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# The integration of activity based costing and enterprise modeling for reengineering purposes

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## Abstract

This paper describes an approach to integrate the Activity Based Costing (ABC) technique within the framework of GRAI Integrated Methodology (GIM) in order to assist business process reengineering justification and evaluation. The first step of integration is to have ABC adopt cost pools and lists of activities derived from GIM process modeling. Further on ABC is involved in two stages of the methodology: (a) ABC adds to the ECOGRAI method of performance modeling by supporting the determination of the right performance indicators that are responsible for business process costs. (b) ABC is a sound approach to translate operational performance indicators not found in accounting ledgers into financial terms and the company's profit bottom line. The approach has been developed during the Esprit research project REALMS and implementation results from two industrial partners are presented. © 2000 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

The 1990s can be characterized as the decade of change. The struggle to gain or even sustain competitive advantage in a global market, in most of times, has led many companies to alter the complexion of many businesses. As a result, the direct cost of products and services become shorter and shorter. All the above affect critically the cost structure of the enterprises. The increase of overheads in comparison to direct costs is outstanding in the manufacturing sector [1] and a need for an alloca-

tion in a more equitable manner among dissimilar products and customers is identified [2,12,24]. It is worth saying that the extremely demanding market calls for products of higher quality and lower prices. The slogan "the customer pays for only the services he gets" clearly depicts the market pressure [3]. The new economic and competitive realities, as businesses evolve into the 1990s affect the management as well. The organization must adapt to the changing environment in order to survive and the role of management information is fundamental to a more long-term development of management capability [4].

Management information must reflect reality, be predictive, embody strategy, explain cause and effect, reflect the customer's perspective, determine the relative profitability of both products and

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customers, relate to the business processes, be in the language of management.

Enterprise modeling and Activity Based Costing (ABC) try to satisfy the above needs, having the objective of improving business performance and sustaining this improvement in the future. A lot of success stories have been reported [5,6] trying to define the most appropriate implementation in a company. Information Technology (IT) has definitely been an enabler of ABC [7] and has helped its extensive use in Business Process Reengineering (BPR) projects [8].

It is well recognized in the literature that one of the most difficult tasks in the development of an activity-based cost system is the identification and design of the activities that should be included in the processes. Many modeling tools are available nowadays, whether for incremental (TQM) or radical enterprise system analysis, redesign and improvement (BPR). Enterprise modeling is an important prerequisite for a successful BPR project [9]. Many different methodologies exist, such as SADT, NIAM [10] or ARIS [11], all of them having the same purposes:

- to handle the complexity of the real world,
- to precisely model the business processes with sophisticated mapping techniques,
- to be understandable, flexible and descriptive.

The integration of enterprise modeling with an activity-based cost system is recently been studied, the most popular approach being this of IDEF-0 modeling with ABC. Many different software programs, such as Activa, EasyABC, TRM/ACM, Profit Manager, DaCapo Process Manager [12–14] combine modeling techniques, activity based costing and/or simulation. However, this kind of integration has not always been successful.

ABC was treated as an accounting approach in the context of strategic management accounting that can help the company in planning, control, decision measuring and performance evaluation. No systematic search for the activities to reengineer or for the appropriate performance indicators and related cost drivers is included in the above software products.

In the following paragraphs, an account of work done within the ESPRIT project REALMS (REengineering AppLication using Modeling & Simulation) will be presented. This project's goal was to prove that the integration of enterprise modeling, activity based costing (ABC) and simulation to support reengineering is feasible and would lead to considerable benefits for the industrial pilot users.

The long-term goal of the project is the development of an integrated methodology and software tool to support business process reengineering and benchmarking in mid-sized European companies. No similar integrated tool existed up to now that combines different scientific disciplines (*Systems Analysis, Simulation, Cost Accounting, Engineering Economics, Management Consulting*).

## 2. Approach

The methodological steps followed in the REALMS project that combine enterprise modeling and ABC for reengineering purposes are the following (Fig. 1). The main difficulty in this kind of project is to detect the activities that need reengineering.

1. *Model a pilot users' critical business process.* The modeling tools used are those of GRAI Integrated Methodology (GIM) [15], i.e. IDEF-0 for the physical and functional views of the business process, GRAI-grids and GRAI-nets for the decisional views. Those tools are included in the software product IMAGIM.
2. *Develop a performance model for the selected business process.* The performance measurement tool used is the ECOGRAI methodology [16] to define performance drivers (time, quality, cost/productivity) in relation to the objectives and the decision variables of the business process. Activity based costing (ABC) is added here to the ECOGRAI approach in order to support the determination of the right performance indicators that are responsible for the business process costs (cost drivers).
3. *Conduct benchmarking* based on the performance model developed in step 2. Identify examples of best practices, compare to the existing

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