

SURVEY, ANALYSIS AND VALIDATION OF INFORMATION FOR BUSINESS PROCESS MODELING

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Abstract: Business processes modeling became a fundamental task for organizations. To model business processes is necessary to know all the activities as well as consumed and produced informational resources. From this knowledge, abstractions are constructed, which allow elaborating a high-level business process model. 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.

This document establishes a methodology for the survey, analysis and validation of the information necessary for As Is business processes modeling, conjugating top-down and bottom-up approaches, in an iterative and articulated way.

1. INTRODUCTION

Currently the organizations operate in a highly competitive global market, which leads to the necessity to increase its competitive position. This implies to increase the quality of the produced goods and services, to reduce lead times of those same goods and services, minimizing costs and increasing profits. In order to reach these competitive goals, the organizations must optimize their internal operations. This optimization requires a business model that represents the business composition, allowing the organizations to analyze and simulate change before implementation. In the past, the business has been only represented with hierarchical models of the organizational structure of companies. However, the business can be improved through the optimization of business processes. A business process represents the organizations way of work, horizontally, allowing an analysis of the workflow through their internal and external boundaries.

The goal of the business modeling is the production of descriptions or abstractions of complex realities, capturing the core business functions. Some of the reasons to proceed with the business modeling are [Castela et al., 2001]:

- To start a Business Process Reengineering, that leads to a better understanding of the business, to improve business and to identify new business or outsourcing opportunities.
- To develop an Information systems Architecture, that uses the business process modeling as a base of support to the new information systems.

The business process modeling has two approaches, the As Is and the To Be.

The As Is approach is suited to illustrate the business as is right now. The To Be approach is suited for the simulation of changes to be implemented in the future.

The process of modeling these two approaches is not the same. The As Is modeling follows a bottom-up approach and the to be modeling a top down.

The characteristics of the survey, analysis and validation of information (SAVI) for the business process modeling are presented in the first part of this paper. Then, the case study and the methodology used for SAVI is presented. Finally, and based on the difficulties of the SAVI in the case study, a new methodology is presented.

2. SURVEY, ANALISYS AND VALIDATION OF INFORMATION

Before start business process modeling is necessary to know the existing organizational processes [Reijswoud-Rijst, 1995]. One of the most common modeler tasks is the existing business processes documentation, and this can be make trough activities diagrams representation [Bhaskar et al., 1994]. The task before modeling is the one that deals with the information survey, which allow elaborating the workflows [Weske et al., 1999]. Some authors refer that the BRP has its roots in systems engineering and the mental approach is the same [Bhaskar et al., 1994]. This fact and the increasing use of UML for business process modeling, at first sight, solve the problem of the requirements specifying (using. Use cases diagrams). In one hand, [Marshall, 2000], [Baresi et al.,], [Chandrasekaran, 1997] are some of the defenders of this thesis. In the other hand, [Eriksson-Penker, 2000] and some of the manufacturers of business process modeling tools [Proforma, 1998] says that the use cases diagrams fit another step of the process, which is the requirements capture of information systems based on the business models.

2.1 As Is Business Process Modeling

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 [Podolsky, 1998]. 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 [Giaglis et al, 1999].

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 [Stratton, 2001]. 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 [Grabau, Grange, 1998]. 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? [Liles, Presley, 1996]. 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 behavior that transforms inputs in outputs. The activities are basic constructors and are useful when organized in business processes [Presley et al., 1993].

3. THE CASE STUDY

The following case study was performed in an apparel industrial company, and the work developed was, in general terms, based on the enterprise architecture planning of [Spewak, 1992] (figure 1):

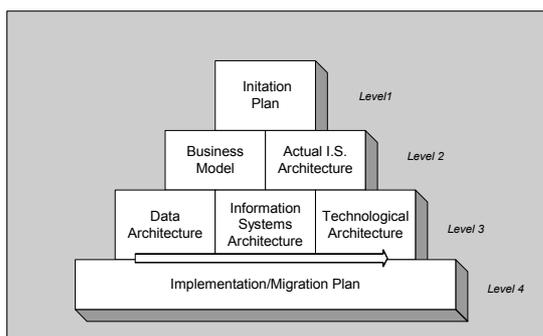


Figure 1: Enterprise Architecture Planning (Adapted from [Spewak, 1992])

The ProVision Workbench was the tool used to represent the case study business processes.

