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Open Source ERP In Organization: Research Agenda

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Abstract

Open Source Software (OSS) is a growing phenomenon, changing the way in which Information Systems (IS) are developed, distributed and implemented. The success of OSS in the worldwide market for operating systems, web servers, and other infrastructure software is substantial. However, it is still infrequent in ERP type application domains, which are said to be impossible to design from an OS angle. While a significant number of research investigate aspects of OS, few researches were dedicated to OS ERP. Based on a review of the academic and professional literature, this paper aims to improve our understanding of the current influence of OS ERP in organizations, to provide a new light on a previously developed topic and to challenge the conventional wisdom in our field which stipulates that there are some areas like ERP applications where OS could not be developed.

Keywords: ERP, OS, Research agenda

1   INTRODUCTION

Over the last few years, OSS (Linux, Apache, OpenOffice, Tomcat, Firefox, MySQL, Php, etc.) has spread into enterprises, providing evidence of its capacity to operate crucial parts of the firm's IS (Fitzgerald, 2006). A European Commission report shows that in most cases surveyed, the use of OS software generates long-term economies however tremendous the investment, specifically in terms of training (Ghosh, 2006). The OS phenomenon is certainly no boogieman warned about by developers, it is a sea change that should be reckoned with. However, in the above examples, it appears that the stars of OS are essentially technical tools that are designed for and used predominantly by computer specialists. What about business applications that are critical to any enterprise's routine and forms the daily tasks of an accountant, inventory manager, sales manager, etc.?

Today, the battle between the proprietary world and OS is moving from infrastructure layers to application domains. These applications are crucial to the success of an organisation because they handle valuable business processes and logic through which their main revenues are generated. Analysts think that we will see more use of OS ERP in the enterprise. A Forrester Research analysis (2006) concluded that "*Although fewer than half of the large enterprises in Europe and North America are actively using or piloting open source software, a majority of those are using it for mission-critical applications and infrastructure*". This is an indication that OS is moving into mission-critical general business applications and companies, at the same time, are finding OS suitable for running their critical business applications. Dreiling et al., (2005) indicate that OS Enterprise Systems could be considered as a viable alternative to commercial solutions.

Over the past few years, the OS movement has shaken up the business model of ERP vendors, which have seen the advent of OS ERP solutions (Compiere, ERP5, Tiny ERP, etc.) capable of running enterprise IS. These ERP systems are patterned after their forebears but present some specific features in terms of distribution. They are governed by a license, which enforces free availability of the source code. Even though OS is not only about free software, this model, admittedly, enables the firm to gradually engage its resources with the possibility of halting the project at any time, and especially to be independent from the vendor and migrations. The OS ERP, therefore, could become a credible alternative and would be part of the host of possible choices for the company's senior managers. In this respect, proprietary vendors would be forced to provide real added value to their new products to respond to the competition of these new entrants and keep their customers. However, while the switch to OS is

tempting more CIOs into pursuing less expensive computing budget and less complex applications, it may scare managers and users away. What with license freeness not being a critical criterion, functional and financial criteria may impact the choices and decisions of managers prior to embarking on an OS project.

The growing popularity of OS has drawn the attention of professionals and academic researchers alike. There has been a great deal of scholarly research on OS. This literature has attempted to break down this new phenomenon by analyzing the community that develops it (Gossain, 2003), their incentives and mode of organization (Jin et al., 2005; Stewart and Gossain, 2005), development methods (Jørgensen 2001), the comparison with the proprietary world (Boulanger 2005), etc. However, there have been few studies dealing with OS in the application world and specifically the ERP environment, which is said to be impossible to design from an OS angle. With the marketing rhetoric of proprietary vendors who go to great lengths to downplay the breakthrough of OS, as well as the newness of the phenomenon and the poor media hype of its evolution, it is appropriate to rationalize and deal with this issue and initiate academic research to improve our understanding of the significance of OS ERP in organizations.

