

## A SUPPORTING TOOL FOR BUSINESS PROCESS MODELING

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### ABSTRACT

It is largely recognized that Business Process Modeling it is an increasingly task for nowadays organizations in order to maintain their competitiveness. There are two types of Business Process Modeling, the As Is Modeling, that is a representation of the current business processes in an organization, and the To Be Modeling, that is a prospective representation of the future (reengineered) business processes.

If there is no lack of methodologies for building the business process model, because there is a great number of languages and methodologies for it and tools to support its development, there is a lack of methodological support for the step immediately before the business process can be made. We call here that step as the Survey, Analysis and Validation of Information for Business Process Modeling.

To model business processes is necessary to know all the activities as well as consumed and produced informational resources. This modeling process, which goes from the survey of the activities of the organizational units to the construction of a business model, follows a bottom-up approach. However the majority of the existing business processes modeling tools follow a top-down approach, more adjusted to the To Be modeling, what makes the development of the As Is modeling more difficult. These tools start from

the high-level business processes models, which became detailed to a more granular level through the decomposition in activities, the opposite of the necessary for the As Is modeling.

To support the Survey, Analysis and Validation of Information for Business Process Modeling, we propose a methodology and a supporting tool.

### INTRODUCTION

This work was derived from the observation, in real industrial environment, of the methodological absence for the As Is modeling and its articulation with the tools used for To Be modeling.

The Information Systems Architecture supports the information systems strategic development that is based in the business processes. The establishment of this architecture is constituted by the following steps [1]: strategic business model, information systems existing architecture, data architecture, systems architecture, technological architecture and implementation/migration plan.

In the data architecture, and for the business process modeling, it is necessary to gather the information about activities performed and informational resources produced/consumed by each activity. Then, this information is analysed in order to establish dependencies between activities (workflows). Finally, this information is validated by

the managers of each organizational unit, and consequently by the managers of the whole organization.

This process of surveying, analysing and validating the information proved to be paper based, time consuming, with few methodological support and no computer support. These facts, associated with several difficulties encountered in this process leads to the necessity of creating a new methodology and a supporting tool. This tool work as information repository and automates the more repetitive and time-consuming tasks in this process.

The methodology disciplines the process of gathering various kinds of information through the establishment of an executing order of various steps, avoiding the error propagation through the frequent information validation.

The tool supports the produced/consumed resources matching tasks, establishing the activities dependency, and creates diagrams for a better visual validation of the gathered and analysed information.

The main goal of the methodology and tool is to facilitate the modeler work and to promote the communication between the IS people and the business people, for a common proposal – to improve business.

## THE CASE STUDY

The company in study (Dielmar, S.A.) initiated its activity, apparell manufacture for man, in the 60's. Today the company has 400 employes and is classified among the 1000 bigger companies of Portugal.

The company sells its products in Portugal (where counts more than 260 customers) and in the foreigner, whose exportations represented 49% of the total of its business volume, being 29% destined to the European Union market and about 18% for countries of the American continent, Japan, Koweit, etc.

Currently the company produces complete suits, pants and coats for man with three proper brands. The annual sales reached 12500000€. Since its creation the company keeps the spirit of traditional hand made suits in order to mark an image of quality and differentiation of its products.

## SURVEY ANALYSIS AND VALIDATION OF INFORMATION FOR BPM

Before start business process modeling is necessary to know the existing organizational processes [2]. One of the most common modeler

tasks is the existing business processes documentation, and this can be make trough activities diagrams representation [3]. The task before modeling is the one that deals with the information survey, which allow elaborating the workflows [4].

The basic idea to survey the existing business process start by the description of the processes based on the activities identification and the relationship among the activities [5]. A business model should be capable of provide several informative elements. These elements include what activities compose the processes, how and why they are executed and what informational resources manipulate [6].

