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## **Management information systems in an open source software context**

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# **Management Information Systems in an Open Source Software context**

## **(MIS in an OSS context)**

### *Introduction*

A management information system (MIS) is a system that provides effective management information needed in an organization [1]. The key resources used in management information systems are in number three, namely technology, information and people. We must recognize that these are key components in the study of management information systems. Looking from a creationist point of view, both technology and information are created by people. Technology development along the evolution of the human race and we can say it had an upward trend, but we cannot deliver absolute judgments of value whether it was used for the best. Information is rooted in the raw data. Raw data becomes information because of the significance they have for people in various processed forms. To work with data, people have devised models that build a certain logic that can be applied repetitively on the data to obtain the necessary information without having to reiterate the construction of logic that leads to the result. Therefore, the most important resource of management systems is the human resource.

### *Framing the subject*

Management information systems is regarded as a component of internal control procedures of a business, covering training people, documents, technologies and procedures used by managers to solve business problems, such as those relating to costs, services and strategies. MISs is different from other systems in that they are used to analyze data from systems involved in operational activities.

In academic terms, the term MIS is used to refer to a group of management methods related to automation or human decision support, such as DSS (Decision Support System), ES (Expert System) and EIS (Executive Information System) [2].

Open-source software development is a way to harness the power of open communities to contribute to products by the total transparency over the source code of the software products. In the context of achieving competitive advantages in the new knowledge economy, there is a need to examine how open-source ideology promotes collaboration and initiative. The use of open source software is present at the governmental level, also educational, military, business or even in space projects. The implications concerning intellectual property and the economics of providing free software are just a few more reason to address this issue.

## *State of knowledge*

Initially, in organizations internal reporting was done manually and from time to time, more from an accounting perspective to which were added a few statistics. Data was supposed to be categorized by people depending on the requirements and needs of the organization. With the distinction between data and information, instead of massive data collection, they started to store only the data that they considered it to be needed in the future.

Businesses can benefit from the use of open source technology that meets their requirements. It is not recommended waiving commercial software but we stress that it can coexist within an enterprise OSS in order to achieve the objectives. The total cost of ownership (TCO) can be significantly reduced by using OSS, which can increase the performance attributed to collaboration and innovative nature of open source [4].

The first simple economical applications were offering facilities like computer managed sales and wages, without going into further detail on the subject. Meanwhile, they became more complex, more data was stored and people began to look at it in detail, obtaining reports from the raw stored data. The term MIS has its origins in this type of applications that were designed to provide managers with information about sales, inventory and others that could contribute to a good management of the enterprise. Today the term MIS is used in a wide number of contexts, including but not limited to DSS, ERP (Enterprise Resource Planning), SCM (Supply Chain Management), CRM (Customer Relationship Management), project management software and query databases, applications for human resource management.

A MIS is a system in place for collecting, processing, storage and dissemination of data as information necessary to perform management functions. After Philip Kotler, a marketing information system consists of people, equipment and procedures to gather, sort, analyze, evaluate and disseminate information needed by decision makers [3]. This information is supposed to be useful, on time and to convey accurately the reality.

The term MIS is often confused with "information system". You must keep in mind that an "information system" can include modules not intended decisions. Area of study called MIS is sometimes referred to as being, in a restrictive manner, management of information technology (information technology management). There are some differences between MIS and ERP, suites incorporating modules that are also targeted to support decisions.

The option to choose open-source software is not just about choosing Linux as operating system, it is not just a choice solely on software procurement, but a means to acquire knowledge.

Developing countries should look at the open source option as a means of acquisition of knowledge about the technology itself and a way to create, customize these products to suit their needs. OSS, according to the authors, is characterized by two fundamental aspects: the first is the potential for sharing concepts and the second is the potential for modularity. The real advantage offered by open source software is not that it is free of charge but that you can build your own knowledge base. Costs will probably equal those of a commercial product, but the difference between the two is that in the case of commercial software, you will not get any of the knowledge acquired while developing it; you will always pay without ever learning anything [5].

The impact of OSS development over the software industry becomes increasingly stronger. The embrace of this concept by more people led to a significant increase in the quality of open source products. The possibility to access and to modify the source code is a factor that stimulates improvements. The monopolistic trends of some software companies are now mitigated by the evolution of open source [6]. Economically speaking, a low initial investment is increasing the attractiveness of adopting such products, and then being adopted by enterprises is enhancing their competitiveness by starting an almost continuous chain of improvements. Once in use, spending is focused on internal software development, on the acquisition of knowledge rather than paying licenses and depending on the manufacturer.

