

A Strategy to Manage the Metaprocess of ERP System Customization

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Abstract: *This paper presents a transdisciplinary approach, based on the concept of metaprocess, for modeling, organizing and managing ERP systems customization in various projects simultaneously executed. For its operation, is presented an integrated environment capable of dynamically self-adapt to changes in the customization processes through the use of a management framework.*

1. Introduction

The increasing use of ERP – Enterprise Resource Planning – systems is associated with several economic benefits that they are capable of providing to small, mid-sized and large companies. These main benefits are: costs reduction; productivity increase; capacity to execute more complex tasks in less time; besides, the easiness for manipulation, diffusion and reuse of great volumes of information.

The possibility to incorporate new functionalities and self-adapt continuously to the new business-oriented rules or operational contexts, place the ERP systems in the center of the evolution process of the products and services commercialized by great part of the modern companies.

In the actual business-oriented environment, the companies that use ERP systems, as well as the companies dedicated to its development and integration, are continuously challenged to answer quickly to the frequent changes that occur in their operations scenarios. These changes result from the uprising of new opportunities and business-oriented rules, threat from competitors, increase of the customers' expectations for the offered products, necessity of costs reduction and efficiency improvement in their production systems.

As a consequence of these facts, not only the “ERP systems products”, but also their customization processes are submitted to a constant necessity of evolution and transformation, even after the conclusion of the first cycle of development and operation of the product or service.

As the actual technology for systems development still use a less automated, human work intensive structure, [Greenfield & Short, 2004], organizations dedicated to ERP integration and customization in several simultaneous projects undertake continuous efforts to automate, standardize and organize their activities, thus obtaining more organized and foreseeable operations.

However, when the demand for ERP systems implementation increases, there is also an increasing in the problems caused by the systematic used by developers and integrators, generating difficulties for integration and harmonization of the technical characteristics of

each ERP module and a great management effort to control the complex process to be executed in each project.

In the ERP systems customization this problem is increasing, because the organizations that acquire these systems to attend their necessities, require additional functionalities, in order to customize the system to their business-oriented strategies.

This customization can be the most complex part of an ERP system implementation process, being responsible for the majority of deadline extensions, causing costs increases and let the client unsatisfied.

1.1. Objectives

This paper presents a new approach for modeling, organizing and managing ERP systems customization processes, making it possible to integrate the management of the diverse activities to be executed in each project and quickly answering to the adaptation needs of the business-oriented processes of their customers.

For this approach to become operational, it is proposed the use of a customization management framework whose objective is to optimize the processes to be executed and allow their fast reconfiguration to add more adequate functionalities to the new contexts arising during the execution of the projects.

2. Characteristics of Actual Model for ERP Systems Customization

The ERP systems integrators use a customization strategy focused on the mapping of customer's business processes. The production model that better characterizes this strategy type can be represented by the simultaneous execution of various projects destined to attend the requests from various customers of the organization. Each project has a specific set of business rules which must be followed to satisfy the necessities of the several clients.

This way of operating is very different from a continuous operation, as in a traditional line production, where the manufacturing of one exact product can be repeated several times, as the scope of each item is always the same. Differently, the adopted strategy for the ERP system customization needs to be defined by the parameters established by customers and integrators in each executed project.

Each customization project follows a peculiar workflow, defined in function of the established scope, the technology, the organizational context and the resources allocated to its development. The amount and characteristics of these resources are usually defined separately for each case.

The integrator acts as the responsible organization for the management of the multiple projects and for the optimization of the resources used by them throughout the time. The system customization occurs through the parallel execution of the workflows for diverse processes executed by the integrator.

The integrator's management focus is concentrated in his customization processes, where the customers' business is optimized through them, being able to satisfy the necessities and business rules that had motivated their decision to implement an ERP system.

In the most frequent approach, the integrator acts as a Project Management Office - PMO [Hobbs, 2007] whose objective is to assist the project managers in the implementation of the principles, practices, methodologies and tools used in the project management.