How to respond to this new model that pushes software freeness to the fore? Should OS ERP systems be invested in? The purpose of this paper is to understand this newcomer and figure out whether it is suited and applicable to the corporate world. What about its importance and role today in enterprises' information systems. What are its main actors and their propositions, and the risks and assets of this new offering? What are the persisting hurdles and hesitations?

The following reflections are based on a review of the academic and professional literature. The main objective is to bring into sharper focus the contours of the OS ERP phenomenon for both the IS research community and IS professionals. In the next pages, the general term OS for Open Source is mostly used.

2   THE BREAKTHROUGH OF OS IN BUSINESS FIRMS

The ever growing use of OS software in firms constitutes one of the main developments currently occurring in the IS area. What was once an idealistic and protest movement is now behind a transition movement in the development practices of IS applications.

To better understand the difference between OS software and proprietary software, it is necessary to define them and present their characteristics. The core principle of OS software is that the source code is public and abides by the so-called "*GPL*" (General Public License), in other words, it must be distributed freely. Related services alone can be sold. By customizing the source code to its needs, the enterprise commits to making all its modifications freely available for all, and freely distributable. The goal of this is to ensure that a malevolent person will not modify some code lines and then try to sell it in full in a proprietary fashion (Fitzgerald 2006). Even though "*free*" as in "free speech" and "*OS*" does not systematically mean "free", free software is predominantly distributed without license costs. By contrast, the traditional market operates on the basis of the sale of operating licenses. The software, developed and sold by traditional vendors, is called "proprietary" because the source code and the instructions that operate the computer and execute the set task are neither public nor readable nor modifiable by the software buyer. The vendor does not sell the actual software but a license and a right of use that remain the vendor's sole property (Adam et al. 2003). By buying this license, the enterprise commits to paying a fixed charge to benefit from upgrades even if it does not need it for its activity.

The OS phenomenon has attracted the attention of researchers from various fields such as IS, social psychology, economics, software engineering, management, etc. For example, part of the literature has addressed the incentives of the different actors participating in OS projects (Hann et al., 2005), the social structure of these projects (Crowston and Howison 2005) and the governance mechanisms (Sagers 2004). Lerner and Tirole (2002), who explain the benefits of such participation, point out that developers improve their knowledge and skills and achieve recognition from their peers. Those OS

projects differ from traditional software development projects in that they are reliant upon a host of voluntary developers, and these form a decentralized community around a virtual network (Gallivan 2001; Markus et al. 2000; Harvey et al. 2005). What many software project managers would have deemed a nightmare in terms of organization and ability to ensure results has turned out to produce potentially better products. Raymond (1999) has used the term "Bazaar" to name this organization whose management processes differ from software design centralized structures in bricks-and-mortar businesses. However, some researchers are running counter to this and argue that OS projects have a hierarchical structure rather than a flat structure (Gacek and Arief 2004; Crowston and Howison 2005). Other researches show that the structure of an OS project is both centralized (there is a relatively stable nucleus consisting of the main contributors) and decentralized (due to the great participation of the different actors in decision-making) (Ghosh 2006).

Other researches have compared quality in OS and proprietary software (Zhao and Elbaum 2003), with a focus on OS development methods (Jørgensen 2001) and the quality of codes and programs (Stamelos et al. 2002). The results and viewpoints are contradictory. Kuan (2001) and Klang (2005), who have worked on the specific features of OS products and projects, believe that OS software is of better quality than proprietary software. An in-depth analysis found good evidence that OS code quality appears to be at least equal and sometimes better than proprietary software (Samoladas et al., 2004). Walia et al. (2006) point out that OS products are safer and less vulnerable than proprietary software. In the meantime, several experts have questioned their quality, criticizing their lack of support as well as security and reliability problems (Shell 2005). Besides, some projects on innovation show that OS products are not dramatically different from the proprietary world. According to Bower and Christensen (1995), technological changes must come with a range of new functionalities that can change the nature of competition in the market. Despite differences in terms of design processes (Bonaccorsi, Rossi 2003; Scacchi et al. 2006) and drivers of innovation and technological development, OS is still similar to proprietary software (Von Hippel and Von Krogh 2003). Most packages so far have copied the basic functionality of pre-existing proprietary software and are based on an incremental improvement process and ultimately offer the same functionalities.