The information for business modeling can be gathered through interviews to the people that intervening in the execution of the activities that compose the business processes. The bottom-up modeling approach for As Is business modeling begin with the managers and groups of workers interviewing in way to determine what work they do, as a base for the activities definition [7]. In the first step of the business modeling, the modelers interview the business experts who provide information about the activities, inputs, outputs resources and business rules. The As Is modelers as well as the To Be modelers can easily capture *the what* of the business processes [8]. Enterprise architecture must define three things. First, what activities are performed in the organization? Second, How should these activities be performed? And finally, how should the enterprise be constructed? [9]. An enterprise is a collection of activities organized in a set of business processes that cooperates to produce the expecting organizational results. An activity is defined as an organizational behaviour that transforms inputs in outputs. The activities are basic constructors and are useful when organized in business processes [10].

## METHODOLOGY PROPOSAL

As presented in [11] the process of surveying, analysing and validating information for the As Is business process modeling in an industrial environment encountered several difficulties. The main difficulties and the proposal to solve them are presented in figure 1.

These difficulties come, mainly, from the inexistence of methodological support for this step of the information systems architecture or the business process reengineering.

Difficulties	Solution
1ª - Less efficient and clear communicational support in order to check the activities near the managers of each organizational unit.	Development of a diagram that illustrates the activities of each organizational unit and its communication with the others organizational units
2ª -Long and complicated matching resources verification process.	Automation of this process

Fig. 1. Difficulties in the surveying, analysing and validation process

The methodology proposed (figure 2) has the following general goals:

- Establish a step sequence for normalizing the surveying, analysing and validating process, in order to integrate and articulate the bottom-down and bottom-up approach.
- Establish validation mechanisms through the construction of intermediary modeling diagrams.
- Offer the possibility of automating some steps through the development of a computer based tool for analysing the information gathered.

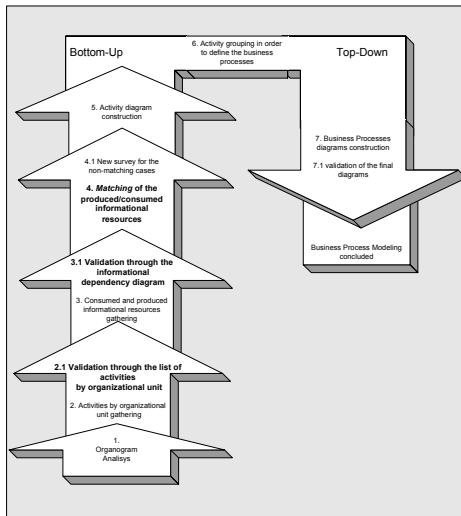


Fig. 2. Methodology Proposal [11]

This methodology was developed to support the information surveying, analysing and validating for the As Is business process modeling, following a bottom-up approach from step 1 to 5, which correspond to the activity diagrams construction. The step 6, which correspond to the abstraction of the activity diagrams in business processes, uses the results of the bottom up approach. The step 7, which correspond to the construction and validation of the business process diagrams, is made using a top-down approach.

## THE SUPPORTING TOOL

The implemented tool goal is to support the methodology presented in [11], liberating the modeler from the time consuming and repetitive tasks. The tool also produces intermediary diagrams to help in the validation step. All the diagrams in this tool are stereotyped UML diagrams.

The tool supporting steps are in bold in the figure 2.

From the inserted data (organizational units, activities and informational resources), the tool produces an activities list grouped by organizational unit (figure 3). The main goal of this feature is the validation of the data collected by the responsible of each organizational unit

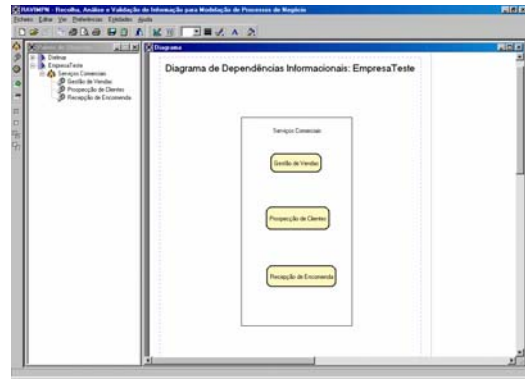


Fig. 3. Activities/Organizational Units List

From that list and the data collected about the produced and consumed informational resources, the tool produces a diagram with the informational dependencies between the activities of the analysed organizational unit and the others organizational units activities (figure 4). The validation of this data has to be made by the responsible of each organizational unit.

