University of Navarra

Working Paper

WP No 595

June, 2005

CIO HERDS AND USER GANGS IN THE ADOPTION OF OPEN SOURCE SOFTWARE

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Abstract

Open Source Software (OSS) has received wide attention from the research community, which has analyzed both the innovation process of software development by distributed and unrelated teams, and the market dynamics between "free" and proprietary software. Up until now, OSS adoption has been irregular, although OSS seems to be breaking the dominance of existing players in some market segments. In this paper, we contend that, due to the particularities of its development process, traditional ways of explaining IT adoption –rational decision making, technology diffusion models, and the psychology of the decision maker– are insufficient to explain the case of OSS diffusion. We believe that the existence of a strong and diffused development community gives a new role to the user community, as the two are intertwined. In addition, new concerns for corporate social responsibility and welfare create a new context, in which "user gangs" may exert some degree of pressure on the IT decision maker. By analyzing some significant cases, we depict under what conditions significant OSS adoption may unfold, showing that in two of the cases studied user gangs play a significant role. The resulting preliminary framework will inform future work, in which we aim to validate the emerging insights gained in this research.

Keywords: Open Source Software, IT adoption, user communities, CIO herding

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Introduction

The pace of change in the information technology (IT) field has been accelerating over the past two decades, with a host of promising new software platforms confronting organizations (Taudes, Feurstein and Mild, 2000). In particular, Open Source Software (OSS) has irrupted in the software market and although it still has a very minor market share in desktops, where Microsoft's Windows is the absolute leader with over 90% of market share, other OSS applications, like the webserver software Apache, are showing strong growth, reaching market shares closer to 70%[1]. On the other hand, there are some segments in which no clear market leader exists, like in servers, where although OSS has shown strong growth, Microsoft dominates and even has been increasing its market share[2].

These three different rates of success in displacing the dominant player from its position have prompted us to study the reasons behind these discrepancies, trying to increase the general understanding of the variables that influence software adoption in markets where there is a dominant player. In particular, we believe that the case of OSS, being developed by a community of users with a sense of "democracy" and without any company dependence, has some particular characteristics that might be relevant for IT adoption, beyond those being stated in the traditional IT adoption literature. Specifically, we contend that due to the particularities of the OSS development process some relationship between the developer and the user community exists. As a consequence, user perspectives and opinions can exert some influence on a CIO's decision to choose one platform or another. In addition, the overall "mood" of the OSS movement may have a potential effect on the overall dimension of the IT adoption decision, giving rise to longer-term views other than technological. Corporate social responsibility and maintaining social welfare, directly leaving rents in the hands of customers by decreasing the revenues of private companies, could be some of these factors.

This paper is organized as follows: after having discussed the literature on OSS, diffusion of innovations and IT adoption, we establish a preliminary categorization of IT adoption dimensions. Next, we explain why we decided to follow a qualitative research methodology, and explain the main traits of the data that we obtained through CIO interviews. Iterating between the data and the preliminary IT adoption dimensions, we construct a framework that explains how IT adoption decisions are made, showing that traditional criteria are insufficient to explain part of the OSS adoption phenomena. We introduce a new dimension, the effect of the user community. If the effect of the user

[1] Data as of February 2005. For up-to-date figures see http://news.netcraft.com/archives/web_server_survey.html
[2] See http://www.idc.com for server market shares and forecasts.

community becomes strong, we show that different conditions may lead to high degrees of OSS adoption.

Our contribution to existing research is threefold: First, this work sheds some light on the underlying mechanisms that drive IT managers and CIOs in their OSS adoption decision-making process. Second, some of the insights gained may serve to guide future work to investigate more generic determinants of IT adoption, offering some additional explanation of the criteria that drive decision makers and how industries and consumers can exert influence on the way CIOs decide. Third, by studying the particular case of OSS adoption, we offer a complementary view to existing literature, which is basically devoted to the innovation process per se and that pays only minor attention to the user point of view.

