She felt that she knew how to use Word and Excel, and wouldn't to have to "*learn how to use StarOffice*".

The Vice President has strong opinions on the refusal of the Finance section to migrate to StarOffice. His belief is that the Finance section maintains the attitude that they are the only people who really need IT, and they need the "*good stuff*", i.e. Microsoft Office. He also expressed his belief that the Finance section always tends to go for the "*safe option*" which they perceive to be the Microsoft Office. He commented "*They hold the view that Microsoft Office is*

the most widely used, supported and reliable software in the world'. His believes that the primary reason the Finance section opposed the migration to StarOffice was because they saw it as a threat to their power and influence. A majority of the General Officers at the time had the attitude that the only serious relevance of computing was for financial accounting, and that this attitude led to a "*natural opposition*" in Finance to the StarOffice migration. The Vice President stated, "*Finance were not forcing the pace, the IT Manager and I were, and Finance didn't like that. We were creating an alternative source of computer power within the organisation*".

StarOffice 5.2 Available for Free

The fact that StarOffice 5.2 was available as a free download was widely known by staff. However, it would seem from comments made during the research that staff did not understand how StarOffice could be made available for free. This is evidenced by the fact that some staff members expressed curiosity about the Open Source movement, and no one seemed to understand the methodologies and philosophies behind OSS. Most staff interviewed expressed the belief that if StarOffice was being given away free it must be "*rubbish*". Some staff also suggested that the software must be worth very little if "*they have to give it away for nothing*". A staff member in "Branch C" commented that she didn't really understand why StarOffice was free if it was meant to be as good as Microsoft Office. She went on to say, "*When you get something on the cheap, you always pay for it further down the line. All the staff training and all the trouble we have had with StarOffice, we should have done it properly in the first place*".

Both the Vice President and the IT Manager believe that Irish Union staff attributed no value to StarOffice because it was available free. The Vice President mentioned his belief that there would not have been as many problems with StarOffice if staff had been told that it was a very expensive software suite.

Irish Union begins the move away from OSS

The research suggests that most Irish Union staff members are opposed to StarOffice for a variety of reasons, and would migrate back to Microsoft Office immediately if they were given the choice. This was confirmed by the attitudes and comments of almost all staff members during the research. Both the Vice President and the IT Manager stressed that they worked hard to address all technical and non-technical issues raised by staff in connection with StarOffice. All staff were assured that any StarOffice problems and queries would be dealt with immediately and

efficiently. The IT Manager claimed, “*Staff were never left with unanswered problems or issues relating to StarOffice*”.

Irish Union introduced new union membership software in early 2006. The software vendor has told Irish Union that Microsoft Word is their preferred Office application for use with the union membership software. In preparation for the new union membership software, Irish Union upgraded their three servers to Windows Server 2003 and their email server to Microsoft Exchange Server in late 2005. The choice of server platform is likely to be easier in many ways than the choice of either desktop platform or Office productivity application. The choice of an Office suite has a direct impact on the day to day computing experience of workers, whereas the choice of backend server software is transparent to workers.

Analysis

In this section we will discuss our research findings. The key themes are technological frames preexisting within Irish Union, user support issues, and network externalities. Irish Union made the decision to adopt StarOffice under the impression that the implementation would be largely unproblematic, and that staff would use StarOffice as a direct replacement for Microsoft Office without complaint. The decision was made to use StarOffice for a number of reasons, the primary one being the potential cost savings arising from the use of the software. The two main StarOffice advocates in Irish Union believed that StarOffice would substitute seamlessly for Microsoft Office, because it looked almost the same and had similar functionality. However, as outlined above, the implementation and operation of StarOffice in Irish Union has resulted in staff discontent with the software.