3.1 Case Study Methodology

The principal steps of the EAP methodology were kept. However in the Business Model the focus of work was the enterprise business strategy, instead of the exhaustive business process identification and their decomposition, as defends [Spewak, 1992]. In Data Architecture the focus of work was the survey, analysis and validation of information for business process modeling. This step used some enterprise survey steps of the EAP business model, in order to schedule, preparation and execution of the interviews. It used also the information about the

definition needs of the informational entities (organizational units, resources, events) and their relationships.

The survey, analysis and validation of information method, specifically, was based on the IDEF3 method diagrams (activity flow diagram) [Painter et al., 1996], [Delen et al., 1999], the Eriksson-Penker Business Extensions to UML [Eriksson, Penker, 2000] and the ProVision information necessities in order to business process modeling. The figure 2 shows the steps of the methodology adopted in the case study.

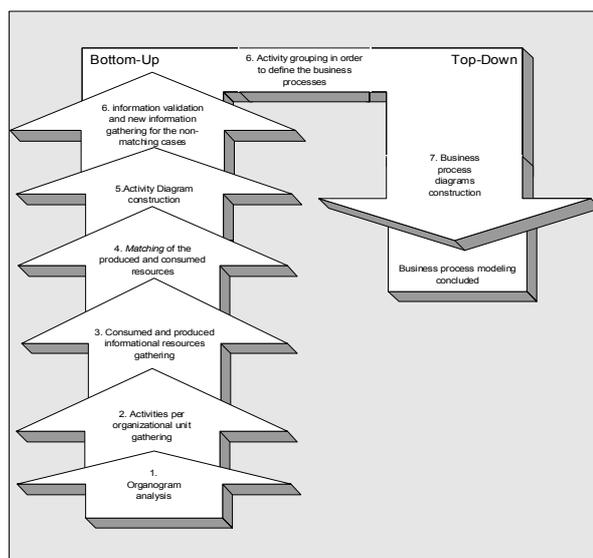


Figure 2: Methodology adopted in the case study

3.2 The Company

The company in study initiated its activity, apparel manufacture for man, in the 60's. Today the company has 400 employees 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. In 1999 the sales reached 2.5 billions of escudos. 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.

3.3 Information Systems Architecture

3.3.1 Business Strategy Model

The Company's strategic positioning is the differentiation and product quality centered on the customer satisfaction.

The future strategy of the company can be summarized in a Vision Statement: "to keep and to consolidate the leadership in the internal market and to increase the share of external market". This high-level goal can be decomposed through a Goal Diagram (figure 3) [Eriksson-Penker]:

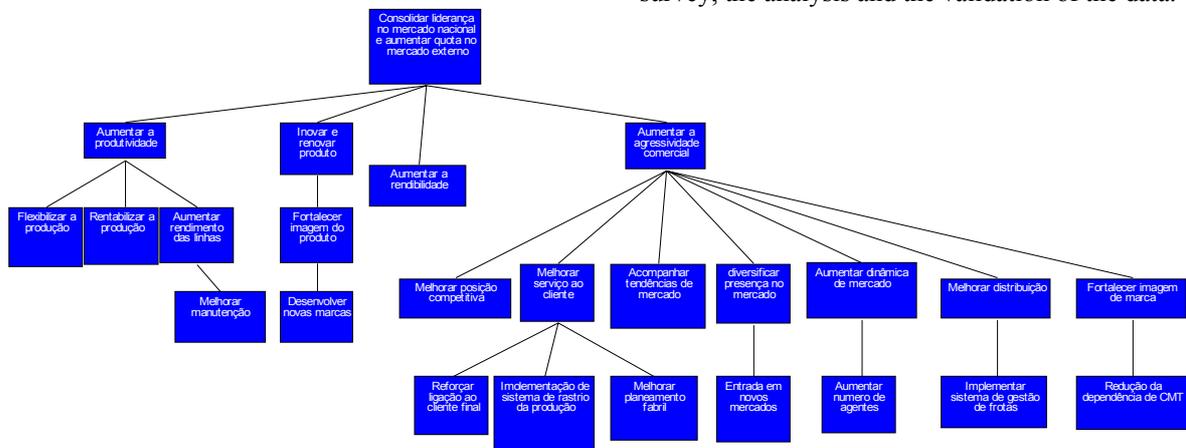


Figure 3: Goal Diagram

3.3.2 Actual Systems Architecture

The company has several information systems based on different platforms. Table 1 summarizes the systems and platforms.