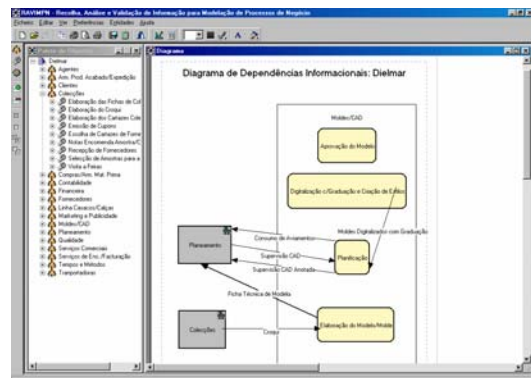


Fig. 4. Informational Dependency Diagram

After the validation of the data, the tool verifies, for each informational resource, which activity has produced him and which activity or activities consumes him, in order to establish de informational dependencies at the activity level (figure 5). This diagram shows what are the consumed and produced resources for a selected activity. It also shows the producers of the consumed resources and the consumers of the produced resources. This information is completed with the names of the organizational units of the activities involved.

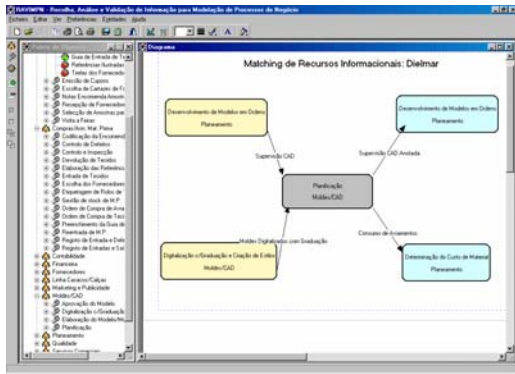


Fig. 5. Informational Resources Matching

The tool also produced a list of the non-matching informational resources. These are the resources that are produced and are not consumed, and the resources that are consumed and are not produced by any activity. This is useful because show the way to the necessity of re-validate the activities involved (figure 6).

Unidade Organizacional	Atividade	Recurso	Tipo	Tipo de Fluxo
Arm. Prod.	Expedição	Guia de Saída	Saída	Sem Destino
Arm. Prod.	Expedição	Lista de Matrizes de Clientes	Entrada	Sem Origem
Arm. Prod.	Expedição	Nome da Transportadora	Entrada	Sem Origem
Arm. Prod.	Expedição	Tipo de Transporte	Entrada	Sem Origem
Coleções	Elaboração dos Cartazes	Guia de Entrada de Tintas	Entrada	Sem Origem
Coleções	Emissão de Cupons	Guia de entrada de Cupons	Entrada	Sem Origem
Coleções	Emissão de Cupons	Ordem de Fabrico	Saída	Sem Destino
Coleções	Escolha de Cartazes de	Cupons com Amostras	Entrada	Sem Origem
Coleções	Notas Encomenda	Nota de Encomenda	Saída	Sem Destino
Coleções	Recepção de Fornecedor	Data de Visita	Entrada	Sem Origem
Coleções	Seleção de Amostras para a	Ficha de Encomenda de Cupons	Saída	Sem Destino
Coleções	Seleção de Amostras para a	Ficha de Encomenda de Tintas	Saída	Sem Destino
Coleções	Visita a Feiras	Data das Feiras	Entrada	Sem Origem
Compras/Am. Mat. Prima	Codificação da Encomenda	Código da Encomenda	Saída	Sem Destino
Compras/Am. Mat. Prima	Elaboração das Referências	Amostras de Avanços	Entrada	Sem Origem
Compras/Am. Mat. Prima	Escolha dos Fornecedor	Pedido de Amostras de	Saída	Sem Destino
Compras/Am. Mat. Prima	Gestão de stock de M.P.	Listagem de Stock	Saída	Sem Destino

Fig. 6. Non-Matching Resources report

The tool presented has an important role in supporting the following methodology steps: Organizational Unit Information Validation, Informational Dependencies between Organizational Units Validation and Produced/consumed Resources Matching

Thus, also has an important role in the process of building the business process models. Figures 7 show an example of a snapshot of the macro-process model. Then, figure 8 show an

example of a business process model in detail (business process Order).