In this organizational model, the manager of each customization project attempts to optimize the allocation of the necessary inbounds to the execution of the processes under his administration. It is the responsibility of the integrator's management to optimize the distribution of the scarce resources in the most efficient way, in order to maximize the result obtained by the set of projects simultaneously executed.

However, this model is not capable to take care of the current demands satisfactorily. It is verified that, even if the integrators are capable of reaching the best results in the ERP

systems customization in various simultaneous customers, several problems remain, like the frequent necessity to rebuild customized modules to correct errors or to adjust their functionalities to the complex customer's business-oriented rules.

This organizational model can be considered as one of the main causes of the failure of a great number of projects [Koskela, 2002].

3. A Proposal of Metaprocess-based ERP Customization Model

The processes represent a set of orderly operations and activities which are carried out by an organization, throughout time and space, with the purpose of producing goods or services which represent some value to its customers [Davenport, 1994].

The structure of the processes represent a dynamic view on how the production activities take place in the organization, while their organizational structure demonstrates the relationship of subordination and responsibility distributed among the several factors of production used for its execution.

General process models are used to describe the steps involved in the creation of goods and services produced by an organization. To reduce their complexity, these models are usually decomposed using a hierarchical structure, where some processes are part of other broader level processes. The detail level is defined in terms of the complexity and the desired level of control on the performed activities.

This paper presents a proposal of a transdisciplinary approach centered on the metaprocess concept, aimed at the development of a customization environment for ERP systems, enabling improved efficiency for modeling, organizing and managing its processes.

The concept of metaprocess involves the modeling and execution of a process that producing processes, capable of developing the goods or services provided by an organization to its customers. The metaprocess can be quite complex depending on the size, complexity and interaction degree among the set of performed activities.

The analysis of the metaprocess allows not only a better understanding, documentation and control over the situation in production systems, but also the detection of points where there is more inefficiency in the production system, which makes it possible to carry out its refinement and improvement. The operationalization of improvements regarding those aspects is based on the analysis of the process of value aggregation along the production chain so as to identify non-optimized interfaces and components [Baldam, 2007].

When breaking down the complexity of the production system, the metaprocess is located at the top of the hierarchical tree representing the set of procedures performed. This fact is schematically represented in Figure 1.

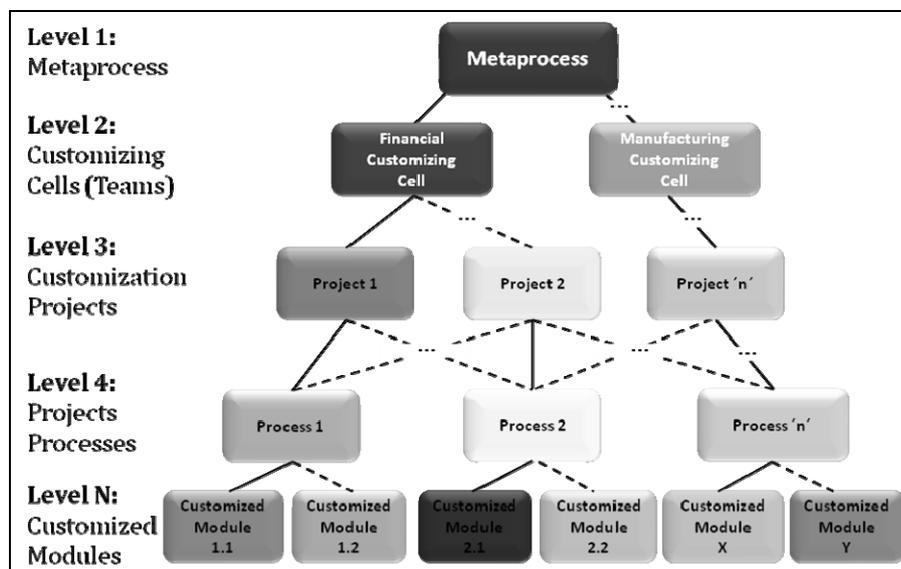


Figure 1 – Hierarchy Model of a Metaprocess

The metaprocess represents the transcendence of the process concept to a higher level of abstraction. It summarizes the characteristics of a set of procedures of a certain level, so that it can be represented by the composition of its properties and characteristics. Its use allows the reduction of the complexity of the system under analysis, making it possible to examine its deficiencies in order to detect non-optimized aspects which hinder the achievement of technical and managerial goals established for the production system.