Literature review

Three main bodies of literature have informed the research on IT adoption: 1) the mechanistic group, basically analyzing rational decision making; 2) research stemming from the more generic, technology adoption camps, usually based on diffusion models and treating the CIO decision process as a black box; and 3) work related to the psychology of the decision maker, usually centered in the final user and the personal factors that induce him or her to use a new system.

Rational Decision Making

Current literature considers that the three main underlying concepts for IT adoption in organizations are radicalness of IT innovations, the existence of knowledge barriers, and the presence of network externalities. These factors refer to macro-level dimensions and in our understanding are too broad to be useful to understand the CIO decision-making process. Based on the practical experiences of analysts and IT professionals stated in the general press and technical reports[3], we postulate three individual-level dimensions that affect the decision process for IT adoption in companies: total cost of ownership, technological attributes, and lock-in.

Cost: Cost is the main factor that has been postulated by OSS followers against proprietary solutions. Cost advantage is a good driver to help decision makers cope with uncertainty and soften the radicalness of OSS adoption; and cost reduction has been proposed as one of the main criteria of technology adoption (Bethuyne, 2002) in the innovation literature. Most OSS programs can be downloaded free from web sites; but the license is not the only cost component in adopting software applications. An in-depth analysis of the cost dimension leads us to consider a Total Cost of Ownership (TCO) approach and conclude that for a company addressing an overall substitution of a Windows-based end-user solution, the hardware and software cost component accounted for between 8% and 15% of the TCO, depending on the company's IT architecture (Armelini et al., 2004). On the other hand, other factors like technical support and downtime accounted for between 60% and 65% of the total cost (Armelini et al., 2004). Also, license costs do not take into account the often very highly perceived cost of the irreversibility of the decision.

[3] Bozman, J., Gille, A., Kolodgy, C., Kusnetzky, D., Perry, R. and Shinag, D. (2002), Windows 2000 versus Linux, in Enterprise Computing, IDC White paper 02C3512SOFTWA3512, October 2002, and Wang, H. and Wang, C., (2001). Open Source Software Adoption: A Status Report. IEEE Software, March/April 2001.

The presence of network externalities, by increasing the availability of complements and other ancillaries, has a strong influence on technology costs (Shapiro and Varian, 1998). This is something we will discuss at greater length later on.

Technological Attributes: Under the concept of technological attributes we have grouped a set of information technology characteristics that are routinely mentioned by CIOs and by some reports as relevant in the OSS adoption process (Roger, E. 1995; Venkatesh et al., 2003). Initially, five criteria have been identified: reliability, performance, scalability, security and brand name. All these criteria will be evaluated more or less rigorously by decision makers in adopting OSS platforms. Our starting position is that some of these criteria will be taken into account by CIOs in order to advance in the decision making process. Each CIO is going to prioritize each criterion and establish the necessity of each one.

Technological attributes may be seen as the set of factors that leverage the radicalness of IT innovations. We propose that CIOs evaluate the radicalness of OSS compared to proprietary solutions through these technological attributes. On the other hand, knowledge barriers are considered to have a strong influence on evaluating these technological attributes in the adoption of an innovation.

Lock-in: Switching costs (Shapiro and Varian, 1998) are present in all technology-adoption decisions, and organizations try to minimize the lock-in that these costs generate. Lock-in can be due to internal decisions or to the influence of external situations. If due to internal decisions, we talk about inner lock-in. Inner lock-in is the result of many different decisions, such as long term agreements with suppliers or the refusal of the workforce to learn new software applications. Knowledge barriers and network externalities affect inner lock-in through CIO decisions. If knowledge barriers are low, CIOs will be able to get all the relevant knowledge in order to decide on IT adoption without acquiring a high level of dependency due to switching costs. Outer lock-in is caused by external situations that, in most cases, organizations cannot control. It happens when a supplier has control of one market and the tools to manage its evolution. Suppliers can manage most of these effects by creating network externalities. Switching costs could be accounted for as an additional cost in OSS adoption, but we believe that decision makers treat lock-in from a more qualitative perspective.