The OS world represents a new concept for most businesses along with a completely virtual novelty (Markus et al. 2000). And yet, businesses have fallen prey to the signals of OS software, which is now accepted currency on Web servers and operating systems. However, it is still infrequent in businesses' application areas compared to other IT with good track records (Fitzgerald and Kenny 2003).

Conventional wisdom says that there are some areas like ERP applications where there is a real difficulty to develop a serious OS solution capable to compete with SAP and others products (Dreiling et al., 2005). ERP applications are a tough category, because the program runs everything from a company's accounting to manufacturing to human resources. Instead controlling the basic functions of a computer (operating systems), the ERP applications are programs that tell a computer how to think, calculate, and manage firm's data and resources. The software usually takes a lot of customization and can cost companies millions of dollars to install and maintain. Now, programmers are going beyond operating systems to build business software products based on open code. Until today, few projects have studied the implementation of OS ERP in businesses even though a number of ERP systems in the form of OS are taking hold.

2.1   OS ERP: the new challenger of traditional vendors ?

The methods and ideas on which OS is based are gaining ground. This success, however, fails to knock proprietary ERP systems off their pedestal. The latter have reached a high level of maturity to the extent that they play a key role in integrating enterprise IS (El Amrani et al. 2006). Ever since the late 90s, businesses have invested huge amounts of money into ERP systems and it appears that many of them have embraced these now popular concepts such as common database, standardization and best practices for redesigning their business processes (Robey et al., 2002). Specifically, this shows that ERP

is not an ephemeral or short-lived solution (Wang 2001). The figures steadily published in the business press underscore businesses' craze for these solutions, and their number is going up and up despite the economic downturn in the last few years. The 90s euphoria and animation which marked the transition to the euro and the year 2000 are not likely to happen again. Nevertheless, there is already a fully-formed and significant base of large companies equipped with ERP systems. The extension of vendors' offerings to small and middle size businesses - a fast-growing market that did not have access to this type of products for a long time – shows how attractive these solutions are.

In the last few years, however, the euphoria about ERP systems has given way to analyses portraying them as the worst management tools ever: too expensive, frequently delayed deadlines, exploded budgets and an economic input difficult to assess (Kallinikos, 2004)!. In addition, following purchases or groupings, the number of surviving proprietary software vendor is getting smaller and smaller, which shows that no vendor can guarantee their solution is a lasting one. This results in an almost monopolistic situation, which is very detrimental to both the developments and the costs, and reducing the choice for businesses. OS ERP systems grew partly out of this lapse, with solutions offering a credible alternative to proprietary vendors' traditional offerings.

Today, the emergence of OS ERP as a viable market challenger to proprietary software products is real (Dreiling et al., 2005). The research firm Gartner (2006) forecasts that demand for OS ERP software should grow significantly in the next few years, spurred by free licenses and the desire not be bonded to a vendor. This situation marks one step closer to changing the applications business long dominated by the likes of SAP, Oracle and Microsoft. SMEs clearly indicated more favorable inclinations toward OS than large firms which would have a natural tendency to go with a more mature and more completely packaged proprietary product.

2.2   OS ERP: The interesting niches in the small and middle size businesses

Alongside proprietary software offerings for small and middle size businesses (SAP Business One, Sage, Microsoft Navision, etc.), currently available OS ERP solutions are becoming increasingly appealing to businesses with annual revenues ranging from 2 to 200 million dollars, a trend that major groups are still presumably skeptical about. Many mid-market firms are now tapping into OS ERP, for reasons of cost (because it's free) and flexibility. They want a system they can adapt to their business without astronomical cost. By saving licensing dollars with OS ERP, they could redirect monies to additional customization efforts and getting a better fit at the end, for the same outlay as commercial software. However, no matter its source, ERP software would require significant customization effort.

