

A BRIEF SURVEY OF OPEN SOURCE ERP SYSTEMS USAGE ON BRAZILIAN ORGANIZATIONS

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ABSTRACT

This paper is aimed at doing quantitative research and providing a brief survey of Brazilian Organizations users of Open Source ERP systems. Firstly, it focuses on the general aspects of ERP systems as the features of Open Source Software. Secondly, the main sample data explanation is presented followed by some discussion. In general the companies are small and medium-sized and pursue the utilization of basic modules of Open Source ERP systems. In most cases, the implementation costs were within the expectations, as well as the time required for the full implementation. The Open Source choice seemed to be a good opportunity for these companies to develop their process and gain competitiveness. This paper is important to point out directions to companies that aims at Open Source ERP systems implementation as well as consultants interested in offer the service.

KEYWORDS

Open Source ERP Systems, ERP Systems

1. INTRODUCTION

According to Jacobs & Weston (2007), in the mid-1970s a plenty of software companies have been established with the purpose of developing software standards for integrated business solutions. Some of these developers “saw the need for prepackaged enterprise technology solutions as an alternative to customized business software applications”.

Souza & Saccol (2003) characterize ERPs (Enterprise Resource Planning) as software package responsible to integrate information related to business processes covering the companies. O’Brien & Marakas (2006) exemplify this integration regarding processing and searching of data on stock, invoicing, schedule for raw material consumption, human resources, among others. Both authors, as well as Laudon & Laudon (2007), point their composition by units/packages.

Besides classification as IS specific subtype, ERP system may or may not be private software (license payment), and may have an open or closed source code besides other characteristics to possibly be classified.

In this context, Gacek & Arief (2004) states that the term “Open Source” is applied to software development projects based on the contribution of several geographically dispersed collaborators, but who maintain an online contact with the project. According to Carvalho & Campos (2006), there are a number of options of Open Source ERP system in the market, presenting different levels of project maturity, different sizes of base, features, technologies, and so on.

In addition to that, Open Source ERP Systems is increasingly accepted by the general market, and one of the reasons is cost and perception by the companies that customizations is an undeniable factor in any ERP performing and maintenance. The options of open source code tend to be forward the private ones, since they offer unlimited access to the system core (Carvalho & Campos, 2006). However it is important to highlight that some definitions support it according to the kind of license, whether is possible or not to modify the source code.

Therefore, when considering the existence of many options available in the market and their distinction for proprietary solutions, this work is justified by the absence of similar work, in order to outline a preliminary profile of companies using Open Source ERP systems in Brazil. This study is important to point

out directions to companies that intend Open Source ERP systems implementation as well as consultants interested in offer the service.

The paper is organized as follow: section 2 contextualizes ERP systems, highlighting the main issues related to their use and implementation. Section 3 presents the context of the Open Source ERP software, characterizing basic concepts to discuss the features present in this kind of software and the reasons to adopt it. The Results and the Methodology are presented in Section 4, followed by the Conclusion and some considerations about the collected data.

2. ERP SYSTEMS

According to Leon (2007) the definition of an ERP is involved with “techniques and concepts for integrated management of business as a whole from the viewpoint of effective use of management resources to improve the efficiency of enterprise management. ERP packages are integrated software packages that support there ERP concepts” .

Laudon & Laudon (2007) states this suite containing integrated software modules is based in a simple database, centralizing the gathering of processes information such as production, finances, accounting, marketing, among others. According to the authors, this great amount of data would be available to be applied in a myriad of intra-organizational areas.

According to Souza (2001, p.1) the significant growth in the use of ERPs is due to the competitive pressure of the market.

Companies recognized the need to better coordinate the activities of their value chains aiming at eliminating resource wastes, reducing costs, and improving the time of answer to changes of the market needs.

O’Brien & Marakas (2006) mention that the main benefits offered by companies using ERP systems are increasing of quality and efficiency in processes, cost reduction, support to decision-making phases, and better enterprise agility.