In the context of ERP customization, the successive decomposition of their processes into steadily smaller units allows for better knowledge about the various aspects involved in each planned and implemented project by the integrators, allowing a more adequate approach to the complexity of the existing transdisciplinary issues existing in the various environments of customization.

In this paper, the concept of metaprocess will be used to map these interrelationships and to enable their automation through an orchestrated set of services through a customization management framework, as will be presented in item 5. Through the framework it is possible to establish a transdisciplinary matrix which makes it possible to address the question in a flexible and appropriate manner adequate to several contexts.

4. The Metaprocess of ERP Systems Customization

The modeling and organization of the customization activities of an ERP system can be represented by a Metaprocess, in other words, a process of producing processes. It has a structural model and a dynamic model, which are immersed in the business scenario in which it operates. The set of these two elements corresponds to the references described by the contextual machine of Gattaz Sobrinho (2006).

The main components of this model are represented in schematically way in Figure 2.

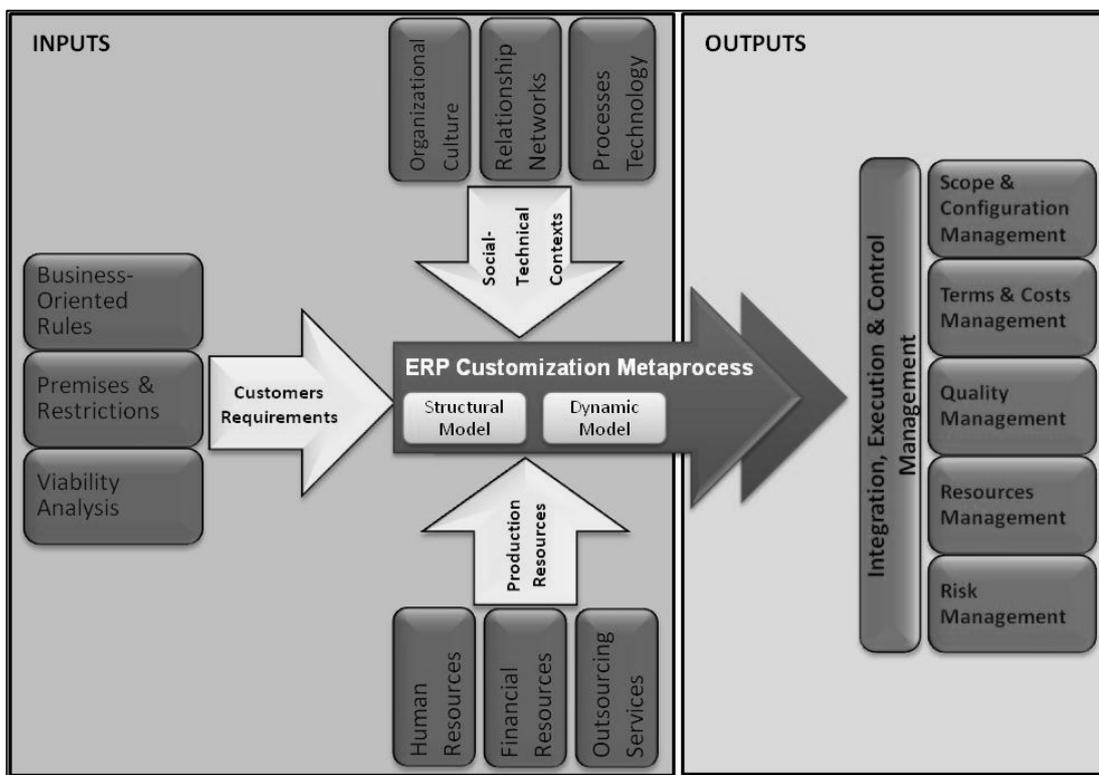


Figure 2 – ERP System Customization Project represented by a Metaprocess

The structural model represents the elements directly linked to the way the organization is structured and describes the interrelationship of the various components used in the customization activities. Its characteristics are determined by the requirements established by customers of developed projects, by technical resources involved, and the socio-technical context where its activities are carried out.