Proprietary ERP Software prioritizes large enterprise accounts and provides more functionality than firms need at a price they can't afford. Result, small businesses that can't afford Oracle or SAP are now interested by OS application companies like Compiere, SugarCRM, Tiny ERP, ERP5, etc.. The most prominent OS ERP system and which has already gained recognition worldwide is Compiere. The company says it broke through the 1,2 million mark of downloaded software. This solution was born in Germany and devised by a former engineer of SAP and Oracle. It spans several management domains (finances, customer relationship, logistics, e-commerce, etc.). Much like the inception of proprietary ERP systems, certain domains are left out of the functional coverage of OS software packages, like production management and payroll. The complexity of the former and the national characteristics of the latter are hampering the development of such an offering. However, this gap should be put into perspective because not all businesses need to deal with this issue. What's more, many proprietary vendors, depending on their specialty, do not offer such specific modules either; and some OS vendors are now developing certain missing modules with new functionalities within customer companies. These will build their offerings and then be turned over to the community for improvements.

Several companies are now interested in OS ERP offerings. The first profile is that of small and middle size companies which have already installed ERP modules from a proprietary vendor. These companies are in the process of upgrading their application equipment and generally trying to obtain an OS ERP

system to replace homemade development or a software package now to difficult to upgrade. Some companies have found themselves in "blocked" transition with proprietary market vendors because of a purchase project, or even, sometimes, because the vendor was unable to ensure upgrades and thus dropped out of the market. Other companies are moving toward an OS ERP solution because they need a flexible solution that can fit their activity. These companies think that proprietary ERP systems are very structuring for their organization and very restrictive for their users. Some other fast-growing companies (start-up or small/middle size business) are looking for a solution that is upgradeable enough to support them at least in the middle term. These companies are looking to invest in a solution which may actually be dropped in a few months' time. For those companies, the absence of license costs as well as input costs are viewed as an advantage.

There is also a certain type of companies with a specific character or culture. These are familiar with the OS world and have already deployed OS applications (linux or appach, for example) within their organization. The resort to an OS ERP system thus flows from an IS strategy based on OS software and represents a sign of trust in the free software world which has a good track record in several domains. Finally, there are certain OS-prone corporate customers that wish to use it like a brick in their IS to support their internal development. OS ERP is viewed as yet another element in the general computerization process of companies without related basic change.

Finally, OS ERP proponents seem to say that companies are driven by the assumed flexibility of their products and also by the software improvement services through the pooling of their development and distribution of maintenance costs. However, this will to share (turn any software change over to the community's development repository) raises some doubts, not least when the enterprise makes some specific changes to its business core giving it a competitive edge. The risk is that a competitor may adopt the same technology. This tension and this paradox of wanting to take advantage of OS while limiting access to the advanced source code (desire for protection) might cause some problems.

2.3   OS ERP: the advantages of a model that depends solely on service and support

Open source software goes a lot of good things. It's inexpensive, shared, and creates alternatives to monopolistic proprietary software. While the main motive at the start of free software originated essentially from the reaction of a few to the monopolistic model of proprietary vendors, companies today are encouraged by the free license, the distribution of maintenance costs as well as by an appropriate response to their specific needs due to the availability of the source code (Wichman 2002).

To stand apart from traditional software packages and attract companies, OS vendors are banking on how easily their solutions adapt through free availability of the source code. Public availability of the source code brings some flexibility to how the ERP system adapts to companies' business characteristics. With support from a specialized integrator or in-house computer skills, the software can be tailored to the enterprise's characteristics. Yet, some similar arguments made in the past when proprietary ERP systems came along were not easy to put into practice (Soh et al. 2000). Companies could not randomly work on the source code without jeopardizing the reliability of the larger system, and without permission from the proprietary vendor. A number of technical and organizational skills are necessary to make this operation successful. Direct intervention on the source code is highly advised against by proprietary vendors who do not advocate modifying their ERP. Many proprietary software product licenses include clauses that forbid any modification of the product without the vendor's permission. To introduce changes in the source program of the ERP system to tailor it to the enterprise's organization is likely, they argue, to undermine the tool performance and the promised integration; and also bring about future problems related to maintenance and upgrades. Instead, they recommend a global adaptation of the enterprise's organization to the best practices of ERP, which means that the enterprise will be compelled to engage in a program to change its organizational processes.