According to Inside-ERP (2008), since ERPs are linked to several areas of the company, their benefits are beyond the tangible reduction of costs. The intangible benefits are noticed in the reduction of time to solve problems, viability of connection among several branches, standardization and acceleration of organizational processes, and better affiliation among company, partners and suppliers.

3. OPEN SOURCE ERP SYSTEMS

The basic requirement for the feasibility of an Open Source project is to make its source code available. Regarding the term definition, Gacek & Arief (2004) refer to an “Open Source Initiative” (OSI), highlighting three basic aspects of the definition: free distribution of the software, access to the source code, and right to create derivative work.

According to OSI website (<http://www.opensource.org>), “is the stewards of the Open Source Definition and the community-recognized body for reviewing and approving licenses as Open Source Definition-conformant”. Their main goal is to act as a charter institution and to prevent misuse of the Open Source term. Another important institution for Open Source universe is the Free Software Foundation (FSF), whose goals are to promote the development and use of free software by maintaining the Free Software Definition and enforcing the General Public License (GPL) when copyright infringement occurs. There are five licensing classifications in Open Source universe, the first three according to FSF and the last two according to OSI.

The GPL declares that everyone can have access to the source code and any derived work can only be distributed under the same license terms. Besides, you can execute the software, study, suit and distribute its source code. There are three classification groups of GPL: Open Source Software under the GPL; Open Source Software not under the GPL; Not Open Source Software. The OSI defines that there are just Open Source Software and Not Open Source Software.

As above mentioned, the Open Source ERP systems have increasingly been accepted by the market in general. Some reasons are the cost factor and the company’s perception that customization is an undeniable

constant in implementation projects and ERP maintenance. In this subject, the options of open code surpass the private one, since they offer facilities for updates and bug fixes faster (Carvalho & Campos, 2006).

Finally, Herzog (2006) declares that this type of solution is frequently targeted by companies whose organizational and flexibility requirements are not covered by proprietary software. Similar scenarios are found in companies demanding ongoing adaptation of highly variable processes.

3.1 Reasons to Choice Open Source ERP

According to Serrano & Sarriegi (2006), both Open Source ERPs and owners involve complex implementation processes in which companies and software are not familiar to changes in their processes. This mutual adaptation generally involves consultancy companies so that processes are less traumatic and less costing in what regards time and money. The authors also point that the benefits when choosing Open Source Systems are more substantial due to:

- Better adaptability: due to the availability of the software source code and its free manipulation, the customization tends to be easier.
- Minimum supplier dependency: once a private solution is achieved, the company will be a “hostage” of the company which owns the project. Therefore, in case the owner leaves the project or the market, the continuity of the updating and maintenance of the ERP on the client company may be seriously jeopardized, since it will not have access to the source code of the software.
- Cost reduction: the Open Source ERP have no costs on license acquisition and usually do not need expensive equipment to be nicely performed. However Boznan et al. (2002) plead that comparing the total costs of ownership is the fairest way to confront costs, and not only caring about the software acquisition.

Hexsel (2002) contributes with another point of view arguing about the low social cost. While the private software development is oriented to create benefits to the manufacturer, the Open Source Software aims to benefit its user. Furthermore, there is a phenomenon called software bloat. It happens when the private manufacturer develops new functions that will be useful only for a little portion of the users, and these new capacities commonly are just perfunctory. Therefore the software tends to offer a lot of functions with limited usefulness for most users.

Finally, according to Carvalho & Campos (2006), once the customizations are understood as undeniable constant, the adoption of Open Source solutions are the better option to be chosen.

4. RESULTS

This section presents the results. At the beginning, the used methodology is explained in order to provide how the research was conducted. Following, the results are presented and discussed, given a brief overview of the companies, evolving topics as for the reasons why to adopt Open Source solution, expectations about the implementation, training and utilization, as well as strategic goals.

