Know-how in Software Project Management

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Abstract: *It is critical to be able to visualize what is going on in your IT infrastructure and implement solutions that not only monitor, but deliver proactive management capabilities. Management software has traditionally focused on managing the elements and resources inside the data center or network operating center. This paper deals with significant aspects of the process of software project management. This new era requires a new breed of software, service and support solutions. The first step in the management journey begins with understanding and gaining control of your operations.*
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Introduction

Today's businesses are more and more organized, lead and automated around the series of processes and of relations among them. These processes involve developments [1; 2; 3] and lines of production and services, the administration of the interaction with the clients and the support of the processes and of the human resources. Consequently, ERP brings data which are usually stored and processed by different independent applications having distinct functions within an economic agent. It can easily be assimilated to an "information" plurality of functions: to process unitary and coherently the data of two departments which have different functions (for example: accountancy and financial). For example an ERP solution will be capable of at least two practical achievements: it will be able to offer a relational (coherent) data structure and it will be able to serve in an optimum and efficient way the needs of storing/reference concerning the examination and the efficient exploitation of already stored data (documents) of an operative nature.

1. Related Work

Software development projects require a lot of "paperwork" in the form of requirements documents, design documents, test plans, schedules, checklists, release notes, etc [1; 4; 3]. It seems that everyone creates the documents from a blank page, from the documents used on their last project, or from one of a handful of high-priced proprietary software engineering template libraries [5]. For those of us who start from a blank page, it can be a lot of work and it is easy to forget important parts [5]. At company level the Informatic System is a complex investment which involves an increased volume of human, material, financial and time resources. It is also known that at company level changes are numerous and unavoidable.

2. Instruments for Evaluation and Data Control in Project Management

Based upon the help of the design product the project manager can evaluate the degree of the accomplishment of the targets.

This mean:
- a relative evaluation of the position of the company,
- a manner to efficiently decide where the company is going to,
- a tool in the measurement of the progress of the projects in comparison with the target.

The application becomes efficient through the design methods, allowing the interpretation and the manipulation of the data depending on the abilities of each user. One can describe such evaluating criteria able to understand the context, the user's medium and to respect the domain of the application. [6; 7; 8]. At present mostly used are: [9]
- Object oriented Analysis, Designing and Implementing methodologies which are UML – Unified Modelling Language; RUP – Rational Unified Process; BPMN – Business Process Modelling

Notation. Object oriented methodologies have the great advantage that, by implementing to re-use the code, thus becoming very flexible to changes that appear or to the development of new versions of the systems. Another facility is that the same types of functional, static, dynamic models are used in all the stages of development of the Informatic System;

- RAD – Rapid Application Development. The specificity of this methodology lies in its being based on a permanent dialogue between the system designers and specialists of the system beneficiary.

A special advantage of using the methodology is the fact that on the one hand it offers increased flexibility during the whole life cycle of the system and, on the other hand it offers the possibility to reduce the period of achieving/developing the system by 50% as compared to using other methodologies. [1; 2]

a. The choice of method or of architecture of integrating the referenced Informatic System. In this respect there are several integration methods, types, technologies or architectures of Informatic System. Among these SOA – Services Oriented Architecture enjoys a special attention owing to its numerous advantages;
b. Constituting the collaborative Network if it is the case.

3. Managerial Ability – "The Power of Words"

Starting from the observation that a main characteristic of each level is to finalizing with a check up and a validation in order to eliminate certain anomalies, it is underlined the fact that a good security of the I.T. and the administration practice's control of the complex I.S. projects is essential. Under these circumstances, one can search new managerial solutions in order to integrate:

- time control;
- cost control;
- quality control of the working team;
- obtained results control.

As effective solutions in this respect we can enumerate: [6; 5]

- Computer assisted technologies (CAx) - an assembly of software/ hardware/ communications product which is able to help designers in all the activities of the life cycle of the Informatic System;
- Cloud Computing – a modality of using the hardware and software resources (servers, storing space, applications and services) which can be configured depending on necessities and which are available as Internet services;
- Grid Computing – a system of interconnecting computers and of storing data which are dispersed geographically with a view to utilizing electronic computers more efficiently.

a. System Software – includes various software products such as: operating systems, SGBD, Software TOOLS, user's applications programs. Of great importance are the software products such as: Application Programming Interface, ERP – Enterprise Resource Planning, Enterprise Service Bus, Supply Chain Management, etc. All these software products are meant to lead and coordinate the activities within business organizations in terms of increased performance as far as the speed of answering, costs, form of presentation, safety in using them are concerned;
b. The Informational Basis includes the data with which the system operates. Flexibility at the level of this component refers to the facilities offered by various models or techniques of organizing, storing and retrieving data;
c. The scientific- mathematical apparatus include two groups of components: the multitude of methodologies of developing informatic systems and the multitude of mathematical models which can be implemented within the Informatic System. These components are decisive for increasing the economic efficiency of the Informatic System.