### *Analysis on the subject*

Open-source activities, by their nature, are activities that involve sharing knowledge. Employees of commercial enterprises that are working on developing software based on OSS are in the situation of double allegiance, both to the company they are working for and to the community of OSS developers. This influences how they decide to share their knowledge. There are a growing number of companies that consider beneficial having their employees involved in OSS projects. This is seen as a barrier being removed from the path of imagination, although the product offered by an employee to the community is shared with everyone else, it can also be applied and implemented in the context in which the employee works. So, it is thought that the “mother” company would benefit the most from the free product developed by the employee [7].

OpenErp is an open source enterprise resource planning software whose development began in 2005. The vision of starting the project was meeting customer needs in a way that was not yet met by the competitors. OpenErp consists of customers, partners, community members, investors and employees. The small team consists of just over 100 employees, continues with over 150 partners who

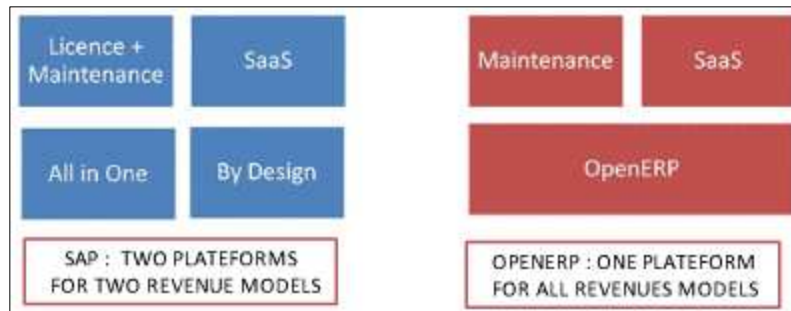
can implement and provide support for OpenErp in 37 countries with over 1,000 community members who share their experience in working with OpenErp. OpenErp benefits of modularity, so that companies can install and use only the applications they are interested in. These include: CRM (Customer Relationship Management), Accounting, POS (Point of Sale), Project Management, Human Resources, Procurement, Production, Marketing, Invoices, etc... In addition to these business applications there are still about 700 modules available on the website.

Higher education is the new pioneer in open source development, through what we call open knowledge. Open source philosophy, applied to knowledge, says that publicly funded research should be made public. Articles or scientific research results are published in a growing number, the barriers of access to academic work results is gradually removed. While open-source software is the only alternative left instead of choosing commercial software, open knowledge becomes the main channel for disseminating knowledge through free access, to lay the foundation for creation of new knowledge from the current state of art. It is the duty of higher education institutions to make research results known to the general public, if they are financed by public money [8]. Access to innovation is one of the most effective ways of cooperation with developing countries.

According to OpenErp, software vendors get around 25% of license revenue. The components of income of such companies are licenses, maintenance, professional services and Saas (software as a service). All revenues of OpenErp are based on services. The company manages to keep costs low due to an efficient development model, a model based on volume sales and a single platform both locally and in the cloud. Because customers don't pay licensing they can copy the software, install it and test for free and then decide to implementation, in case of positive feedback.

A single platform for both local and cloud is considered to be a great advantage for OpenErp.

Figure 1. Platform comparison between SAP and OpenErp



(Source: <http://www.openerp.com/products/business-model>)

As seen SAP has two platforms, one for the cloud and one for the local environment. This can create confusion for users, who must adjust to working with two different looking apps, one on the web and a local one.

In the traditional way of view, to acquire extra value, protecting individual property is necessary. The offer of tangible open source products began to change this view. This free open-source products are a binary variable, a choice between freedom or vendor lock-in, and the open source community claims aperture on the source code. However, the concept of this openness can be seen gradually. Openness is important for developing models. These models can be applied or customized by the community to provide other solutions from them. Distinguishing between open software and hardware platforms, is considered to be more important to have the source code of the software available , while in hardware, it is wanted for the open source software to work no matter the platform and have no dependency on hardware providers . Community members focus mainly on three aspects: transparency, accessibility and replicability [9]. Transparency is seen in terms of access to the final product, accessibility in terms of access to models used to obtain the product and replicability the permission to use, replicate or modify the product.

The framework on which OpenErp is based is named OpenObject. OpenObject has several features such as high modularity, ORM (Object Rational Mapping), MVC (model view controller), workflow designer, reports, OLAP statistics and facilities for automatic testing and migration, web services, etc. OpenObject is used to modify modules or applications to fit the specific business model. In the MVC, objects have views. Objects are coded in Python and view sites are xml files. Views can be edited using a workflow editor, not just in XML.