4.1 Methodology

This work is characterized as descriptive, cross-sectional and quantitative. According to Gil (1999), descriptive research seeks to describe the characteristics of a given population, such as income level, educational level, age, etc. The study is also classified as transverse. Hair et. al. (2005) explains that these types of work provide data in a single point in time, and was then synthesized with the aid of some statistical tool.

The sample data is classified as non-probabilistic accessibility. The authors justify the classification as such given the small number of questionnaires (26) answered, despite the great number of invites made into electronic channels, as explained below. Gil (1999) says that in the samples non-probabilistic by accessibility the researcher selects the elements that have access, even if they can, somehow, to represent the population. Every respondent was, somehow, related with an enterprise that was, in the survey moment, using an Open Source ERP.

In turn, Hair et al. (2005) says that in the non-probability sampling, the choice of elements involved in the research is not necessarily done with the purpose to be statistically representative of the population. So it is

not possible to generalize the findings to the general population with a measured degree of security. The author further explains that accessibility samples involve the use of sample elements that are more widely available as possible to take part in the study that can provide the necessary information.

In order to collect the relevant data, we used structured self-administered questionnaires. According to Hair et al. (2005), self-administered questionnaires are answered by the respondents without the presence of a researcher. As a tool for enabling the questionnaires, we used the Open Source software LimeSurvey. It has several advanced options for configuring a questionnaire without the need of the user field of software development.

As Hair et al (2005) explains, the biggest challenge of a self-administered questionnaire is the low rate of response from the audience. In order to obtain the largest number of prospective respondents, we used the following electronic channels: online forums related support to almost of Open Source ERP market with known users in Brazil, e-mail lists on the support and development of respective software, lists of email on contact professionals who work with Open Source solutions or solutions with private; indirect contact to the database of companies that support their software, invitations to participate in research to professionals of the area, and also by means of social networking specialist.

4.2 Data Sample Characterization

The first part of the questionnaire intends to determine general information about the companies. The questions were related to the company's size, branch and which Open Source ERP systems were selected.

Table 1. How many employees work in the company?

Number of Employees	Frequency
From 1 up to 9	31%
From 10 up to 49	42%
From 50 up to 99	8%
More than 100	19%

From Table 1 it is possible to observe that the majority (73%) of companies surveyed has a staff of less than 49 employees, characterized as micro and small businesses, according to SEBRAE (Brazilian Agency for Support to Entrepreneurship and Small Business Owners) trading companies and services classification.

Table 2. Which branch of the company's operations?

Company's Operations	Frequency
Industry	44%
Mercantile	28%
Mercantile: Technology	24%
Public Administration	4%

About 52% of the data sample was classified as mercantile and 44% in the industrial. However, it is important to emphasize the concentration of companies within the technology area, 24% according the Table 2.

There is a predominance of Open Source ERPs systems ADempiere, Freedom and Compieri. Freedom was the first Brazilian *Open Source* management software developed in Java programming language and works with any operating system. The ADempiere is a fork (branch) of Compieri, that while abroad, as well as Freedom, supports Portuguese language. Finally, the Compieri presents itself as the third most used according to the sample (Table 3).

Table 3. Which of the following ERP systems was implemented in your company?

ERP	Frequency
Aempiere	27%
Freedom	23%
Compiere	15%
Others	35%

4.3 Factors affecting the Software Adoption

The second part tries to find out the main factors related to the ERP selection and implementation.

It is interesting to highlight that the majority of companies surveyed has not had a history on using any ERP (62%), therefore, it can be inferred that the majority of companies surveyed preferred to adopt an *Open Source* solution as the first integrated management software.

Table 4. Why did the company choose this ERP Open Source solution?

