

## Chapter 6.16

# Activity Driven Budgeting of Software Projects

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### ABSTRACT

*There are numerous forecast models of software development costs, however, various problems become apparent in context to practical application. Standardized methods, such as COCOMO II have to be calibrated at an individual operational level on the basis of the underlying database. This paper presents a new activity based approach that is based on business specific cost data that can be easily integrated into existing management accounting systems. This approach can be applied to software development projects based on the unified process in which activity driven budgeting promises several advantages compared to common tools in use. It supports enterprise specific cost forecasting and control and can be easily linked with risk analysis. In addition to the presentation of a conceptual design model, the authors present a framework for activity driven budgeting and cost management of software development projects combined with concrete implementation examples.*

### INTRODUCTION

With the forecast of software development costs numerous problems have to be solved and various challenges have to be met (Zaid, Selamat, Ghani, Atan, & Koh, 2008). Firstly, due to the high intensity of human resources the amount of indirect

costs is relatively high, which leads to various cost assignment problems. Ongoing efforts in business-management literature to solve these cost problems have been widely discussed (e.g., Atkinson, Kaplan, Matsumara, & Young, 2007; Hicks, 2002; Horngren, Foster, Datar, Rajan, & Ittner, 2008; based on Miller & Vollman, 1985; Cooper & Kaplan, 1988). Furthermore, forecasts of the calculation's quantity structure can be

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problematic in various ways, depending on the software development project's innovation level (e.g., Boehm, Abts, & Chulani, 2000; Lum et al., 2003; Pfleeger, Wu, & Lewis, 2005; Boehm, 1981; Leung & Fan, 2002).

A sound cost forecast is critical: it can act as an indicator for a lowest price limit calculation when discussing a development request. In case of a fixed price agreement this implies a high profit risk. Besides this, cost forecasting can function as a starting basis for internal budgeting contracts. Furthermore, the ongoing software development process constantly requires the update of costs budgeted according to the progress made. Cost forecasting helps in particular with the evaluation of adjustment provisions as well. Ultimately they may be used as a performance criterion for the project management.

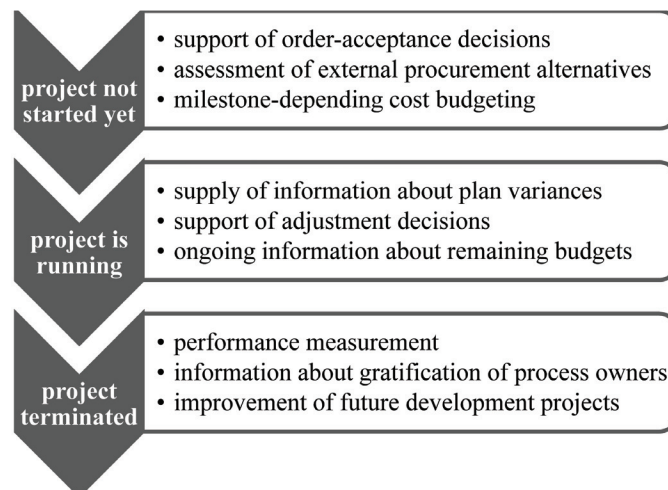
Figure 1 illustrates selected further purposes of cost management in the software development lifecycle. The optimal governance of operational costs by means of cost planning and control is the principle task of software cost management (Boehm et al., 2000).

Key problem of cost forecasting in software development projects is the poor data base: Depending on the novelty of the project, the bulk of

the development tasks is unknown and represents a severe hindrance to an accurate cost forecast. However, available forecast procedures are fraught with different problems (Pfleeger et al., 2005). Standard methods like COCOMO II have to be calibrated at a business specific level (Boehm et al., 2000). This preponderates if the underlying data base is not specific to the software development task (Zaid et al., 2008). Sometimes, cost forecasts can only be made when the project has made some reasonable progress. As a consequence, these approaches do not sufficiently support important decisions one has to make before the project starts; the acceptance of an order for software development may serve as an example. Furthermore, many of these approaches take a rather out-dated attitude and adapt to a traditional arrangement of software development projects in consecutive phases, for instance, requirements analysis, design, implementation, integration and system test.

The purpose of this paper is to discuss a new approach to software development cost management based on business specific cost information which can be easily integrated into the existing management accounting systems. This approach can be used in developmental projects according

Figure 1. Exemplary management purposes in the software development life cycle



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