The human factor includes the categories of personal such as: systems designers, system engineers, programmers, operators and end users. The flexibility of the system will depend on the competence of the human factor to capture the problems with which the business organization is confronted and to offer solutions to them.

The Detail Design of the Information System Components is "real art". The adaptability of the system to the changes that intervene in it and to its maintenance and exploiting facilities depends to a great extent on the way in which each component is conceived and designed. As the matter of designing of the system is a complex problem [2; 10]:

a. When designing primary documents as source of integrating data it is desirable that drafts and their video-formats be very close to the real image and at the same time they should be as suggestive and self explanatory regarding their utilization;

b. In the activity of designing outputs the form of presentation (list, table, graph) will be paid attention to as well as to their complexity (synthetic and analytical situations) depending on the category of end users.

c. In the order to design the code systems of date it will be resorted to:
   - Using sequential codes with groups formation, they are the most flexible for the maintenance of the code;
   - Mnemonic codes or the descriptive ones are very suggestive in their use;
   - The bar codes or RFID (Radio Frequency Identification) offer increased facilities regarding the integration of informatic systems.

d. When designing the applications programs several aspects will be considered:
   - Creating an integrated developing environment with a view to editing the source code, compiling, testing and generating the programming documentation. All these activities can be included in a complex software package which offers a graphic interface which is friendly to the users;
   - Based on finite automatons, programs can be generated automatically for designing entities (data collections) and loading data;
   - Building and implementing some general drivers of connecting clients to various databases and transforming the entities into Java classes. Such a solution offers the possibility to integrate data in various locations and sources which are managed by different SGBD. In this way data portability within systems is increased.

Designing data organization within systems. Any Informatic System or application operating with a great volume of data appeals to a certain way or another of organizing data. At present there is a multitude of models, methods and techniques of organizing data. There is a tendency to develop OOBD (Object Oriented Data Bases) but the greatest weight is held by applications that use RDB (Relational Data Bases): or non SQL Data Bases.

4. Problem Solution - ERP

Some companies, by developing certain specific competences and trying to be closer to the client and because, probably, the size of the market allowed them to, developed niche ERP (see ab-Solution, developed by Process only for the banking area). Bur these are less known on the Romanian market, and if some local active vendors have inevitably become better known on certain verticals (Microsoft Dynamics NAV on retail and distribution, Oracle and MFG Pro for the production sectors, Charisma for leasing) This thing happened on account of the available add-ons and the accumulation of references [6; 7].

The number of supplementary modules may start from 3-4 for the little local applications, to approximately 30 for an important local solution as Charisma, developed by Total Soft, and reaches 550 in the case of an international application like Microsoft Dynamics NAV (it is true that in this case the add-ons are developed by partners according to the standards set by Microsoft). The most important aspect is that all these elements, being called either add-ons, modules or applications are integrated in a unique system and use the same database.

- Multiple possibilities and parameter: Aplix ERP allows the adjustment to new legislations without modifications or with minimum ones which don't stop the cursive exploitation of the system. The adaptability is not only referred to the legislative system, but to the specific of the business, the working method within the company or the change of the business flux.
- Reference which is adaptable to the current needs: We can easily obtain consolidated synthetic reports by the simple hierarchical classification/reclassification of the entities of the organization (administration, departments, jobs, etc.) of articles and/or of third parties, of months/years into reference periods. It is not necessary to alter the content of the data which have already been collected in order to get such references even using historical data.

Open system: Aplix ERP is prepared to be integrated and to operate in the complex heterogeneous information systems using Linux, Windows, OSX, IRIX, AIX, etc. and it equipped with native mechanisms of interfacing with external applications

In the case of a little local application, such as Aplix ERP, the fundamental modules are fewer: Accountancy, Financial, Administration, Immobilization (Fixed means and inventory items), Wages (it includes human resources), and to these four additional modules are added: production (at the simple level of assembling/producing on the basis of a *rule*, including the post-calculus), Logistics (SCM – orders, suppliers, internal departments and clients), Activities (for the service segments, IT, project management, transportation etc. which offers some CRM functions as well) and Aplix BI (the Business Intelligence module offered in partnership with Quick View) EBS Romania has a different strategy concerning the modules offered to clients. In the offer of the company, there are not fundamental modules, but there are modules which can be combined and they are available in three packets: Clarvision Accountancy, Clarvision Standard and Clarvision Enterprise. The ISO DMS module can also be purchased independent of the Clarvision ERP system and it facilitates the supervision and administration of the documents that have an electronic format. The company is now developing two new modules: Cash-flow and Distribution. The investments made by EBS Romania in the series of supplementary modules represent the result of the needs which have been identified amongst clients [7].

