Contributions of Information Technology Tools to Project's Accounting and Financing

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INTRODUCTION

"According to the Standish Group CHAOS Report 2003, each year in the USA there are approximately 175,000 projects in IT application development that spends $250 Billion. Among these, 31.1% of projects will be cancelled, 52.7% of projects will cost 189% of their original estimates, only 52% of required features and functions make it to the released product, and time overruns occur in 82% of the cases. In financial terms $55 billion dollars is wasted in these projects." (Madpat, 2005).

This chapter suggests an innovative platform to analyze software projects in order to overcome the difficulties that are shown through the statistics. The first layer of the platform is based on costing theories in order to handle the cost overruns. At the second layer are the project management tools, and on the third layer is the software engineering. The last two layers give the needed information on the project scope and the development efforts. Connecting those three layers gives a better perspective on the projects, which is the best platform for decision making.

Cost management of a project is defined by the PMBOK (project management body of knowledge) (PMI, 2004) as one of the nine core activities of projects management. This activity is defined as an assembly of processes that include planning, estimating, budgeting, and controlling of project costs so that the process will be executed within the budget framework that has been designated for it. However, although it defines costing as a core activity, it does not provide the methodologies for the application mode of the costing (Kinsella, 2002).

The challenge in project management is described as "the effective allocation of resources within the framework of time, cost and delineation constraints that are balanced against the quality demands and nature of relations with the customer" (Kerzner, 2003. p.5). Hence, cost management should be viewed as part of the project management challenge.

Software projects can be analyzed through software engineering tools, CASE (computer-aided software engineering tools), that assist in the analysis and characterization of the software project and in the evaluation and measurement of the work productivity in the project.

Cooper and Kaplan (1998) analyze the integration between costing systems and operational systems. The integration that Cooper and Kaplan introduce, like the classic costing methods, does not provide a response to the project structure and the features of a software project (such as estimation difficulties, risk management, and lifecycle). This chapter recommends integrating costing systems and operational systems of software projects; the projects management tools and the software engineering tools.

The data presented highlights the significance of costing and the difficulties in costing and estimating software projects. These difficulties derive both from the implementation's limitations of a costing solution in an intricate and changing technological environment (Wouters & Davila, 2004) and from the unique features of projects in general and software projects in particular. The characteristics that obstruct the solving of the costing problem include the project lifecycle that leads to changing work capacities over time (Kerzner, 2003), uncertainty levels and exposure to risk (Rajkumar & Rush, 2000), and a difficulty in defining an evaluation of the project scope.

Given all this, the conclusion that becomes clear is that there is an objective difficulty in establishing an accurate cost framework for the software project, especially prior to its detailed planning. Such planning is executed through software engineering tools. Those tools assist the analysis of the software project and the estimation and measurement of the project's work productivity (Liong & Maciaszek, 2005).

We have seen that cost management within the software project framework requires the combining of software engineering with the involvement of the development team. However, the development team's ability to be fully involved in the cost management process is limited. The develop-

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ment team and projects managers function in monitoring the changing technological implementation throughout the project, and in the knowledge management of the project team. Hence, the amount of remaining time for the costing activity is small. Moreover, in order to accurately define the cost structure, there is a need for a costing model that includes, in addition to the direct costs of the project, also overhead costs in the organization. Project managers that work on the engineering and technical aspects of the system struggle with objectively defining and applying such a model (Wouters & Davila, 2004).

Given this, the chapter presents a model that allows the expression of each and every one of the cost's components (direct, indirect, risk, competitiveness), while it links three areas: project management, software engineering, and managerial accounting. The model will enable not only a retrospective analysis of the economic performances of the project/projects portfolio/software house, but also an in-advance evaluation of costs, economic feasibility, and economic risk level of the project/projects portfolio. The model introduces a new approach in the area of software project costing.

THEORETICAL BACKGROUND

This section presents the theoretical and practical foundation for the research model from several aspects. Our objective is to integrate models of software projects with three disciplines: software engineering, project management, and managerial accounting.

The first section reviews the foundation for the integration between the financial systems that serve the classic models of costing and other relevant systems.

The second section reviews the link between software engineering and project management. This section will emphasize the importance of the association between software engineering and project management tools as a managerial and costing necessity in the software project (or projects portfolio). In the third section, costing aspects are introduced and integrated. A basic integrative model for this association will be displayed, and we shall examine the extent of its compatibility with the costing need.

INTEGRATED COST SYSTEMS

In order to make important managerial decisions, detailed costing information is necessary. Detailed costing information is expected to include all types of costs that are required for manufacturing a product or providing a service. These are data that are based on financial systems and contain, in practice, costs that derive from the firms detailed income statement (and backup schedules). These data include the historical execution data and future estimations and forecasts (Needy, 2002).

Otley (2001) proposes an integration of accounting and financial data for obtaining execution and evaluation measures. It is suggested that these measures will be supplemented by information that is not financial. The need of nonfinancial information has evolved in recent decades out of the comprehension that the costing analysis is not sufficient for it being an outcome analysis: this has created the need for performance measurement. Such measurement includes the accounting information and costing logic with the incorporation of figures that are not financial. Various models (such as balanced scorecard) deal with performance measurement (Needy, 2002), and provide an additional layer for the need to execute integration between financial and operational systems.

Williams (2004) supports the integration approach in accordance with the viewpoint that a modern accounting system is supposed to supply a framework for strategic management of the company's resources. In order to realize this conception, Williams proposes a multidimensional construct that clusters information from the company's systems on customers base, activity areas, and more, for the purpose of forming an accounting system that facilitates planning, improvement, and control, analysis and regulation of resources, and enhancement of profitability. Such a system is based on integrative information from a number of systems or from the arrays DWH (data where house)/BI (business intelligence) in five areas: costs, assets, quality/service, time, and outputs.

The pioneers of the combining of financial and operational information are Cooper and Kaplan (1998), who developed the method of activity based costing (ABC) suggest, in light of the technological development of information systems, to define the integration between operational and financial systems for the purpose of building an accurate costing model.

SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

The success of a software project depends on five software engineering areas that are related to each other: the development of the lifecycle of the software, process management, the model's configuration and language, software engineering tools, and project planning (Liong & Maciaszek, 2005. p.3). The combining between the formal tools of the software engineering and project management processes in its different stages has been proved by research as to result

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