Still, OS ERP vendors fit their strategy around the opening up of the source code, which they have presumably much to benefit from. However, the risk is to lapse into the flaws of the specific development model whose great flexibility could be costly in terms of maintenance and create a high dependence for its designer (Brehm et al 2001). Such latitude short of certification from consultants can lead to very variable service offerings in terms of quality. Ultimately, the main obstacle to OS ERP development may thus come from scant quality commercial offerings.

The other advantage pertains to the independence from the vendor, migrations and upgrades. Because the community owns the intellectual property (the source code), the members can never be locked into a single vendor. In our opinion, this is truly a radical business model that will continue to challenge traditional software development. As users look to the community for support they become customers for the communities services and various members of the community emerge as providers of paid for services, such as customization, support, and even packaging. In the case of a proprietary solution, the enterprise signs up to a long-term relationship with the vendor and buys a license as well as the right to buy a new one with each upgrade. With OS ERP, there is no license and the upgrades are not mandatory. The absence of fee-based license contracts does not put the vendor under any obligation toward their customers. All the rights and duties of each party are laid down in the support contract signed concurrently with the software houses. Its conclusion is therefore critical to a professional use. This independence is not complete, however, because the enterprise will remain bonded to the community in charge of developing the tool.

In terms of project management, OS ERP development comprises the same procedures and risks as their proprietary counterparts. Although the operating license is free, the process for expressing needs, customization, tests and change conduct would not change for all that. The difference lies in the absence of relationships with the vendor in terms of advice, technical setup, upgrades, license management, etc. However, there is a much wider scope for testing and evaluating the functionalities of the ERP system. The free availability of the software package makes it easy to study and test freely whether the modules offer flexibility. This evaluation is done at the pace of the enterprise and without initial investment. The enterprise will sign a contract with the integrator once they have made certain that the product meets the needs of the organization. With a proprietary ERP system, the enterprise must have a license prior to embarking on a pilot project. According to OS ERP proponents, the modules are interchangeable. It is thus possible to remove one or several modules and limit OS ERP use to certain modules. This was the point made by the proprietary world in its early stages. Experience has revealed the difficulties encountered by businesses when they decided to backtrack and/or back out (Markus et al. 2001).

Besides, this free-of-charge use masks some hidden costs that are passed on to service. Once the package is bought or the distribution downloaded, sophisticated skills are frequently necessary, specifically in terms of integration. Training, support and update costs should also be accommodated unless the enterprise has its own in-house teams, which is another form of fixed expenditure. Regarding this financial aspect, proprietary vendors indicate that the overall cost for adopting an OS ERP solution might actually be more expensive than their commercial solutions (Hickman 2004; Russo et al. 2003).

Finally, if one looks at the OS development cycle applied to the enterprise, it can reduce the time to market. For example, the development cycle of Tiny ERP operates along two distinct lines:
- Stable: a version is released every 6 to 8 months and designed to go into production, potential bugs are corrected in the following days

- Development: a new version is released every month. It has all the latest functionalities and modules. It is designed solely for texts until it is stabilized.

2.4 The community's role in OS ERP development

The OS world has an important asset, it does not move based on the profitability constraints of a vendor but rather based on the needs of a user community. This community is dynamic and international and consists of individuals, companies, universities and service companies.