One of the main obstacles to widespread implementation of OSS is the current lack of complex functionality which can facilitate ease of migration and interoperability with other software and legacy documents. This was evidenced by many comments made during the research. Staff expressed the belief that the problems being encountered with StarOffice are mainly of a technical nature. Staff certainly experience interoperability and functionality problems with StarOffice on a day-to-day basis, and these problems were exacerbated by the fact that Irish Union did not take advantage of the improvements in interoperability and functionality that came with successive releases of StarOffice. However, to analyse the circumstances which have led to the current standing of StarOffice within Irish Union through a purely technical lens would be

shortsighted. As we have highlighted earlier, there exists a dearth of research which examines the consequences of the adoption of OSS in organisations. But there is a wealth of research on organisational change arising from the introduction of information systems, diffusion of innovations, technological frames, and barriers to adoption. The literature review would suggest that a number of factors consistent with this research contributed to the staff discontent with StarOffice. We have attempted to frame the analysis within this research.

Interpreting and Understanding StarOffice

The Literature Review referenced research on the subject of technological frames. This research argues that the assumptions, expectations, and knowledge an individual uses to understand technology is based on their knowledge of related technologies. Newly introduced technologies tend to have high levels of interpretive flexibility, and thus the technologies can be interpreted in a variety of ways. Whether the technologies are successful or not depends on who uses them, how they are interpreted and defined, and how users apply their understanding of what the technology is.

An Individual may therefore develop an understanding of StarOffice in terms of what they already know about Microsoft Office. This would seem to have happened in Irish Union judging from comments made during the research. Problems or lack of functionality in StarOffice were always expressed by staff in terms of what StarOffice could not do compared to Microsoft Office. A good example of this is how a number of staff referred to the lack of a “shrink to fit” function in StarOffice Writer. This function is present in Microsoft Word, and is used to reduce the number of pages in a document by adjusting the font size and margins in order to avoid having a small portion of text spill over onto a second page.

Users who had difficulty in using StarOffice generally had a history of using Microsoft Office, and possessed a legacy of Microsoft Office documents. Almost all of these users had completed some level of formal training in Microsoft Office, and had frequent interaction with persons both inside and outside SIPTU who used Microsoft Office. The research would seem to indicate that technological frames are reinforced by prior training and a past history of working with a particular software application. This is supported by one staff member in the Finance section who uses StarOffice Calc and Microsoft Word. This person has a history of working with Microsoft Word and prior training in Microsoft Word, but she had never used a spreadsheet until she started using StarOffice Calc. It is possible therefore that she was not influenced by an

“Excel technological frame” before she started to use StarOffice Calc. This is supported by the claim from The Vice President that staff members who joined Irish Union after the StarOffice adoption seem to have fewer problems using the software. The power of technological frames is also evidenced by the fact that users who had Microsoft Office left on their computers after the StarOffice training sessions, according to The IT Manager, “*never fully moved to StarOffice*”.

Relevant social groups in Irish Union have interpreted and redefined StarOffice as they adapted it to their purposes and applied their understandings of what StarOffice is. Some of the problems with StarOffice in Irish Union occurred because of the existence of incongruent frames. This may have happened because the technological frame of Microsoft Office is different to the technological frame of StarOffice. Incongruent frames can exist for a number of reasons including lack of communication about project goals, objectives or technologies.

Even though all staff members interviewed had completed the Irish Union StarOffice training course, this did not seem to provide a powerful enough revision to organisational memory to affect the technological frames that were already in place. Organisational change requires revisions to organisational memory, and can be seen as a process in which transformative actions must overcome persistent structures. However, the exchange of new knowledge for old is not sufficient to change organisational memory, particularly where organisational memory is widely distributed among members. Thus the provision of a training course in StarOffice was not sufficient by itself to change existing organisational memory or dislodge existing technological frames. Continuous ongoing support may be required to achieve this objective.

Advocacy and Support

While the relative advantages of StarOffice are very clear in terms of cost, the ability of Irish Union to successfully adopt StarOffice depended on a range of considerations consistent with some of the key factors in diffusion of innovations theory. These factors include compatibility with technologies already in place within Irish Union, organisational resources and tasks, and the presence of a strong StarOffice advocate within the organisation.