Technology Diffusion

Rogers (1995) and Carr (1999) propose a three-pronged classification of approaches to frame this body of literature. The approaches are: 1) directional, 2) micro versus macro, and 3) technology versus adopter-focused. The directional perspectives analyze diffusion either bottom-up, from the grass roots to top management, or top-down, where the initiative moves in the opposite direction. The micro-level literature analyzes decisions at the individual level, whereas the macro literature is concerned with aggregate patterns of diffusion. Technology adoption can also be viewed as a technical push (deterministic perspective) or adopters pull (process perspective).

In this context, the decision to adopt OSS or not is particularly interesting, as that cost is negligible because no license fees apply. Therefore, from a pure cost standpoint, organizations should have high interest in switching to the new technology. Also, from a technological perspective, general consensus exists about the superior technological capabilities of OSS. Therefore, from a deterministic perspective OSS adoption appears as an overall superior strategy. Therefore, to fully understand the OSS adoption problem, one has to study it from a process perspective, acknowledging that the adoption phenomenon is

evolutionary, influenced by both objective factors and other more subjective factors that are not directly related to the technology itself but to the broader organizational context in which the IT adoption decision has to be made. In this way, our framework builds on Rogers' (1995) work on the diffusion of innovations:

> "Computer-related innovations create uncertainty in an organization, an uncomfortable state in a system that often leads to a resistance to the technology. This uncertainty is one reason for the special difficulties that computer technologies frequently encounter in the implementation sub process. The more 'radical' an innovation, indexed by the amount of knowledge that organizational members must acquire to adopt it, the more uncertainty it creates and the more difficult its implementation." (Rogers, 1995, p.397).

As Fichman (2003) states, the difficulties in the IT adoption decision process are a consequence of two challenges that can be typically associated with IT platform innovations: uncertainty about the benefits from use of the innovation, and irreversibility in the costs of deployment. Accordingly, the degree of radicalness has often been considered as a primary driver for uncertainty in the adoption of new IT.

Organizational capabilities: In this vein, organizational burdens are relevant and have to be taken into account in IT adoption decisions. First, knowledge barriers may restrict innovative IT adoption, as complex organizational technologies impose a learning burden on adopters (Fichman and Kemerer, 1997). This is especially the case if the knowledge used in the technical problem solving is "sticky" (von Hippel, 1994), and magnifies the sense of irreversibility of IT platform investments (Kogut and Kulatilaka, 2001). With a somewhat complementary view, some authors (Moore and Benbasat, 1991; Venkatesh et al. 2003) propose the "risk avoidance" mechanism as a driving force to adopt software; risk avoidance puts technological capacities ahead of other dimensions, so that a particular system will not even be considered if it does not have a minimal set of functionalities. Other ways of dealing with risk reduction are allocation of IT budgets that allow for experimentation or IT staff time (Dedrick and West, 2003), or the existence of a general culture of innovation.

Network externalities. The presence of network externalities also affects the degree of IT adoption in an organization, as the value of using an IT platform grows in proportion to the size of the adopter network (Brynjolfsson and Kemerer, 1997). This phenomenon, which implies increasing returns to scale has two distinctive characteristics, as (a) the ultimate benefits of IT adoption will be determined not by the technology as it is in the present, but rather by the expectation of the decision maker on how the technology will develop in the future; and (b) increasing returns lead to a distinctive pattern of technology diffusion known as market tipping, with "winner takes all" outcomes (Shapiro and Varian, 1998). These two characteristics affect the adoption process of a particular technology in an organization, as managers may be tempted to commit to a major initial rollout of a particular technology within a firm to quickly reach a critical mass of adoption, or they may wish to wait in order to minimize the risk of ending up with a "stranded" technology that imposes a permanent burden on the organization (Markus 1987; Cool, Diericks and Szulanski, 1997). These issues are particularly relevant when we see decisions like Linux adoption as a platform adoption case. There has been a number of papers investigating the adoption of platforms like MRP (Cooper and Zmud, 1990), EDI (Iacovou et al., 1995) or e-commerce (Zhu et al., 2002), and all of them relate the particular cases to the presence, real or perceived, of network externalities.