OS ERP draws largely upon a movement of virtual collaborative development. Virtual teams have their own modes of management and control of distributed teams, different cultures, technological incompatibilities as well as language barriers (Gallivan 2001). By remaining available and open to any input from new actors, OS projects could obtain an unlimited flow of pioneering ideas (Markus et al 2000). Although each OS project is different, the IS literature has highlighted a number of recurrent characteristics (Crowston, Howison 2005). Governance relies on the legitimacy of skills and contributions. The organization is usually virtual with different levels. OS software is developed based on a collaborative working mode and built from the contributions of the community's members (main developer, developer and user). A core team consisting of high-level contributors initiates the project and forms partnerships with the private or public world to keep the solution going and develop it. It also monitors and ensures the coherence and quality of developments. This organization can produce software at low cost and high technical performance. Moreover, the community plays a major role in debugging new versions, sometimes ensuring large-scale and responsive quality control.

To promote its products, communities seek out software house type partnerships which can share the promotion and marketing effort. For example, when visiting the website of the vendor Compiere, one finds out that they are strengthening their teams and developing their offerings to a network of new partner specialized service or support providers companies that has been growing steadily in the last few years. These partners are certified and offer OS ERP systems in their catalogues, complete with tailored services (implementation, training and support services to users). Some traditional integrators attempting to retain their business portfolio are also positioning on these markets. In some instances, they handle the promotion of OS directly with their customers to position themselves as pioneers. However, although some businesses in Europe and especially in the United States have installed them, the market is primarily geared toward small and middle size businesses. Over the past two years, OS ERP systems have partly caught up and vendors like Tiny, ERP5, Compiere are raking in customers, essentially small and middle size companies and industries so far.

The network of Compiere partners is not merely a distribution network; it is the key part to the operation of its ecosystem. Partners are consulted about the development priorities and receive proactive information as well as extensive support. Finally, to bring a core competency to its partner network, Compiere runs every year four advanced technical training sessions for its partners, letting them deepen their knowledge of the Compiere OS ERP application.

Finally, visibility is a key principle. Anything that is produced, whether it is the code or the documentation, is in the public domain and easy to access. This also involves frequently delivering components that are reviewed and tested by peers or users. These are therefore very much involved in the development process.

3 THE OBSTACLES TO OS ERP DEVELOPMENT: SMOOTH OUT THE DISADVANTAGES

The OS ERP world has not been understood by all enterprises. It is still synonymous with risk-taking (Ghosh 2006). A great deal of enterprises will likely be reluctant to this evolution. Such reluctance can be explained by compliance with and adherence to legislations, security or preservation of data confidentiality. That is, the assertion of total freeness of rights is a very recent notion and it makes perfect sense that it has enterprises baffled and wondering about issues like support, intrinsic quality of used codes, stability, portability and upgrade ability of the solution. This position is shared by several researchers for whom the support and maintenance context could limit the resort to OS ERP (Boulanger 2005). Maintenance and the technical aid center turn out to be the weakest link of OS ERP.

Communities, driven by established computer specialists, underestimate this difficulty. As it is, for users to be happy with OS ERP, the community must see to it that maintenance is structured and if it fails to do so, its software will likely drift into oblivion.

OS ERP systems have been less than five years in existence. Unsurprisingly, they lack maturity and come up against the necessity to have considerable and consistent human and financial means to improve their services and comply with regulatory and social constraints. Based on that, the core message of proprietary software is that the vast majority of OS ERP is too immature to be dangerous. Major proprietary ERP vendors do not feel threatened by the possibility of OS ERP. For example, SAP directors believe that OS ERP won't be a good strategic choice for enterprises because they are in a hype cycle and their applications could not support and run the business correctly. OS ERP products are viewed as some features that are nice to have and support some people and their productivity. Furthermore, the legal issues will be factors in inhibiting the development of OS ERP. Clearly, the big companies like SAP, Oracle, Microsoft and others want to stay on top, and can be dismissive of OS projects that could be disruptive to their business models. OS ERP does have a revolution underway, albeit slowly because the community has neither the marketing power of top vendors nor the same distribution network. To cope with this fact and an often changing context, free software developers must find solutions to a number of practical questions that make a customer vendor-enterprise relationship work right.