It is very clear from the research that there exists a widespread perception that StarOffice was incompatible with existing technologies in Irish Union. The Finance section maintained the belief that both the wages and accounting software being used were not compatible with StarOffice, and this was one of the reasons used as justification for not participating in the

migration. This research has made clear that this belief still exists within the Finance section even though all relevant software vendors have confirmed that their software will operate with StarOffice.

Two of the factors key to diffusion of innovations theory deserve to be looked at more closely to consider how they affected the StarOffice migration. Firstly, we examine how the presence of StarOffice and Open Source advocates in Irish Union influenced the StarOffice adoption, and secondly we consider the inability of these advocates to gain the support of certain sections of Irish Union for the StarOffice implementation.

(1) StarOffice Advocacy

Organisations such as Irish Union potentially have many reasons for adopting OSS. Ultimately though, such decisions are made by one person or a small group of people, and these people are influenced by their own personal and professional motivations. The charisma and drive of the OSS advocate may be the determining factor influencing OSS adoption. Indeed, the Open Source advocate is sometimes the only reason OSS remains in place in an organisation. The politics of Open Source adoption in organisations, and the actions and attitudes of any Open Source advocates, have the potential to resemble evangelism. These politics and beliefs are rooted in efforts to convince the organisation of the benefits of OSS beyond the variables of cost and ease of use. The Irish Union Vice President believes that if he and the IT manager were to leave Irish Union there would have been “*an immediate move back to Microsoft Office*”.

The diffusion of innovations model posits that an innovation is propelled outward from a central source, for example an Open Source advocate. This enables the innovation to move through the organisation without the need for further explanation, and makes it virtually unstoppable. Once the innovation has been pointed out to people then it should just be a matter of time before everyone except the most immovable are converted. The Vice President and the IT Manager played the roles of advocate during the StarOffice implementation in Irish Union. They can be seen as key champions who ensured the initiative did not lose momentum.

The individual ideology of the main two StarOffice advocates in Irish Union was an important factor in Irish Union’s decision to adopt StarOffice. Although the identification of shared values between the OSS movement and Irish Union informed this process, they are not pragmatic justifications for the adoption of OSS in and of themselves. Even though OSS advocates may be

attracted by the potential of an OSS migration to further the overall aims and goals of the Open Source movement, this is rarely a motive that will hold sway against practical needs. There was no evidence of “OSS envy” in Irish Union as highlighted by Fitzgerald and Kenny (2003) in Beaumont Hospital. OSS envy describes the situation whereby organisations could become envious of the high-profile exemplars of OSS adoption in other organisations and would seek to emulate them. We strongly believe that the advocates of StarOffice in Irish Union were primarily driven by the desire to get value for union members’ fees. It also became clear during the research that both Irish Union StarOffice advocates were driven by the belief that Irish Union shares many of the ethics and practices common to the Open Source movement.

(2) Top Management Support

Diffusion of innovations theory proposes that the key to getting software successfully adopted is the creation of powerful enough heterogeneous networks of staff and management to ensure that the technology is adopted. This calls for strategies aimed at the enrolment of others, and perhaps even the blocking off of other possibilities. When the adoption of software within any organisation is unsuccessful, this can be considered to reflect the inability of the advocates to build a strong enough network of alliances amongst the staff and management.

The main StarOffice advocates within Irish Union failed to get the required level of support for the project from the Finance section and the General Officers but decided to proceed nonetheless. Backing from such top personnel is essential, and should manifest itself in terms of commitment to the project and the allocation of sufficient personnel and funding to give the implementation a good chance of succeeding. In this situation, the absence of top management support led to increased levels of uncertainty and resentment towards StarOffice. The absence of this support, combined with the lack of effective communication, was bound to lead to rumour and hearsay about StarOffice. Fitzgerald and Kenny (2003) considered top management support to be an important factor in Beaumont Hospitals’ use of StarOffice. This is evidenced by their statement, *“the benefits of OSS did not immediately become apparent in Beaumont, and it required strong commitment from top management and IT staff to ensure this initiative was not derailed”*.