Platforms	Information System
Informix SE 7.0	ORGA
	SINFIC-S4
Data Files	LAGO
	ASSYST CAD/CAM
	SISTIME
FOX PRO	MAC
SQL SERVER	Recursos Humanos
	Simulação e Cálculo de Preços da Colecção
	Sistema de Custeio Variável
	Registo de Ordens de Compra
MS Access	Loja de Retalhos
	Registo de Correio

Table 1: Platforms and Information Systems in Dielmar

The core information systems of the company are ORGA, which is a production and planning management system, LAGO, which is a production optimizing system, and CAD/CAM system, which digitalize the molds and plan and optimize the cut.

The integration level of the core systems can be seen on figure 4.

3.3.3 Data Architecture

The Data Architecture of the company, considering the knowledge obtained in the previous steps, was made, in order to produce the business processes model.

This step was divided in 3 main phases: the survey, the analysis and the validation of the data.

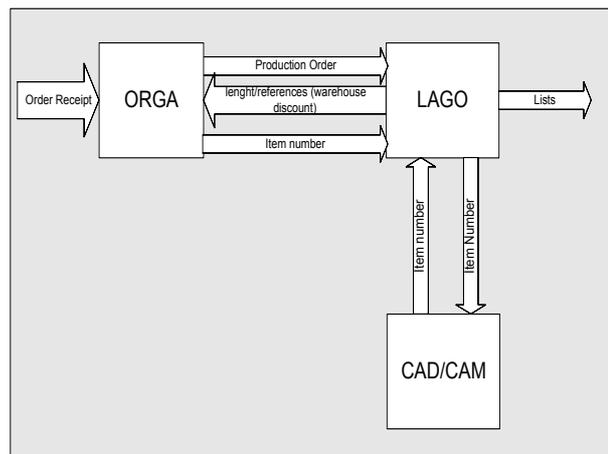


Figure 4: Core Information Systems Integration

The survey phase started with the analysis of the structure of the organization. Then, and for each organizational unit, the information about what activities are executed was gathered with the help of the inquiry of the figure 5.

Dielmar, S.A.
Activities Description

Number
Management
Organiz. Unit

Num.	Activity	Description

Date
Ass.

Figure 5: Activity Gathering Inquiry

Then, the information about the informational resources consumed and produced by each activity was gathered with the help of the inquiry presented at figure 6.

Dielmar, S.A.
Resources and Activities Description

N.
Organiz. Unit
Activity
Goal

Activity Description

Informational Needs	Source

Pág 1

Information Produced

Name	Description	Format	Receiver

Support Information System

Frequency
Employee
Date
Ass.

Pág 2

Figure 6: Inquiry for resources gathering

With the information about the resources, the process of matching between activities was started. This process allow to find what activities are the predecessors and the successors of each activity analyzed, allowing the construction of the activity diagrams, which are the links among the various snapshots analyzed during the matching process.

With the workflows of the organization defined, it was necessary to divide it in business processes in order to create a higher-level diagram, where the granularity of the activity diagrams was hidden. This is necessary to start the top-down approach. The goal of the steps of this approach is the construction of macro-business process models in order to be validated by the administration of the company in order to do the business process modeling. 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)

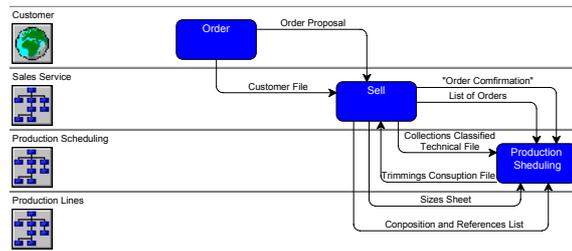


Figure7: Business Macro-Processes Diagram

The process of surveying, analyzing and validating encountered several difficulties. The main difficulties and the proposal to solve them are presented in table 2.