Cultural differences between managers and computer specialists are another obstacle. Managers prefer to sustain the comfort of their relationships with proprietary vendors in terms of support, maintenance, training, etc.; but they would consider them if almost all the risks were already known and identified by business managements. The critical factor for top management lies in costs control because it increases profitability favorably. Again, the results are conclusive in the other areas of OS. This control has been validated by user organizations where installed applications have proven effective and sustainable over time.

4   THE TRANSITION PHASE: FROM OPTION STATUS TO STRATEGIC IS STRATEGIC GUIDELINE

Inadequate understanding of the OS model is the main obstacle to their development. To overcome this preconceived idea, it is important to walk a fine line between community development and economic development. Paradoxically enough, OS advocates who promoted open code turn out to be merely interested in its freeness. The utopia of totally free software would not materialize simply because a model based on free resources is not viable over the long term. To shift OS from the status of option over to that of IS strategic guideline requires a more efficient promotion of technical support service offerings which lets customers benefit from a number of warranties, including code quality and evolution over time. Clearly, users will demand more and more warranties on product quality, related services and their sustainability. In the meantime, however, they will not go over a certain limit for the prices of licenses and support. Be that as it may, the software economy must question itself.

Today, the OS ERP world falls behind the proprietary world (at the workstation level) because it focused first on server environments while application solutions vendors went ahead with workstations. To turn things around, it must revolutionize the application software world by moving toward web based or rich applications technologies or else it is doomed to lose the battle. For example, ERP experts say that if vendors and companies switch rapidly to SOA (Service-Oriented Architecture) and web services, it will the end of the ERP market as we now know it and it represents an opportunity for OS ERP. If they manage to take an architectural turn toward new technologies (Linux, Web) allowing them to set up this paradigm, they would eventually outpace those of the proprietary world. But there is no telling if they would be able to compete with hosted application models offered, for example, by Salesforce.com and recently SAP.

With the rise of OS, however tentative but real proprietary vendors have responded in short order. They caught on to the competition OS could create, especially in the world of SMEs and are now looking to provide some strategic solutions against this newcomer. Some vendors are preparing their future by

investing massively in R&D. For example, SAP decided to invest over 900 million euros in a five-year span to develop its offerings to SMEs. ERP proprietary companies are also fighting back on freeness. As remarked by Niederman et al., (2006), SAP expected to develop new strategies and approaches for going head to head with OS providers. That is, SAP developed an extensive user network through its SAP Developer Network (SDN) Web site and announced intentions to create extensive user programs based on "open communities", "community process", and "community structure" (SAP France, 2006). Oracle and Microsoft launched so-called "express" free versions of their databases or development tools. The German vendor SAP went so far as to hand over its database (MaxDB) to the community MySQL to reinforce the chances of this database to become a serious alternative to Oracle, which is its most threatening ERP competitor. Through this agreement, SAP is letting go a bit more of its suppliers/competitors, Oracle and Microsoft, without causing a qualitative drop of its offerings. Finally, it should be mentioned that proprietary software vendors sometimes resort to OS bricks in their development, on upgrade ability and cost grounds. But few of them agree to make it public.

5   OS ERP RESEARCH AGENDA

Papers reporting the research results on proprietary ERP have been published extensively. However, until today there has been very little reported research specifically on OS ERP. We still lack information and data. Numerous articles related to OS ERP have been published in non-academic magazines. Many practitioners believe academic IS research findings often do not have direct or immediate relevance (Benbasat and Zmud, 1999). Result, they are ignoring our production. I believe that we (IS academics) should not left these kinds of analyses to commercial industry analysts, who are interested in 'constructing' expectations and the 'market'. At the same time, we should not make the same mistake when we missed out to predict the success of ERP projects by the end of the 1990s.

Yet OS ERP is not the subject of much IS research, and it is rarely taught in schools. Clearly, this situation cannot continue if we are to remain responsive to the changing conditions of practice. IS technology changes rapidly. As a result, what we study changes. I strongly believe that IS as an academic discipline will continue not only to exist but to prosper. To that end, IS academics need to understand the changes that are occurring in industry and how they affect us. Thus, we may be able to provide an even more valuable service to industry and society, by doing research that may appear relevant to practitioners. I argue that our research and the underlying reward system that drives it, needs to respond to these concerns. Thus, more academic research and case studies are required.