The dynamic model of customization management represents the sequence of technical and managerial activities developed to plan, implement, integrate and manage customization activities. Although these activities are directly influenced by the structural model, they are self-dynamic and suffer frequent needs to be reorganized and adapted to new requirements, rules and business scenarios enabling the expansion of the efficiency of customization operations.

The need to implement these changes occurs more and more frequently, because if companies want to remain competitive, they need to quickly adapt their structure and information systems in order to incorporate new technologies, reduce costs, self-adapt to new cultural and institutional environments, etc. These changes are made not only to self-adjust to changes in operational environment, but mainly in search of a more efficient way to operationalize their processes, as in the business environment where they operate there is a continuous growth in competition, caused by the fact that it is held in increasing scale and less restricted to regional contexts.

The structural and dynamic aspects of metaprocess customization compose the essence of the proposed model, because they allow a holistic and transdisciplinary approach of the several aspects involved in modeling, organizing and managing production in ERP systems customization process. These characteristics will be briefly discussed below.

4.1. Metaprocess Inputs: Structural Model for ERP Systems Customization

The Metaprocess receives as input the business requirements and the scope definition which must be approached by the various projects simultaneously developed by the Integrator. This set defines the main aspects to be employed in the planning and execution of its operations.

Another decisive aspect for the organization of operations involves the socio-technical context existing in the organization, represented by its organizational culture, relation networks, and technology used to manage its processes. In a long-term vision these are determining factors for the operational efficiency of the integrator.

The production resources used by the metaprocess represent the means used to perform the activities of customization. They are composed of human resources, capital (material, equipment, facilities, etc.), and outsourcing services that are used in the customization project.

The detailing of the structural model allows the reducing of the operational risks and uncertainties involved in the various stages of the projects.

4.2. Metaprocess Outputs: Dynamic Model for ERP System Customization Management

The dynamic model of ERP systems customization involves a set of activities based on the diverse areas of knowledge that the PMBOK (2004) establishes for the management of projects. In the PMBOK these areas are divided into 44 management processes that not always reflect the reality of the customization projects executed in each customer simultaneously.

In this manner, it was opted to simplify this set of activities in only six management items which summarize the main processes related with: 1) Integration, Execution and Control Management 2) Target and Configuration Management 3) Terms and Costs Management 4) Quality Management 5) Technical Resources Management and 6) Risk Management.

5. Metaprocess Model Operation

The implementation of an ERP customization management model in several simultaneous projects is difficult in practice due to their heterogeneous conditions. This scenario is complemented by the large variability of technological, organizational and socio-cultural contexts founded in the various customization environments.

In this paper, it is briefly presented a model of management of the customization process, whose goal is to provide the optimal management of the various aspects involved in the customization of ERP systems through an environment able to dynamically adjust to changes in requirements, allocated resources, and the socio-technical context where the projects are carried out.

Its implementation, complements the previous publication (Augusto Neto et al., 2007), is accomplished through a set of weakly coupled components which allows it to self-adapt quickly to new contexts, without causing great impact on the other involved areas.

Among the main characteristics of this environment, the following are pointed out: a) The management of the production centered in processes (BPM); b) A set of functionalities that can be adjusted to the characteristics of each project; c) The graphical representation of the customization flow through the BPMN (2008) aiming at the simplification of its documentation, analysis and management; d) The control and monitoring of the process execution aiming at the detection of imperfections and critical points which can be improved; e) The capacity to collect data and analyze the development of the projects before they end, so as to enable the adoption of preventive measures capable of minimizing the impact of events involving the execution context of each project and the integrator as a whole.

