

UML-BASED BUSINESS PROCESS REENGINEERING (BPR-UML) APPLIED TO IT OUTSOURCING

Edumilis Méndez, Luis E. Mendoza , María Pérez, Anna Grimán
Processes and Systems Department – LISI
Universidad Simón Bolívar
Caracas – Venezuela

Keywords: Business Process Reengineering, Information Technology, Information Technology Outsourcing.

Abstract: Business Process Reengineering (BPR) is one of the current approaches organizations take to address global market pressures. BPR allows firms to analyze their internal processes with the view to developing customized goal-oriented solutions. On the other hand, Business Process Outsourcing (BPO) can be used: 1) as a tool for new processes defined by reengineering, which allows Information Technology experts to perform the business process involving that know-how; and 2) as part of a BPR, to reorient its implementation regarding quality levels and client satisfaction. This paper presents a methodological proposal that merges the BPR methodology proposed by Jacobson (1994) with Rational Unified Process (RUP). It also describes how this proposal can be applied in a BPR for IT Outsourcing in order to improve efficiency and quality levels in the corresponding business processes, specifically, the Printing Outsourcing Service (POS). This methodological proposal ensures traceability between the models proposed for the business and the features that the technological enablers should have for supporting them, thus reaching higher effectiveness in the reengineering process.

1 INTRODUCTION

According to Irazabal (2001), IT Outsourcing includes charging provider with some processes that are not central part of a business, so that more attention can be paid to those processes representing the core of the organization-client relationship, with the aim of achieving higher productivity and competitiveness levels.

If the results are not favorable or promising, then the provider should develop strategies or mechanisms, many times radical ones, to redesign its service offer. And it is precisely when the BPR proposal emerges.

Business Process Reengineering (BPR) is defined by Hammer and Champy (1994) as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality and speed”.

There are numerous BPR methodologies, which have failed due to the lack of a direct link between

modeling of a new process and the requirements of the technological enablers proposed, because the latter do not have any notation and/or documentation to allow implementing BPR with the IT guidelines required to complete it successfully. Based on the above-mentioned, the main goal of this research is to present a methodological proposal known as UML-based Business Process Reengineering (BPR-UML), with the aim of closing the gap between the proposed solution and its implementation.

This work was based on the Systemic Methodological Framework (SMF) by Pérez et al. (2004), which, in turn, is based on the Action Research Method (Baskerville, 1999) and the DESMET Methodology (Kitchenham, 1996a) to validate/evaluate the product obtained.

Some of the contributions include the use of RUP artifacts as support for the BPR-UML phases, as well as the reengineering of the IT Outsourcing process on which the methodological proposal was applied.

2 RESEARCH METHODOLOGY – SMF

Pérez et al. (2004) developed the SMF, which is adjusted to the research conditions, is systemic regarding the research objective, and is adjusted to the techniques or tools every time it is instantiated.

Once it is instantiated, SMF proposes the five (5) phases (Diagnosing, Action Planning, Action taking, Evaluation, and Specifying the learning) as well as the ten (10) steps included in its implementation (Documentary research, Objectives and scope formulation, Instantiation of Action-Research, Product design, Context Analysis, Application of DESMET methodology, Product Evaluation, Analysis of the results, Scope definition for the next iteration, and Conclusions and Recommendations). The BPR-UML was generated in Step 4 (Product Design) of the SMF Phase “Taking action”. It is worth mentioning that SMF iteration was carried out to obtain the BPR-UML first version. Acceptability of BPR-UML was tested using DESMET Qualitative Effect Analysis (Kitchenham, 1996a) as an evaluation method. The BPR-UML is shown in the next section.

3 BPR-UML

This BPR-UML is based on the four stages of Jacobson’s MBPR (1994) and some templates of the RUP Business Modeling Discipline, such as Business Vision, Organization Evaluation and Business Architecture.

Figure 1 shows the workflow followed throughout the four BPR-UML stages, which are as follows: Development of business vision; understanding the existing business (Reverse Engineering); design of the new business (Forward Engineering); and implementation of the new business. The following activities, deliverables, and roles associated to each phase were defined in the BRP-UML.

3.1 Phase 1: Development of Business Vision

What does the organization desire in its processes? This question is analyzed in this phase in terms of the business vision, as shown in Figure 2. In this case, the RUP document Business Vision was adapted.

3.2 Phase 2: Understanding the Existing Business

The environment of the Target Organization is evaluated in this phase, in order to support the analysis of the current situation and propose, in case it is necessary in the future, a redesign of the structure and modeling of the business processes. The business, ideas and strategic framework within the context of the project, internal and external factors involved in the business process, support enablers, and the firm's internal structure are established. The result of this phase is documented with the RUP artifact: the Organization Evaluation, which can be observed in Figure 2.