Reason	Frequency
Be Competitive	35%
Flexibility / Avoid Private software limitations	15%
Software Continuity	11%
Financial Criteria	12%
The company didn't use an Open Source ERP solution	12%
Other purposes	15%

First of all, we try to point out why these companies choose an Open Source solution (Table 4), since the major reason for adopting the software was related to the search for competitiveness (34.6%) and the flexibility inherent in its characteristics. At first glance, our hypothesis considered costs (Financial Criteria) as the main reason. However, the companies considered the system as a component of the strategy.

Table 5. Which of these features suit you best in this Open Source ERP solution?

Features	Frequency
Friendly Interface	19%
Active Community	15%
Scalability	12%
Easy Customization	12%
Documentation Availability	11%
Other	31%

We also try to figure out what kind of system features has influence on the choice. Among the features that most respondents liked, we have: Friendly Interface, Active Community, Easy customization and Scalability (Table 5). It is not possible to observe a polarization of only a few features that satisfied the sample.

Table 6. Which are the most important modules or functions in the software?

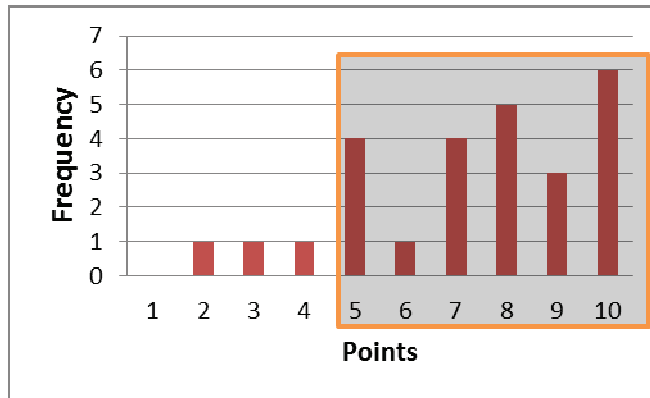
Modules/Functions	Frequency
General Management	35%
Financial / Accountancy Management	27%
Material Stock / Management	15%
Other	23%

In the Table 6 we can see the predominance of use of three main modules: General Management, Finance/Accountancy Management and Materials/Stock Management. It can be concluded these basic functions were predominant in the sample, i.e., the main reason to implement ERP system is the operational

excellence, as Laudon & Laudon (2007) point one of the main objectives for the companies implement information systems.

4.4 Implementation Issues

The final part of the questionnaire tried to study topics related to the system implementation issues. It is important to verify if the systems overcome the expectations and, consequently if the strategy was important to reach the success on implementation.



Graph 1. Were the implementation costs according to expectations?

Rate, with 1 being "Strongly Disagree" and 10 for "Strongly Agree" [The implementation costs were according expectations]

About implementation costs, as depicted on Graph 1, 73% of respondents attributed 6 points or more, or most of the projects reported here have made their implementations within their budget expectations. Thus, the project was executed on estimated costs. Although Open Source system do not have licenses costs, the probable budget is spent with IT staff and/or consultants.

Table 7. What was the total time of implementation (considering only the steps: system acquisition, customization, and initial employee training)?

Time of Implementation	Frequency
From 1 up to 6 months	35%
From 7 up to 12 months	27%
From 13 up to 24 months	15%

Considering time of implementation, note that 77% of the total time of implementation took a year or less, while 38.5% lasted less than six months (Table 7). This time is according to the literature, considering the licensed ERP systems for this size of companies.

Table 8. How many employees participated directly in the implementation?