Psychology of the Decision Maker

A third stream of research that has informed our work analyzes the effect of information cascades and herding behavior in the adoption of IT systems (Li, 2004; Kauffman and Li, 2003; Tingling and Parent, 2002). Although the concept of herding has only recently become a subject of interest in the IT adoption literature, it has been studied in other areas of management for a much longer time (Graham, 1999).

Informational cascading. Basically, this explains the behavior of decision makers when they are subject to bounded rationality and observe the decisions made by their peers without full knowledge of the reasons why those decisions were made. Some researchers have analyzed decisions through the prisms of agency theory (Laffont and Martimort, 2003), where CIOs do not decide in the overall best interest of the organization but according to a different set of individual objectives. Moreover, the resource-based theory of the firm (Grant, 1991, Wade and Hulland, 2004) establishes how resource performance can drive competitive advantages and how competitors amass resources and capabilities to imitate the strategy of other firms in the same strategic group. Based on this theory, CIOs could follow the decision of a successful rival when they are bounded in their decision making process. In these two strands of research, literature points to the fact that CIOs, when facing complex decisions with incomplete information, tend to rationally "run with the pack".

Concerns about the reputation of the IT manager. Of particular interest in platform adoption is what Kauffman and Li (2003) coin as "reputational herding", where CIOs do not want to be associated with having chosen the "losing platform" and they will go with the majority regardless of evidence that a non-conventional decision could be in the best interest of the company.

Table 1: Main IT adoption decision dimensions in the literature

Body of Literature	Relevant Dimensions
Rational decision making	Cost (hardware, software, reliability, industry maturity, etc)
	Technological attributes (fit to task, difficulty of administration, ease of experimentation, long-term platform availability)
	Lock-in (portability, brand image, etc)
Technology diffusion	Organizational capabilities (budget size, time availability for experimentation, innovative culture)
	Network externalities (availability of complements, skills of existing IT workers)
Psychology of the decision maker	Informational cascading (observation of decisions of peer groups, information overload, existence of conflicting data)
	Reputation concerns of the IT manager (career, incentive incompatibility, agency problems)

Summarizing, different literatures have contributed to a fuller understanding of the main dimensions that drive the CIO's IT adoption decision-making process, as shown in Table 1. Nevertheless, in general, most adoption decisions are driven basically by the existence of some sort of herding behavior, which may be perfectly rational when informed by cost, lock-in, network externality or technological capability criteria, or responding to more subjective or deliberate criteria, as in the cases of informational cascading or reputational concerns.

Research methodology

Since one of the motivations for starting this research was our suspicion that the decision to adopt an OSS platform could be influenced by two factors not considered in the literature –user-driven pressures due to the community effect of the developer community, and broader considerations of social responsibility– we needed to gather a deeper understanding of the overall CIO decision-making process. Therefore, we decided to adopt a pluralistic research methodology (Mingers, 2001). In a first step, we use qualitative methods, carrying out in-depth interviews with 11 CIOs of national and multinational companies that have been purposefully chosen. In a second step, beyond the research described in the paper, we will test the insights gained by carrying out a survey, as suggested by Markus (1994), Ngwenyama and Lee (1997) and Carlson and Davis (1998). This overall research strategy will enhance the generalizability of our results (Lee and Baskerville, 2003).

In this paper, we inform about the results of the first step of the overall research strategy: identifying the underlying dimensions of CIO decision making. We approach this problem via a series of semi-structured, in-depth and open-ended interviews (Orlikowski and Baroudi, 1991). For each interview, we prepared and jointly ratified a guide, based on a prior analysis (Miles and Huberman, 1984; Walsham 1995) of the IT and innovation adoption literature. We carried out the eleven CIO interviews, and in some cases we had follow-up meetings to clarify unclear issues. The eleven CIOs encompass a full range of companies, from multinational, publicly traded companies to universities, and a public organization created to run a single event that took place in 2004. See Table 2 for an overview of the companies; identities have been disguised for reasons of confidentiality.