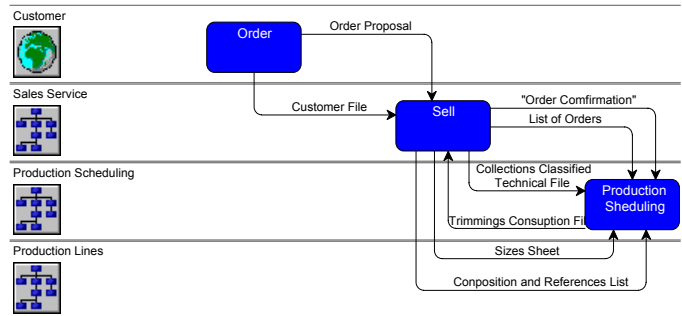


Fig. 7. Business Macro Process Model [11]

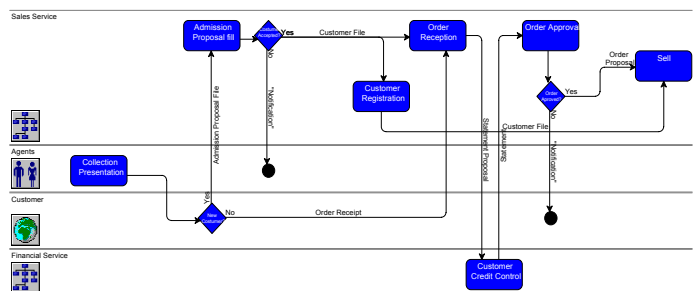


Fig. 8. Business Process "Order" [11]

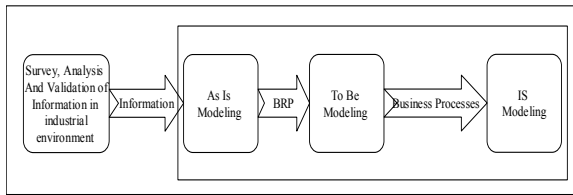
CONCLUSIONS AND FUTURE WORK

With the use of this tool, we can obtain the following advantages:

- Time reduction of the activity dependencies analysis
- Automatic construction of several diagrams that help the validation steps
- Automatic construction of several reports that helps the analysis of the resumed information gathered through all process of As Is modeling.

The need to establish a methodology for the survey, analysis and validation of information for business process modeling and the development of a tool for supporting the methodology, derived from a set of difficulties founded in the construction of the business process model in a real industrial environment.

In the bibliographic review realized couldn't be found related work that clarifies, in the appropriate manner (integrated and systematic) the way to survey, analyse and validate the information for the As Is model. Besides of the existing work developed referring the As Is and the To Be modeling for the BPR process and for the IS modeling, there is no references that indicates the necessary steps to do work before the As Is Modeling Process, called here survey, analysis and validation of information (figure 9).



**Fig. 9.** From the survey towards IS Modeling

The use of the methodology and the tool brings advantages in the case of the need to integrate new activities in the existing model. If the tool was not used in this case then would implied the need of reanalyse all the forms used to gather information to recalculate manually the matching resources between the new and the existing activities of the model. This manual process implies more time and more human errors.

In general terms, the methodology and the tool presented, can bring advantages for the As Is modeler in any organization. The methodology aims to normalize the steps necessary to build the As Is business process model, towards the subsequent building of the To Be model, in a BPR process or in a development/migration of IS.

In conclusion, the survey, analysis and validation of the information for the As Is business process Modeling can be optimised using a methodology and a supporting tool.

As future work, we can introduce some alternative paths to the methodology, depending of the organization type, to become more general.

In the tool, we can introduce the following features:

- Set execution responsibilities to the human resources to the activities and to the organizational units, in a way to better identify the business actors.
- Introduce swim lanes to the matching diagrams (like in the UML activity diagrams).
- From the repository of all the activities, automatically construct the global activity diagram of the organization, avoiding the use of other tool to build the final activity diagram of the business model.

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