Given the conditions surrounding the introduction of StarOffice in Irish Union, it is not surprising that confidence and trust in the software was progressively eroded. The situation created by the lack of top management support was summed up by the Vice President. He commented, *“The fact that Finance refused to change to StarOffice created a sense of inequity in the organisation.*

The general view was if Finance doesn't change, the Microsoft Office stuff has to be better. There was a kind of 'upstairs downstairs' view, and because the Finance section didn't migrate to StarOffice there was an automatic undermining of the StarOffice implementation in other sections of Irish Union".

StarOffice 5.2 for Free

The promise of significant cost savings, and that these cost savings would be retained within the overall IT budget, was not enough by itself to convince Irish Union staff that StarOffice could be a viable alternative to Microsoft Office. Emphasising the low cost of OSS often backfires. The history of technology transfer and technology projects includes efforts that dumped obsolete technology on developing nations when it was no longer marketable in developed nations. In the Literature Review it was suggested that this fact was the primary contributory factory in the failure of an OSS initiative in Ghana. The users in Ghana could not accept that software which was free could have any value. As a result, inexpensive and inferior are often equated.

The fact that StarOffice 5.2 was free raised a very important issue within Irish Union in terms of individual ideology. For some people, this led to the feeling that certain Irish Union branches were undervalued by being asked to settle for a less expensive solution than that being used by their colleagues in other sections of Irish Union. This feeling was reinforced by the fact that two of the more "powerful" sections within Irish Union did not migrate to StarOffice, preferring to keep using Microsoft Office for a variety of reasons. There was a common belief that StarOffice must have no worth or value if it had no cost.

Summary

In summary, the StarOffice implementation in Irish Union was dogged by difficulties from the outset. It could be argued that even though the main StarOffice advocates had sound ideological and financial reasons for wanting to adopt the software, they did not create powerful enough user networks, or secure the required levels of top management support to ensure the success of the migration. It could also be argued that StarOffice did not have the required level of functionality and interoperability with Microsoft Office that Irish Union staff needed to adequately perform their daily duties.

Significant barriers to the adoption of StarOffice also existed, and these barriers were extended and strengthened by the culture and discourses that exist within Irish Union. Because StarOffice

was free, staff attributed no value or worth to the software. There was a need to connect the characteristics of StarOffice to other social and political values, including but not limited to cost, and this was not done.

Given all the factors and conditions outlined above, staff trust and confidence in StarOffice was quickly eroded, making it progressively more difficult to win support for the project. Views became more entrenched, and levels of resistance to StarOffice grew. The next section proposes how levels of resistance to StarOffice within Irish Union might have been reduced, and makes suggestions as to how future migrations to OSS might be carried out in order to minimise staff resistance to the software.

Conclusions

Introduction

We believe a number of significant and interesting findings have emerged from this research. There was a failure to create powerful enough user networks, and to create enthusiasm for StarOffice. There was also a failure to put in place ongoing training and support which was robust enough to tackle the cultural beliefs and preexisting technological frames within Irish Union. Upgrading to the latest version of the software may have temporarily addressed some of the technological issues expressed by staff, but this would not have addressed the social and political issues associated with the migration. These points are now discussed further.

The Failure to Create Powerful User Networks

It is very clear that Irish Union failed to create powerful user networks around StarOffice. The reasons for this are partly explained by diffusion of innovations theory which suggests that the key to getting software successfully adopted is the creation of powerful networks of staff and management. The resources and support of the entire organisation should be available when migrating to OSS. It is our belief that many of the current problems in Irish Union can be directly attributed to the fact that the StarOffice migration lacked the support of the general Officers and the Finance section. Because top management support is undoubtedly critical, greater emphasis should have been given to supporting the migration to StarOffice in Irish Union.