Table 2: General information of companies and their overall IT strategy

Company	Company Acronym	Industry	Revenues (M€/year)	IS strategy and philosophy
Pharmaceutical	EST	Pharma	475	Support for strategy: Sales Force automation, CRM
Public Organization	FOR	Culture	325 (three years)	Support for operations: ERP, and visitor control.
National Subsidiary Pharma Company	NOV	Pharma	500	Support for strategy: Sales Force automation, research.
Savings Bank	ESP	Banking	12,414(in deposits)	Support for strategy: New Sales channel.
Telecommunications	RET	Telco	1,028	Business growth through IS: Internet Data Center
University	UVW	University	68	Support for operations: e-learning and teaching support.
Telecommunications	JAZ	Telco	129	Business growth through IS: Internet Data Center
Purchasing Group	EUR	Retail	6	Support for operations: ERP, extranet.
Cosmetics	COL	Beauty Care	N/A	Support for operations: Infrastructure to run a newly deployed ERP
Telecommunications	TEL	Telco	10,217	Support for strategy and business growth: ERP, CRM, Business Intelligence
Steel Mill	CSA	Steel	2,100	Support for operations: ERP and CRM

All interviews were transcribed and then analyzed by each of the three researchers. The results were then compared, and after a constant iteration between the data, the emerging insights of the researchers, and existing literature, we finally agreed on an emerging framework, which we report in the next section.

Results

All companies are major players in their industry and region of operations. As a first indication of their position in relation to Open Source, Table 3 presents what could be considered their in-use platform strategies: all companies use Microsoft's Windows on the desktops, and only two of them have some OSS server systems.

Their infrastructure policies are divergent: while two companies consider that they are not bound to switching costs if they choose to adopt OSS, as they are thinking of completely new deployments, all others either have large proprietary systems installed or they have a platform infrastructure that prevents them from easily moving to other architectures.

All companies except two consider the need to reduce their technological risk as the main criterion for software selection and adoption. None of the CIOs considers that a significant branding effect exists in vendor selection decisions.

Table 3. IT infrastructure and espoused IT adoption decision making[4]

Company	EST	FOR	NOV	ESP	RET	UVW	JAZ	EUR	CSA	TEL	COL
End-User platform	MsW	MsW	MsW	MsW	MsW	MsW	MsW	MsW	MsW	MsW	MsW
Server platform	IBM	Linux MsW	MsW	UNIX	UNIX	Linux MsW	UNIX	IBM	IBM	IBM-UNIX	IBM
Infrastructure	P	NSwC	PC	ITA	ITA	ITA	NSwC	P	P	ITA	P
Technological risk reduction	1	1	1	1	2	1	1	1	1	2	2
Cost	2	3	2	2	1	2	2	3	2	1	3
Other techno. aspects	3	2	3	3	3	3	3	2	3	3	2
Supplier brand name	No	No	No	No	No	No	No	No	No	No	No
% of budget in OSS systems	1,50%	60%	0%	1%(*)	1%	35%	5%	0%	0%	1%	0%
End-user interest	No	Yes	No	No	No	Yes	No	No	No	No	No

(*) but supports 25% of all business transactions

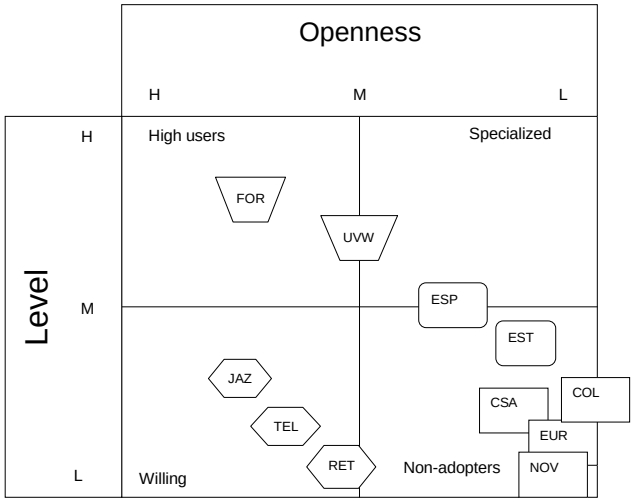
[4] Legend: MsW: Microsoft Windows, P: Proprietary server platform. PC: obliged to choose from a product catalogue. ITA: IT Architecture guidelines present. NSwC: No switching costs present due to new deployments.1,2,3: order of importance of the dimension on the decision to adopt OSS.