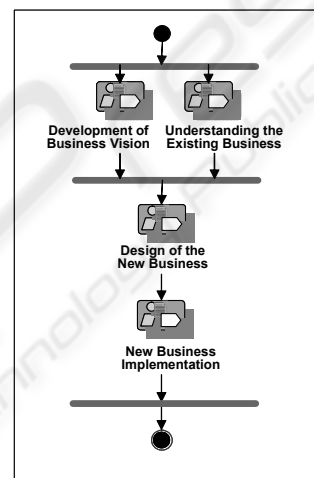


Figure 1: Methodological proposal for BPR (BPR-UML).

3.3 Phase 3: Design of the New Business

This phase includes redesigning the business process allowing for the fulfillment of the organization goals. In this sense a business architectural description is shown, using a number of different architectural views which describe the various aspects of the business. The aim is to obtain and convey the relevant decisions regarding business architecture.

To this end, the activities shown in Figure 2 are carried out, thus producing the supporting RUP document Business Architecture, which details: Business Context model, Use Cases model, Sequence diagrams, Business Classes, General Behavior Patterns, Communication View, and Traceability diagrams.

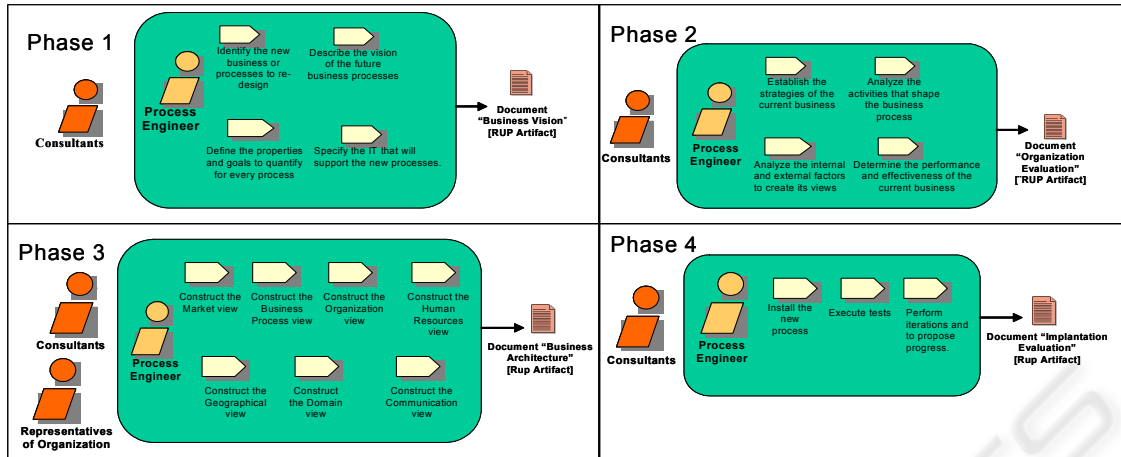


Figure 2: Roles, activities and deliverables in Phases of BPR-UML.

Table 1: Roles, activities and deliverables in BPR-UML.

Phase	Activities	Deliverables	Roles Associated
Development of Business Vision	Identifying the new business or processes to redesign; describing the vision of the future business processes; defining the properties and goals to quantify for every process; specifying the IT that will support the new processes.	Business Vision	Consultants and Process Engineers
Understanding the Existing Business	Establishing the strategies of the current business; analyzing the activities that shape the business process; analyzing the internal and external factors to create its views; determining the performance and effectiveness of the current business.	Organization Evaluation	Consultants and Process Engineers
Design of New Business	Constructing the views of: Market, Business Process, Organization, Human Resources, Geographical, Domain and Communication.	Business Architecture	Organization Representatives, Consultants and Process Engineers
New Business Implementation	Installing the new process; testing; performing of iterations, and proposing progress.	Implementation Evaluation	Consultants and Process Engineers

3.4 Phase 4: New Business Implementation

Activities in Figure 2 should be carried out in order to fully document the implementation of the new business and to generate the RUP document Implementation Evaluation, in which the setting up of the new business process is specified, tests are conducted, and iterations are carried out based on the best proposals. An analysis of the technological enablers that will be used to implement the new business should also be performed.

Table 1 presents a summary of the BRP-UML proposal, showing activities, deliverables, and roles involved in each phase.

Figure 3 shows a summary of the comparison between BPR-UML and other four BPR methodologies.

4 SELECTION OF THE BPR-UML EVALUATION METHOD

After analyzing the practical and technical selection criteria proposed by the DESMET methodology (Kitchenham, 1996b), in this case the BPR-UML, the method *Qualitative Effects Analysis* was found to be the best suited for this research, because according to the practical criteria, it is recommended for research with a short evaluation time, low cost, and high risk, being this latter reduced by the availability of experts.