Difficulties	Solution
1 ^a - 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 it's communication with the others organizational units
2 ^a -Long and complicated matching resources verification process.	Automation of this process

Table 2: Difficulties in the surveying, analyzing and validation process

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

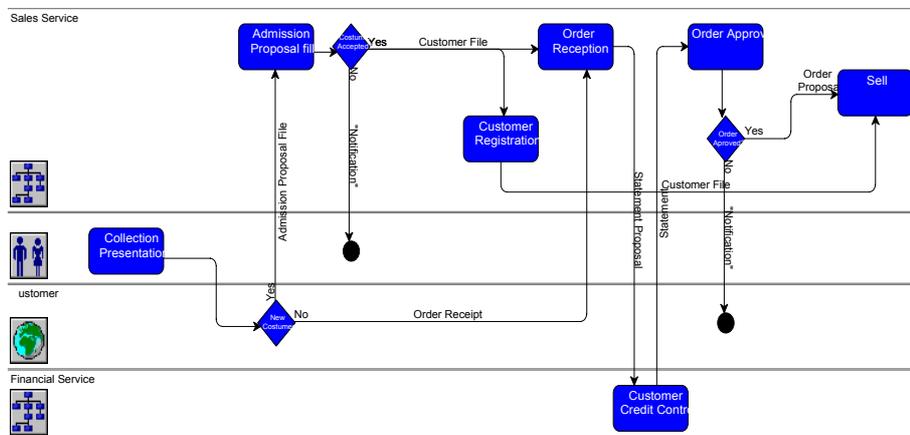


Figure 8: Business Process "Order" Diagram

4. METHODOLOGY PROPOSAL

The methodology proposed (figure 9) has the following general goals:

- Establish a step sequence for normalizing the surveying, analyzing 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 analyzing the information gathered.

4.1 Methodology steps

This methodology was developed to support the information surveying, analyzing 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 diagram of the figure 9 shows the various steps of the methodology.

4.1.1 Bottom-up approach

Step 1: Organization chart analysis

In this step, the organization is divided in organizational units, in order to create several informational sources with a defined hierarchical management.

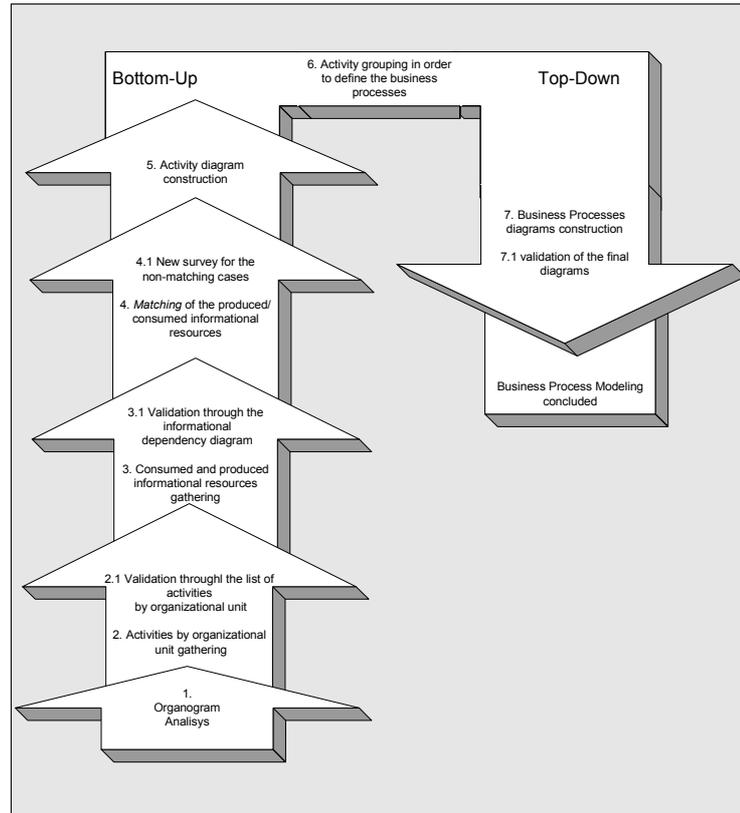


Figure 9: Methodology for the Survey, Analysis and Validation of Information for Business Process Modeling

Step 2: Activity gathering

In this step, the information about what activities are performed in each organizational unit is gathered through the inquiry shown at figure XX.

Step 2.1: Activity validation

In this step, the managers of the organizational units validate the information gathered in the previous step through a list of activities.

Step 3: Informational Resources gathering

In this step, the information about the consumed and produced informational resources of each activity is gathered using the inquiry shown at figure XX.

Step 3.1: Informational Resources validation

The information gathered in the previous step must be validated through a informational dependency diagram.

Step 4: Informational Resources Matching

The matching between the produced and consumed resources of the various activities must be made in order to start establishing dependencies. These dependencies allow constructing the workflows of the organization.