In OSS adoption decision making, CIOs consider that they face a situation with some specific peculiarities: First, they do not consider that OSS is a "new technology" in itself. Most CIOs have some experience with UNIX, in the form of proprietary solutions from IBM, HP or SUN. Second, they do not consider that OSS offers technologically superior features. Third, although cost has been claimed as a breakthrough advantage of OSS compared with proprietary systems, this does not seem evident to decision makers in practice. Although license cost and hardware cost are lower for OSS platforms than for proprietary platforms, they consider that there are many other cost dimensions that are very difficult to identify and measure, but that have to be taken into account.

Hence, a situation emerges in which the OSS adoption decision is a two-step process. First, CIOs must decide on IT adoption as a new platform for company systems. Once a platform decision has been made, the second step consists of finding concrete OSS applications that show some sort of superior advantage. From the interviews, we deduced that these processes are intertwined, although each is driven by some very specific decision-making attributes. As we were unable to clearly identify them by just reading the interviews, we adopted a slightly different approach for the next iteration on the data.

As we needed to clarify both levels of decision making, we decided to introduce an intermediate step that allowed us to map the final output (OSS effectively adopted) in two dimensions, so that we could map each company on a 2x2 matrix. The two dimensions are: a) Openness to deploy OSS, and b) level of OSS usage. Companies and CIOs may be open to adopt OSS if the opportunity arises, independently of whether they have had a chance to do so, while, on the other hand, although in principle reluctant to adopt OSS, they may do so if, when facing a problem, a vendor provides guarantees and support, and the solution is cost-effective. The results of placing the interviewed companies in this matrix are shown in Figure 1.

Figure 1: Companies' level of usage and perceived openness toward OSS



As a result of the mapping process, we found that the companies could be grouped in four groups:

- *Non-adopters:* These companies affirmed their lack of interest in adopting OSS and do not have any meaningful installation.

- *Specialized:* Two companies have adopted OSS for specialized systems (web servers and business-to-consumer systems) and have no plans to use OSS in other systems. They are not really open to OSS, but superior technology has induced them to adopt it.

- *Willing:* Companies in this group are open to use OSS when it becomes a suitable choice for a specific system. All of them are open-minded in using OSS and are actively seeking opportunities to study the feasibility of OSS choices. The level of use of OSS in each company depended on the projects available. None of the companies was planning a full migration of their systems to OSS.

- *High Users:* Two companies are using OSS widely as a platform for their systems. FOR is using OSS for their ERP, and UVW is using it for their Intranet and for their e-learning system.

In a next step, we went back to the interview transcripts, in order to analyze them in terms of the IT adoption criteria that we found in the literature. We found that these criteria could satisfactorily explain the behavior of three of the four groups, but that it could not fully explain the case of high users. In these two companies, we found that both CIOs gave significant importance to user community power. We summarize these findings in Table 4.

Table 4: IT adoption dimensions in terms of resulting groups

	Non-adopters	Specialized	Willing	High Users
TCO			☑	☑
Lock-In	☑	☑		
Network Externalities		☑		
Technological capabilities			☑	☑
Organizational capabilities		☑	☑	
Informational cascading	☑	☑		
Reputation of IT Managers	☑		☑	
User community effects				☑

In the case of high usage, the two companies were driven by significantly different motivations. In the case of FOR (company created to organize and run a four-month long cultural event), the CIO had to follow a general company consensus, driven in part by the political owners, that the implementation of an OSS initiative was close to the overall company ideology and that it would give the right signal about the organization's intentions to the environment. In the case of the university UVW, faculty were a driving force. They are considered to be heavy users and their interest in the OSS movement for both research and teaching purposes was one part of the final generalized OSS adoption decision. In addition, some sort of "ganging" took place at the user level, as other universities in the same region were also deploying OSS.