Mitigating the Social and Political Effects of an OSS Migration

Beyond the technical aspects of migration planning and deployment, it is essential to create enthusiasm for the migration project among staff. It became clear during the research that Irish Union staff did not feel any sense of ownership of StarOffice. There was a general feeling that StarOffice was inferior to Microsoft Office, and was being imposed on staff purely as a money saving exercise, even though the main StarOffice advocates went to great pains to stress the exact opposite was true.

We believe there are a number of approaches that Irish Union could have adopted to encourage staff to feel a greater sense of ownership of StarOffice. Ongoing support and training are undoubtedly critical to the success of any OSS migration. The creation of a user feedback system both during and after the migration process may have allowed staff to believe their opinions of StarOffice were being listened to. The feedback system may also have assisted in documenting all experiences during the migration process including any issues with the software, successes, failures, and lessons learned.

Staff may have also required incentives (both personal and financial) to make a success of StarOffice in Irish Union. If users are made to believe they are part of a community who are collaborating to address everyone's problems and not simply a consumer of a product being fed to them from on high, they will be more likely to accept the product. Users may feel a sense of empowerment and belonging if they can influence the development of StarOffice in a way which contributes to getting the software to function in a manner suitable to their everyday needs. Staff need to be made aware that if they use the software they are actually an important member of the overall StarOffice project. Providing financial incentives for using StarOffice might also have improved staff attitudes towards the software. For example, staff could be given some share of the savings made by migrating to StarOffice as a one-off bonus in their first year. Staff could also receive bonuses for finding and filing bug reports. Most Open Source developers are not office power users, and hence many bugs go unreported. It may also be possible to have an annual staff social event which could be paid for by savings arising as a result of using StarOffice. A StarOffice developer or Sun Microsystems representative could be invited to this social event to let the staff meet them, thank them, berate them, and tell them how they feel about using StarOffice for their everyday work.

Upgrade to StarOffice 8

Although we recognise that the issues encountered by Irish Union staff with StarOffice are primarily social and political in nature, we believe that an upgrade to the latest version of the StarOffice software may have slightly mitigated some of the problems experienced. Irish Union continues to use StarOffice 5.2 for a variety of reasons. It is clear from staff comments made during the research that there exists a widespread belief that the problems being encountered with StarOffice are mainly of a technical nature, and arise as a direct result of the current lack of complex functionality in StarOffice 5.2. The release of StarOffice 8 in September 2005 has seen increased functionality and improvements in interoperability with Microsoft Office. StarOffice 8 uses XML file formats which are to be incorporated into future releases of Microsoft Office. In theory, this improves interoperability and makes file sharing between the two applications reasonably easy.

The research suggests that staff hold the belief that their work was being undervalued to some extent because StarOffice 5.2 was free. There is a perception that StarOffice must be flawed in some way in comparison to proprietary systems if it costs substantially less than those systems. It is clear that these beliefs are made worse by the fact that two sections in Irish Union continue to use Microsoft Office in preference to StarOffice. The problems arising from the fact that StarOffice 5.2 was available as a free download are likely to be lessened in the future because of Sun's pricing policies. The current version of StarOffice 8 is not free but it still costs significantly less than Microsoft Office. If staff are aware that the software they are using has an actual monetary cost, they may be less likely to associate "free" with "worthless". They may also be less likely to believe their work is undervalued by having to use free software.

Summary

The adoption of OSS, particularly for the desktop, requires investment in planning, training of users, development of skills for implementation and ongoing support, and detailed consideration of migration and interoperability issues. As previously mentioned, Microsoft Office is the de-facto standard for desktop software, and any consideration of Open Source alternatives must recognise this. OSS is becoming more widely used and end-users are becoming more familiar with Open Source products, an example being the Firefox web browser. OSS presents both challenges and opportunities for organisations, and there are convincing arguments for taking Open Source products into consideration in connection with the procurement and replacement of software in organisations. However, as can be seen from Irish Union's migration to StarOffice,

such adoptions can be potentially problematic for a variety of reasons. Cultural, social and political considerations play a large part in the adoption and use of OSS, and may be the main reason for the difficulties encountered when attempting to embed OSS into existing organisational and social structures. Technological and interoperability issues may also be relevant, but to a much lesser extent. Any attempted OSS migration should take this into account.