It is certainly too early to predict what the course of OS ERP will be. However, there are many topics of interest to MIS scholars. Tracking and understanding the presence of OS ERP in large firms and SMES is particularly important in understanding the maturity of OS. The main questions are clustered around the basics such as:

- What is available? The characteristics of SMEs implementing OS ERP as their primary solution and the number of large firms implementing OS ERP as an alternative solution in a specific business area.

- What is the implementation process?

- How to integrate them with the rest of the IT portfolio and how to maintain and eventually retire them. For most adopting organizations, OS ERP systems must be integrated with a variety of other systems and technologies. IS research should focus on the entire package of systems, not just on the technological aspects of systems.

- What does it really cost to implement OS ERP solutions? This business model is based mainly on services. Thus this, investment could affect training and staff skills, compatibility among applications, challenges of customization or upgrading over time, and pressures for participation in the on-going support of the acquired systems.

- The extent and growth rate of the collaborative community supporting an OS ERP product. IS research should address this important issue.

- Another theme that could be interesting to study is the situation where the company desires major customization, which just isn't available in the proprietary ERP.

This list of themes is incomplete. The objective is to mention the most frequently issue facing the IS academic discipline and practitioners. Each of these themes could be supported by different theories. Niederman et al., (2006) present seven theoretical approaches (adaptive structuration theory, agency theory, complexity theory, diffusion theory, game theory, social network theory, and transaction cost theory) among the most familiar to IS researchers that they could apply to study and examine the OS ERP issues. These theories were selected to acknowledge the variation in the type of MIS research that they target. Moreover, researchers could use many approaches to gather data: case studies, surveys, interview based research and use of statistical analysis of archival data. Those opting for case studies need to consider the meanings and viewpoints of those both producing and using OS ERP to develop an understanding of their purposes and experiences.

6   CONCLUSION

The relatively limited number of research projects on OS ERP shows that the implications of this type of solutions are inadequately studied. This paper is dedicated to giving a first perspective on the advent of OS ERP within organizations.

The OS ERP market is not a passing delusion. It is certainly too early to assess the impact on the market structure and the extent to which companies use it; but the market shares obtained by OS could have an impact similar to when specific development transitioned to software packages in the 80s. Much like ERP vendors (SAP, Oracle) blew apart the model of manufacturers (IBM, Bull), the advent of the OS age is shaking common practice with well established proprietary ERP vendors. SAP, Microsoft and Oracle are today the top players of software packages. Salesforce.com and Compiere may be some of the winners in the years to come.

Clearly, the new model will not supersede the old one within a few months but the rules of the game are changing. Not all enterprises will switch to OS ERP systems all of a sudden. These are rather positioned as an alternative to proprietary ERP systems and are not aimed at replacing them altogether.

Like any sustainable industry, the OS world goes through changes. It is important to put into perspective the aggressive drives of proprietary vendors who go to great lengths to discredit the breakthrough of OS and the self-congratulatory discourses of free software players. OS ERP systems are still a small market share for enterprises, however fast growing. One should not be deluded by the colossal figures given by OS vendors regarding the number of downloads of their applications. The millions of downloads announced by these are therefore not significant because they do not automatically translate into maintenance contracts, which are essential to a professional use of the solutions.

In the years to come, it will be interesting to look at how OS software packages will handle the paradox between "cultivating" informal structures and handle them conventionally by offering commercial packages. However, there is a significant difference between getting access to software and the possibility to profit from it in a business context. It is not the tool that provides value but how it is used. To this day, OS has carved out a path through the IS infrastructure of enterprises and ERP-type business software are likely to follow suit. There is a gap between access to OS and use, and it can be filled by checking out how OS ERP applications are installed and used by enterprises. We still lack hindsight and feedback from enterprises which must be carefully examined. Given the lack of serious empirical studies about this question, it is urgent to take on this topic and make it a subject matter for research.

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