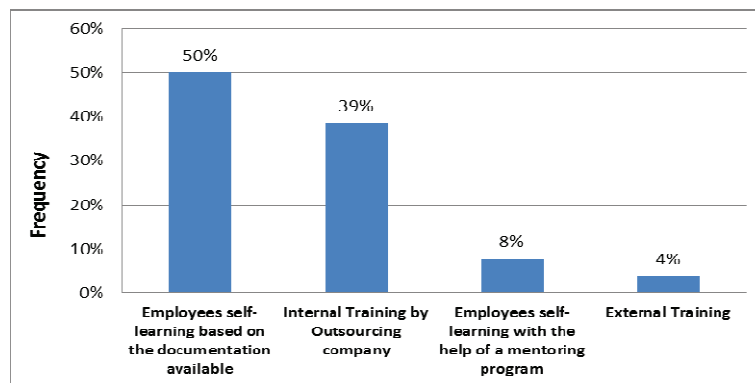
Number of Employees	Frequency
From 1 up to 2	42%
From 3 up to 5	31%
From 6 up to 10	12%
More then 11	15%

As mentioned in the companies' characterization, the data sample is composed by micro and small companies, consequently the projects are small, involving implementation processes teams composed by 1 to 5 people, representing 73% (Table 8), which corroborates the hypothesis that the sample is composed mostly by micro and small businesses.

Table 9. For the deployment, configuration, parameterization and any software customization, what were the means employed ?

Means	Frequency
Using our own team (IT)	46%
Outsourcing company	35%
Software provider	19%

It is noticed that the sample in question is split into two major groups: companies that chose to use their own IT team to implement the software, and companies that hired subcontractors (whether the software provider or not) to do the work. From Table 9 it is possible to observe that 46% of the companies preferred an internal IT team to implement. Once again, there is a correlation with the company size (micro and small). Maybe it is cheaper than the consultants or another kind of provider.



Graph 2. For staff training, which were the main means used for?

The Graph 2 shows how companies preferred to train the staff. As a form of employee training, 50% of the companies based only in the documentation available and 8% in the employees self-learning. 39% chose an Internal Training by Outsourcing company.

Table 10. What is the primary means used to obtain information about settings and customizations?

Means	Frequency
Outsourcing company	31%
Software provider	23%
Forums	23%
Community website	19%
Mail groups	4%

The dispersion of responses presented in the Table 10 can be justified by the fact that the data sample is divided into two groups, which used an outside company to implement the system or which benefited from its own IT staff. Thus, the options "Company specialized third party" and "Company maker / creator of the software" are related companies that used a third party as a manner to implement the system. The options "Forums", "Site of the official community" and "Mail groups" are probably closer to the reality of companies that made use of an IT staff itself.

5. CONCLUSIONS

Depending on the company size, the total cost of acquisition of an ERP system can reach millions of dollars is prohibitive for many companies. It is noteworthy that because the high costs of private solutions, they eventually concentrated on large companies in the first place.

However, it was noticed that most of the analyzed companies, whether micro and small-sized, pointed the search for a competitive factor as the germ of adopting an Open Source ERP. This leads us to believe that the increased competition and the need for greater efficiency in administrative procedures among other factors related to management software, reached the status of necessity for enterprises in current markets, both in industry and services sector.

The importance of the basic modules of ERP Open Source (Management, Finance / Accounting, Inventory Control and Reporting) corroborates the idea of marketing pressures, since no other company mentioned the option to search for differentiation as the reason why to adopt a system.

Still related to financial issues, it was noted that most of the cases reviewed indicated that implementation costs were within expectations, with very high grades awarded in this requirement, which shows by exceeding the expectations of companies adopting cost below the expected. Using the own team of IT to implement systems and to make internal training courses for users were also very important factors for the costs reduction of the projects.

The time required for the full implementation of the systems reviewed was very short, and only six months or less were required to conduct an important part of the implementation. This factor is another important point of view of motivation as too long projects can cause the decrease of interest of stakeholders over time.

Although it has been noticed an increasing presence of technology-related companies as users of software, it is attributed to the fact that greater intimacy and knowledge of Open Source options available in the market and not just private.

The results of this study are not generalizing, given the small size of its sample. As a suggestion for future studies, it is proposed to replicate the same spectrum with a larger sample to match statistically with the reality of the Brazilian Open Source ERP, which has great need of further studies.

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