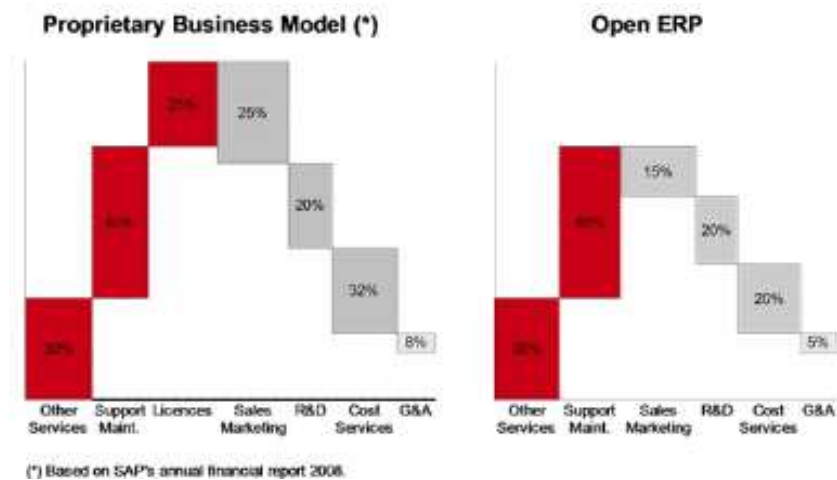
An accurate estimate of the maintenance effort is required for a successful software maintenance process. This effort is generally measured in number of hours per person required to perform a task. While in commercial software projects this is examined, in open-source low attention is paid to this aspect. Effort estimation plays an important role in calculating the total cost of ownership of the software. Since the open-source participation is voluntary, the change done in the code and the necessary time to do it are used as indicators. If this time could be accurately assessed, including all actors working on one change, then a temporal pattern could be established and validated, to express the progress in development work. Calculated effort to change the code is actually only part of the total maintenance effort [10].

Companies involved in developing open-source products are in the situation of their products to be used by competition. To protect themselves from the negative effects of this fact, firms apply several strategies: developing new applications in the in a restricted frame, sale of services related to these

products and attracting sponsorships/donations [11].

OpenErp benefits also from the business model they have implemented. In addition to flexibility, it is a good marketing tool when presented to the client. Compared with SAP, there are no 25% licensing costs, that generates savings for the client. OpenErp does not compromise the research and development which accounts for 20%, but the cost of sales, marketing and services is significantly lower.

Figure 2. SAP vs. OpenERP –model development



(Source: <http://www.openerp.com/products/business-model>)

Economically speaking, the low initial investment increases the attractiveness of buying such products, and their adoption by enterprises enhances their competitiveness by starting a chain of improvements. Once in use, spending is focused on internal development software, on the acquisition of knowledge rather than paying licenses and depending on the manufacturer.

### *Conclusions*

Open source development has a growing impact on the software industry. In the past five years the adoption of open source solutions by more companies and users usually as alternatives to licensed operating systems has increased the quality of open source software. The effect of the communities formed around some operating systems or software is to be taken into consideration due to the lack of intellectual property. Low initial investment are increasing the attractiveness of buying such products, and them being adopted by enterprises enhances their competitiveness by starting a series of improvements to the original version.

In the case of OpenErp, new modules have been developed recently, bringing the product on track on the ERP market's, a market segment dominated by SAP three years ago. Modules for CRM, human resources, reports, OLAP statistics, are making the software to be a top tier one.

In recent years, free software or open source software are becoming to have a more important role in the development and implementation of information technologies in developing countries. The role of open source software developers is high, the belief that if an open source software is equal to or higher in quality compared to a proprietary one, will make it be adopted automatically by users is considered false if developing countries where the user community is conservative. We must keep in mind that open-source software is free, but its use is not, there are costs to run this software, like personnel costs, or data conversion, etc. [12]. If the software purchase would be dictated only by the acquisition cost, then open-source would dominate. As long as the open source bidders are focusing on one product at a time and not on selling the ideology, then they will not compete with multinationals in the business of developing and selling commercial software.

MIS's currently have no defined limits. Somewhere in between ERP, DSS's, management programs, their field is a dynamic field where the trend seems to be on integrating the facilities offered by each in modular solutions that the customer can purchase separately.



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