In Figure 3, a schematic representation of the architecture of this system is presented.

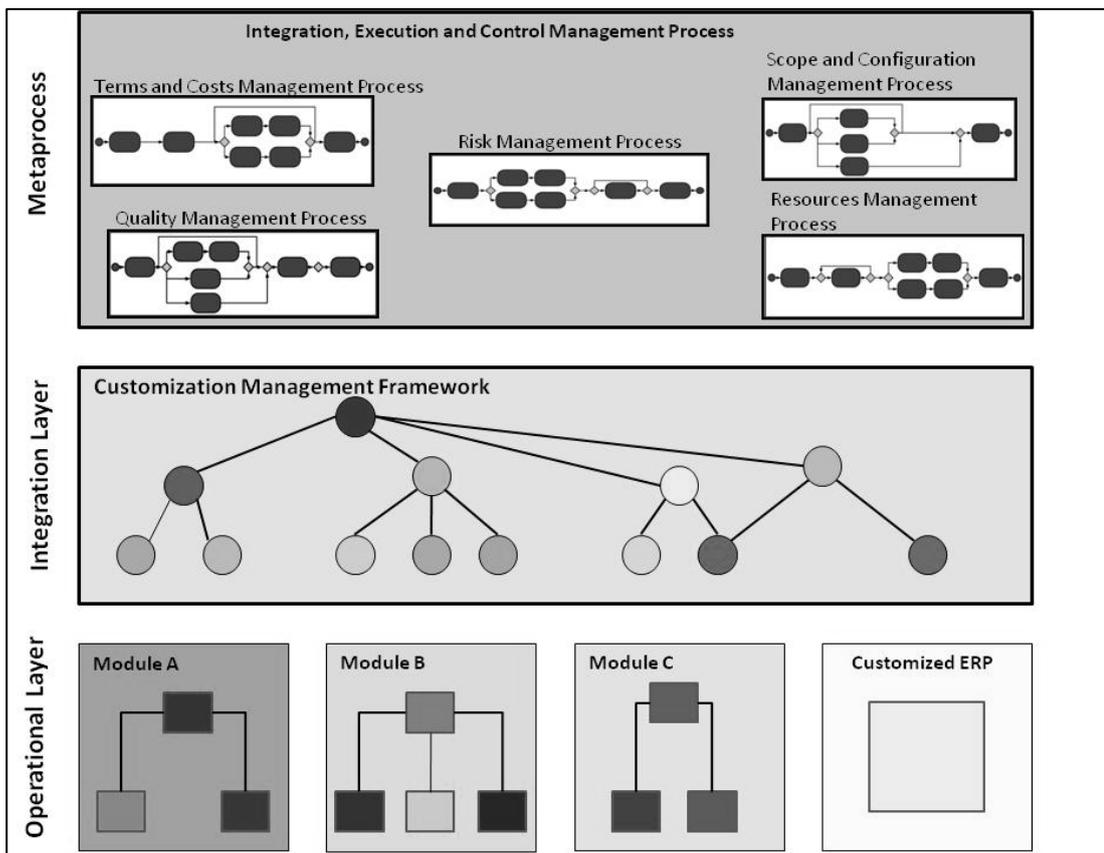


Figure 3 – Proposal of an Environment for Metaprocess Management

Amongst the main foreseen results with the use of the proposed environment are the dynamic balancing of the demands for the resources used in the different projects and the possibility to correct the existing distortions in the customization processes before their impact propagates and extends the needs of rework.

6. Conclusions

This paper presents a model for management of ERP systems customization projects for several simultaneous projects, which allows optimizing the processes executed in different environments of execution and allows a flexible implementation of the necessary functionalities for the management of the customization metaprocess.

The use of an integrated environment and a management framework allows a more simplified customization of ERP system modules, adequate to the contexts that may arise during the implementation of the projects, thus reducing the losses and rework needs.

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