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Process reverse engineering for BPR: A form-based approach

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Abstract

Firms spend significant efforts identifying and representing their current business processes for business process redesign (BPR) projects. Despite the efforts, due to the lack of proper tools and methodologies, they find it difficult to decide which process to redesign and how. Considering the effort spent in the process analysis phase and limited support in the process redesign phase, we find a need for a better process modeling and redesign method. This article introduces the enterprise process reverse engineering (EPRE) method for analyzing business processes and supporting process redesign tasks. By analyzing common business forms, the method provides designers and users with guidance for process redesign as well as in generating the current process model. Working procedures are described using a sample hospital case and a set of the EPRE prototype screens. For validation purpose, we applied the method to a real BPR project for an advertising agency and report on its outcome. © 1998 Elsevier Science B.V.

Keywords: Reverse engineering; BPR; Process modeling; Form; Field type

1. Introduction

Relentless changes and competitive pressures in the 1990s have placed new strains on organizations and made business process redesign (BPR) a major subject of attention in academia and industry [12, 19, 34]. BPR is offered as an enabler of organizational transformation, and many organizations have embraced the BPR approach for radical performance improvement. Currently, however, there are two major challenges facing BPR implementations.

First, existing business processes have to be understood to enable the BPR team to identify the potential problem areas before creating a new process or redesigning the existing ones [11, 17]. However, it is not a trivial task to identify and represent existing processes in a formal, yet easy to understand, process model [15]. Most BPR methodologies rely on labor intensive approaches for capturing and modeling business processes [4]. We also suffer from the relative lack of documentation compared to the elaborate and structured documentation found in systems development projects. For example, there is seldom a trace of the initial or intermediate process models when the BPR team directly translates its interview results into the new process model or

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shuffles hundreds of Post-It notes during the analysis phase [5].

Second, support for the process redesign should involve top management buy-in. Many process modeling formalisms originate mostly from the application development perspective [1, 20], which cannot satisfy the cross-functional, customer-oriented process nature of BPR. Accordingly, methodologies that depend on such process modeling formalisms tend to lack the necessary diagnostic mechanism. Thus, after the current processes are modeled, the question of which process to redesign and how to redesign them still remains unanswered. This explains why most of the BPR literature is restricted to descriptions of the 'situation before' and the 'situation after', giving very little information on the redesign process itself [16].

The time-consuming efforts spent in the process analysis phase and the limitations of the current methodologies in supporting the redesign phase have motivated us to develop a new method called enterprise process reverse engineering (EPRE). The EPRE method can be used in producing current process models and suggesting process redesign guidelines based on the analysis of business forms. It will facilitate the interaction among BPR managers, IS personnel, and end-users in the analysis and redesign phases of the BPR implementation process.

2. Literature review

2.1. BPR and process modeling

Despite the explosive growth of organizations implementing enterprise-wide BPR projects, there has been a disappointing track record; Hall et al. [18] estimate that between 50 and 70 percent of the firms fail to capture the expected 'dramatic' gains from BPR. One of the BPR implementation problems is that the firms do not have a proper method supporting systematic redesign [10, 26].

Before BPR, process modeling was mainly the task of graphically modeling the way users process their data, using techniques such as data flow diagram (DFD) [13, 14] to support the development of IS applications for functional area users. Modeling orientations were toward internal employees and the goal of the operation was to improve productivity by automating routine tasks. With BPR, process modeling takes an entirely different perspective. Instead of focusing on developing IS applications for functional areas, process modeling aims at modeling the cross-functional business processes of the entire organization. Frequently, these processes are initiated by customers and the modeling orientation reflects a strong customer perspective. BPR support tools that are application development oriented have inherent limitations to satisfy the customer orientation of BPR [22]. In this study, we adopted the event-process chain (EPC) diagram [23] since it reinforces BPR's cross-functional and customer orientation while preserving the modeling depth and abstraction mechanism.

2.2. Reverse engineering: Form-driven approach

Reverse engineering in the IS field involves extracting design artifacts such as program structure or data schema from the existing system [3, 8]. Its main objective is to increase the overall comprehensibility of the system for maintenance and new development. Thus, reverse engineering focuses on how to extract correct and complete target objects more efficiently. Business forms, databases, data models, and program codes are the frequently adopted source objects [7, 27, 28, 32].

Business forms, due to their simplicity and availability, have long been used for recovering process and data models. Since business forms implicitly provide process information, early methods adopted them to represent process flows with form-related organizational activities [25, 33, 35]. With growing interest in workflow management and groupware system, form procedures have been investigated further [6]. Researchers have also adopted business forms for recovering data models such as entity relationship (ER) diagrams [2, 24]. Mapping the characteristics of a form to a data schema is a relatively straightforward process, since the business form's layout and fields generally correspond to the attributes of the data model. To extract entities and their relationships, heuristics on field positioning or form hierarchy have been suggested. Table 1 analyzes the previous form-driven research in terms of purpose, target object, field type, use of field layout, and constructs.