The Qualitative Effects Analysis offers a subjective perspective of the quantitative effect of a process. In this research, the evaluation was based on the opinion of four (4) experts while a case study was being applied, which is show below.

Once the BPR-UML was proposed, the evaluation method was selected. The selection procedure and the chosen evaluation method are shown below.

5 RESULTS OF APPLYING BRP-UML – CASE STUDY

The case study in this research is represented by the Printing Outsourcing Service (POS). For agreements of confidentiality, the actual name of the organization where the research took place will not be revealed. WNV (supplier-firm) is very prestigious among the IT market, particularly in the integration of products, solutions, and services with added value towards clients. The environment where POS carries out its processes is financial institutions at both the main office as well as branches level. The personnel working at the client-firm, at the operational level, range between 2-10 employees, with a printing work volume depending on the space where the work is taking place.

The documents Business Vision, Organization Evaluation, Business Architecture and Implantation Evaluation were produced.

Features	Methodologies				
	Adair & Murray	Currid & Company	Davenport	Hammer & Champy	Based UML Methodology
Re-engineering Definition					
Start point: business goals	Yes	Yes	Yes	Yes	Yes
Process focused	Yes	Yes	Yes	Yes	Yes
Corporate Goals/process relation	Yes	Yes	Yes	Yes	Yes
Priority for Aggregated Value Process	Yes	1	Yes	Yes	Yes
Customer oriented	Yes	1	Yes	Yes	Yes
Proposes a radical change	1	Yes	Yes	Yes	Yes
Extends BPR to suppliers/partners	No	No	Yes	Yes	Yes
Studied processes					
Only one	Yes	2	No	No	Yes
Multiple processes	Yes	2	Yes	Yes	Yes
Added value processes	Yes	2	Yes	Yes	Yes
Support processes	Yes	2	Yes	Yes	Yes
Methodology					
It's described	Yes	No	No	No	Yes
It has adequate details	Yes	No	No	No	Yes
It uses a management technique	Yes	No	No	No	Yes
It includes a new process vision	No	No	No	No	Yes
It includes sub-divisions for the new process	No	No	No	No	Yes
It includes technical design	No	No	No	No	Yes
It includes HHRR design	No	No	No	No	Yes
It considers obstacles for change	Yes	No	No	No	1
It includes an implementation plan	No	No	No	No	Yes
Role of Automation					
Start point	No	No	No	No	No
Training	No	Yes	Yes	Yes	Yes
Legend: Yes: feature is present 1: not specified No: feature is absent 2: not considered					

Figure 3: Comparative table of BPR-UML and other BPR methodologies; adapted from Manganeli and Klein, 2004.

The phase 4 supported the redesign of the POS processes by means of an analysis of the technological enablers supporting the redesigned

processes. Technological enablers can be defined as those technological tools supporting business processes with the aim of obtaining results in shorter response times, customized according to the client's needs, and with a better performance at the business level.

The target firm, WNV, had a technological tool known as *Printing Administrator (PA)*, which currently does not support the POS business processes. As a result, those processes relevant for the service lack of technological support. After applying BRP-UML through a case study, the activities of the Qualitative Effects Analysis evaluation method were conducted to obtain results regarding the performance of BRP-UML.

6 RESULTS OF THE BPR-UML EVALUATION

The evaluation process involves the evaluation of BRP-UML, in this case, activities inherent to the Qualitative Effects Analysis. This paper will show only the results per characteristic, and the results of the evaluation of the General Characteristics for BPR-UML are analyzed below. Figure 4 shows the results obtained for each characteristic. *Consistency with the Goals, Correspondence with the Vision, Organizational Structure, Definition of Activities, Process Implementation and Learning Time* are placed in the *Excellent* category (Figure 4). In other words, the six characteristics evaluated were over the minimum acceptance level. It is also observed that BPR-UML is widely accepted.

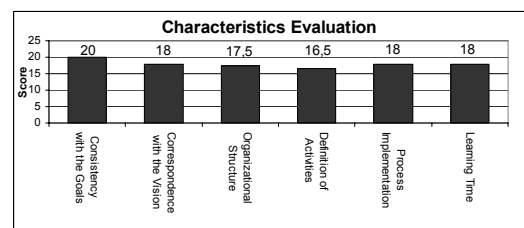


Figure 4: Results of the BPR-UML Evaluation.

7 CONCLUSIONS

This paper presents a methodological proposal for UML-based BPR (BPR-UML) and its application in a case study. This research was successfully developed due to the following achievements: 1)

satisfactory results with the application of BPR-UML, specifically, a BPR proposal for an IT Outsourcing; demonstrating the strengths related to the notation, documentation, and traceability improvements 2) favorable results with the evaluation of BPR (BPR-UML) through the Qualitative Effects Analysis evaluation method, with a high acceptance degree by the POS experts regarding the six characteristics evaluated.

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