Microsoft Dynamics NAV is an interesting case because of the ampleness which was given to the notion of add-on. According to the Microsoft strategy, any personalized application is done by certified partners and placed at the disposal of the entire community. Over 220 ISV-s have developed approximately 550 supplementary modules for Dynamics NAV, all of them being grouped in an Add-on Catalogue. This catalogue contains horizontal modules oriented towards: BI, Collaboration, Integration, Mobility, Storing, e-Learning etc and vertical ones such as: Public Administration, Professional Services, Agriculture, Fishing, Forestry, Logistics, Utilities etc, obviously every bit lowering to the level of niche in these economic domains. Some of these add-ons for Dynamics NAV have been developed by local partners from Microsoft. The investments were mainly made in order to answer every request coming from the clients and, subsequently, for commercial exploitation, but there is also the case of programmed investments [9].

Ager Solutions is the Microsoft partner which developed and officially registered in 2006 the first Romanian Add-on for the Dynamics NAV solution, named "Commercial Effects". The decision of the development was determined by the clients' requirements, concerning the extension of Microsoft Dynamics NAV functions. The Add-on is now being used by approximately 15 clients. The add-on was made in almost a month and a half, and the investment has already been recovered after their own implementations or through the partners from Microsoft. "By repeatedly selling these functions, the initial investment is easily recovered and, consequently, the selling price is reduced, as well as the delivery time. Concerning our advantage as Microsoft partner, it refers to the fact that it can prove our commitment and implication towards our clients. It is also a good collaboration point with other local partners, and AGER Solutions already has such activities". A gloomy verdict given by the well-known vendors of ERP solutions from all over the world, not only by the Romanian ones. With one exception - the one offered by the vendors of ERP Open Source applications, which had been rising since last year.

The increase in interest for this type of solutions is not only due to the unfavourable economic climate of investments in complex IT systems, like the ERP solutions, but especially to the maturation of the Open Source offer. (The functions of an ERP represent the main selection criterion of such a solution, which prevail over other criteria).

The argumentation cannot be reduced to this element alone; it is more complex. For example, another reason, which is frequently used, is based on the fact that, in most cases, an ERP implementation needs detailed, customized and expensive features, imposed not only by the specific of the business, but also by the evolution of the business in time and the necessity of adapting it to new requirements set on the market. From this perspective, the freedom of accessing the source code and the possibility of making the needed modifications (adaptations, improvements, developments of new modules etc.)

in house, they seem to be much more economic, in comparison with the use of one solution. It is true that, in order for these things to be achieved, a company must own high competences in the OSS field, which is not within reach for everybody. But it is equally true that the vendors of Open Source solutions rely on the support of large communities of volunteer developers who are highly experienced, a serious support for the client companies which do not wish to ask for the vendor's support anymore.

5. Conclusions and Future Work

The degree of complexity of the projects is a factor that can influence the method of control as well as that of rapport. An evaluating system based on the four mentioned activities in the Cobit standard of I.T.'s evaluation is extremely useful. The given method is addressed to the managers of project as well as to the economic unit's managers and assures an I.T.'s evaluation method.

Companies are constantly faced and will face numerous and inevitable changes of legislative, organizational or in terms of what informational needs of policy makers. In such a context is necessary for systems to be flexible and easily adaptable to changes that occur.

To offer clients both quality and technology, personal design and software development products were considered necessary to be created. AplixERP can rapidly become a complex software product (covering all automatic processes required within a firm) which can be applied both in small, medium or large networks. Implementation has to be gradually carried out, on modules, depending on the firms needs at that time. Receipts, payments, transfers can be operated in different measuring units at equivalent prices as compared to the inventory file. This enables efficient file collecting in the measuring unit required by the supplier, and allows the operator to work simply. Receipts/ payments files are usually generated from debts/claims and this facility extends then to emitted or received fiscal files. As retail inventory files are operated, the application verifies the correspondence between the retail price of the stock and that of the file. As a result of retail price modification, the application automatically stocks and generates an inventory note and price modification note, and blocks the possibility to operate that file for prior dates to inventory or price modifications.

Collecting screens of inventory notes encloses the possibility to gather details (positions) with the help of a code bar reader. If an article can not be found (the code bar is not filled in), there is the option to collect it manually. Types of files can be created aside from the standardized ones, according to the business operator's needs. Their form and content can be changed by authorized users, without asking the help of the application provider. Once they are modified, reports are saved under a different name, in order to be parameterized as file type within a subunit (inventories, storage locations, etc).

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