References

- Attwell, P. (1992). "Technology Diffusion and Organizational Learning: The Case of Business Computing." Organizational Science **3, 1**: 1-19.
- Beattie, C. A. and J. R. M. Gordon (1998). "Barriers to the Implementation of CAD/CAM Systems." Sloan Management Review **30, 1**.
- Bijker, W. E. (1989). The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology. Cambridge, MA, The MIT Press.
- Brown, A. D. (1998). Organisational Culture (2nd ed). London, Pitman Publishing.
- Damanpour, F. (1991). "Organizational Innovation: A Meta-analysis of Effects of Determinants and Moderators." Academy of Management Journal **34, 3**.
- Davidson, E. and D. Pai (2004). Making Sense of Technological Frames: Promise, Progress, and Potential. IFIP Working Group 6.2 Conference, Manchester, UK.
- Dedrick, J. and J. West (2004). An Exploratory Study into Open Source Platform Adoption. Proceedings of the 37th Annual Hawai'i International Conference on System Sciences, Waikoloa, Hawaii.
- Fitzgerald, B. and T. Kenny (2003). "Open Source Software can Improve the Health of the Bank Balance - The Beaumont Hospital Experience."
- Fitzgerald, B. and T. Kenny (2003). Open Source Software in the Trenches: Lessons From a Large-Scale OSS Implementation. International Conference of Information Systems. Seattle, WA.
- Goode, S. (2005). "Something for Nothing: Management Rejection of Open Source Software in Australia's Top Firms." Information & Management **42(5)**: 669-681.
- Kwan, S. K. and J. West (2005). A Conceptual Model for Enterprise Adoption of Open Source Software. The Standards Edge: Open Season. S. Bolin. Ann Arbor, Mich., Sheridan Books: pp. 274-301.
- Orlikowski, W. J. and J. J. Baroudi (1991). "Studying Information Technology in Organizations: Research Approaches and Assumptions." Information Systems Research **2**: 1-28.
- Orlikowski, W. J. and D. C. Gash (1994). "Technological frames: making sense of information technology in organizations." ACM Transactions on Information Systems **12(2)**: 174-207.

Orlikowski, W. J. and C. S. Iacono (2001). "Research Commentary: Desperately seeking "IT" in IT research - A Call to Theorizing the IT Artifact." Information Systems Research Vol. 12(Iss. 2): P.121.

Overby, E. M., A. S. Bharadwaj, et al. (2004). An investigation of firm level open-source software adoption: Theoretical and practical implications., Working paper, Emory University.

Robey, D. (1995). Theories that Explain Contradiction: Accounting for Contradictory Organisational Consequences of Information Systems. 16th International Conference on Information Systems (Eds, DeGross, J I., Ariva, G., Beath, C., Hoyer, R. and Kemperer, C.). ACM, Amsterdam.

Rogers, E. M. (1995). Diffusion of Innovations (4th edition). New York, The Free Press.

Tatnall, A. and A. Gilding (1999). Actor-Network Theory and Information Systems Research. 10th Australasian Conference on Information Systems (ACIS), Wellington, Victoria University of Wellington.

Von Krogh, G. and E. Von Hippel (2003). "Special Issue on Open Source Software Development." Research Policy 32(7): 1149-1157.

Walsham, G. (1993). Interpreting Information Systems in Organizations. Chichester, Wiley.

Wilson, M. and D. Howcroft (2000). The Politics of IS Evaluation: A Social Shaping Perspective. International Conference on Information Systems. Brisbane, Australia.