Regarding the other three groups, besides the relationships already depicted in Table 4, the analysis of the interviews also showed to some extent the interplay of the different dimensions within each group:

- TCO influences *Willing* and *High User* groups. JAZ told us that they are committed to adopt OSS in all opportunities they have, but only when ROI analysis is adequate. TEL and RET expressed their commitment to OSS adoption based on TCO study. In our research we didn't capture any case of *High User* adopter with a positive or negative effect of TCO. One company of the *Willing* group has refused to adopt OSS because a software vendor gave them a 90% rebate in the license costs. With that cost, the CIO could not justify the adoption of OSS. Cases like Google and Amazon have to be considered in the group of *High Users*, with a strong influence of costs in their adoption process, and are consistent with our findings.

- Lock-In has been cited as one of the most important negative factor for adopting OSS by *non-adopters*. Most of them are using proprietary platforms or have been engaged with a supplier for a long time and are not ready to open a new line of platforms. Companies in the *Specialized* group mentioned lock-in as one of the difficulties in expanding their OSS usage. Old and proprietary systems, IT staff training, and so on introduce many additional costs for companies in that group.

- Network externalities earned in adopting standards platforms have been mentioned by all the companies in the *Specialized* group. In some cases, OSS adoption was the first step to open their platform and to be freed of a proprietary environment.

- Technological capabilities are the main reason for companies in the *Willing* and *High users* group to expand their OSS usage.

- Organizational capabilities negatively influence adoption of OSS in companies from the *Specialized* group. These companies encounter a lot of organizational constraints to widening OSS usage. In contrast, companies that have decided to promote OSS in their platform adoption decisions use most of the organizational capabilities to increase OSS adoption. They share a culture of innovation and have time and budget available to experiment.

- The reputation of IT managers faced with decisions that may change the current infrastructure of the company is the main concern for *non-adopter* CIOs. They are not ready to assume the cost of a failed adoption.

- Finally, user community effects, as mentioned earlier, were the main dimension in adopting OSS in the two companies of the *High user* group, superseding any TCO or technological fit analysis.

Contributions, limitations, and further research

The results reported in this research have allowed us to gain a deeper understanding of the CIO decision-making process of IT adoption. Although we studied one particular case, OSS adoption, we found some interesting new insights that, albeit supporting most

reported evidence of existing literature, will require some careful reconsideration. First, although in the interviews CIOs explicitly tend to state one set of reasons to make a decision, we found that they seem to implicitly operate by another. Two CIOs stated cost as the main driving factor for software adoption, although they did not adopt Linux after considering it because one had architectural constraints, and the other did not believe the system could sustain the company's expected growth. Another CIO, after stating that his company decided solely based on cost, explained that he would install a Linux server only if IBM guaranteed its reliability and provided support. Actually, this phenomenon is not new and has been widely studied in the organizational learning field, which differentiates between an individual's "espoused theories" and "theories-in-use" (Argyris and Schön 1978). We addressed and solved this problem by classifying the companies according to the observed output, and then going back to the interviews to understand their underlying reasoning process. This has been one main contribution of this research.

Second, this research informs about a new dimension of IT adoption decision making: user community effects. Different factors can drive this dimension, such as pressure from the programming community, social corporate responsibility, non-profit organizations, or culture and social welfare criteria. In some sense, user gangs are influencing CIOs decisions to adopt OSS at the platform level.

Third, this research adds evidence to already existing research on OSS adoption, as we found significant support for most of the current explanations, although we also found that they seem to be of varying significance, depending on the context and level of adoption in each company. In this sense, we support Dedrick and West's (2003) results of technological, organizational and environmental-driven OSS adoption.

Nevertheless, as in most qualitative research, the generalizability of our results is very limited. This is why we are already starting with the second step of our overall research strategy, which involves conducting a survey, so that we can confirm not only the existence of these dimensions on a broader basis, but also get more insight about the relationships that underlie CIO's decision-making processes.

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