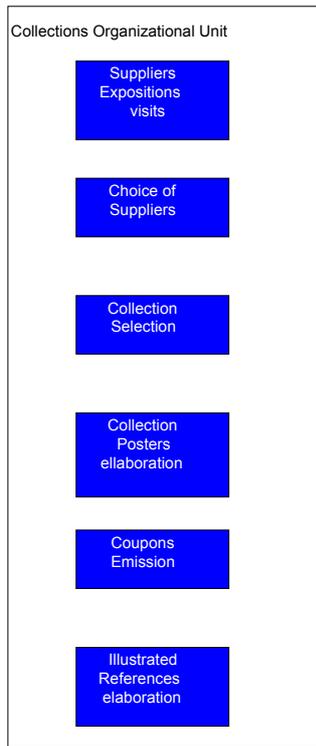


Figure 10: Activities by Organizational Unit

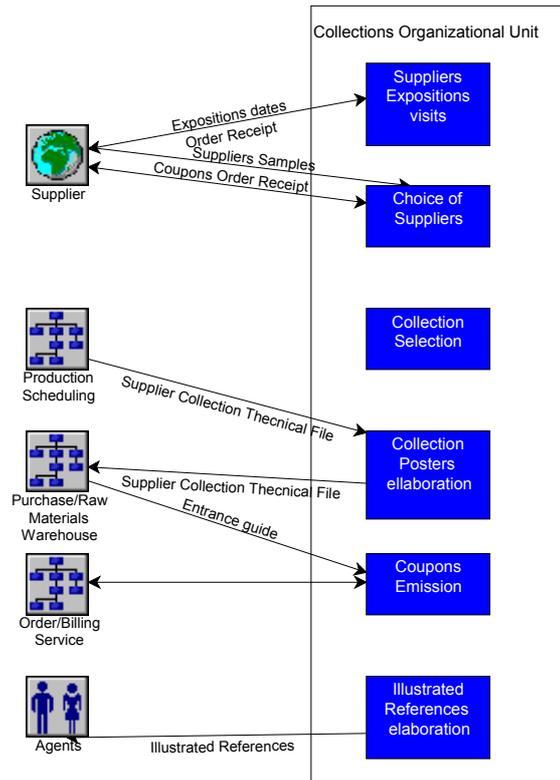


Figure 11: Informational Dependency Diagram

A list of the non-matching cases has to be done in this step.

Step 4.1: Validation of the non-matching cases
 In this step, the non-matching cases (resources that are produced and are not consumed or resources that are consumed and are not produced) have to be investigated, in order to solve the incoherencies.

Step 5: Activity Diagrams construction
 With the various fragments of the activity diagram obtained in the previous step, the all activity diagram of the organization can be constructed.

Step 7: Business Process Diagrams Construction
 Starting by the high-level diagram, the activities are placed below the correspondent business processes in order to model the entire business.

Step 7.1: Business Process Diagrams Validation
 Someone who knows well the horizontal workflows of the business must do the validation of the diagrams obtained in the previous step (administration, management)

4.1.2 Top-down approach

Step 6: Grouping activities in business processes
 Trough the analysis of the diagrams of the previous step, the grouping of the activities in business processes is made in order to construct a high-level business process diagram.

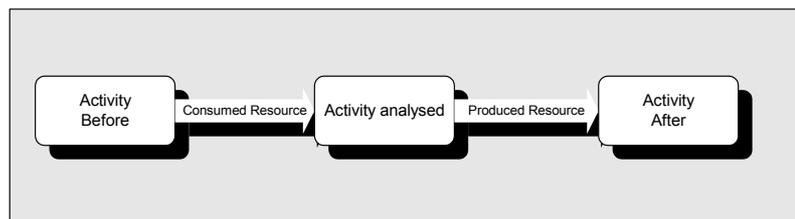


Figure 12: Matching among Informational Resources

5. CONCLUSIONS AND FUTURE WORK

A proposal of a methodology to use for the information survey, analysis and validation to construct the As Is business process modeling was presented in this paper.

This methodology intend to articulate the bottom up and top down approaches, in an iterative, integrated and adapted to reality fashion, because it was based in the practical experience obtained modeling a business in a real organizational environment.

As future work, a computer-based tool must be developed to support the matching process between the resources of the activities. This tool must provide the diagrams to validate the information gathered (list of the activities per organizational unit and informational dependencies diagram).

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