

A Software Process Tailoring System Focusing to Quantitative Management Plans

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Abstract. This paper presents a survey about use of quantitative management indicators in a Japanese software development organization. This survey is conducted in order to investigate possible criteria for selecting and customizing organizational standard indicators according to the context of each project. Based on results of the survey, we propose a process tailoring support system that is mainly focusing to quantitative management planning. The system EPDG+ (Electronic Process Data Guidebook Plus) helps project planners select / customize indicators to be employed in process control. Derived software project plans including measurement and analysis activities can be browsed in detail with this system.

1 Introduction

Quantitative management, i.e. the quantitative control in both of quality and schedule management is a key factor of the software processes. The quantitative management requires *indicators* based on quantitative data. Generally, we need to select indicators according to the context of each project, and then we also need to plan the activities for both of measurement and analysis of quantitative data that is required to derive the indicators. Organizations in a certain level of capabilities (e.g. CMMI-staged[1] level 3) usually define their own set of the project management indicators. Thus project planners must understand the purpose of each indicator, select/reject it according to the context of each project, so that activities for measurement and analysis are planned properly. This work is often very difficult for novice planners without sufficient knowledge of quantitative management.

In this paper, we report the survey about the use of indicators in a Japanese software development company (though we are not allowed to disclose the detail of the company, including its name, in this paper). This survey was conducted in questionnaire form in order to design the features of the process tailoring support system EPDG+ (Electronic Process Data Guidebook Plus) that is being developed by us. EPDG+ mainly focuses to the quantitative management, having features to expose appropriate indicators according to the context of each project based on the master list of organizationally standardized indicators. EPDG+ also supports to integrate the measurement and analysis activities required for selected indicators into an engineering process at project planning.

* Hitachi, Ltd. from April 2006.

2 Related Work

Many studies and standards related to quantitative management have been done since it has direct influence to the improvement of productivity and quality. ISO/IEC15939[2] shows the framework for software measurement, analysis, and construal to achieve various information needs, such as project management and quality assurance. Information structure handled in the measurement and analysis process is specified as a reference model as shown in Fig.1.

This model shows the way which eases objective decision-making based on quantitative information by associating well measurable attributes characteristic to process or product in a project, such as development scale, effort, and number of defects, with the indicator for decision making[3]. Thus, the primary data called *base measure* is collected by quantifying various attributes which exist in a project according to the defined measurement method. Then, the secondary data called *derived measure* is derived by assigning some base measures to measurement function. Finally, the indicator is obtained by analyzing these measures according to the defined analysis model. A project manager makes decision according to the finally derived information product with decision criteria. At the following discussions, we use this concept and the terms based on ISO measurement information model.

Meanwhile, several EPG (Electronic software Process Guidebook) systems are proposed in the past (e.g. [4]). Most of them mainly focus to support to understanding of the prescribed software process. Our approach is also capable of this field, though our current focus is how to utilize the information models, such as definition and flow of quantitative data, required by quantitative management. The ISO information models are useful and very important for the process tailoring.

3 Survey of the Current Status of Used Indicator

3.1 Background

In this study, we consider software development organizations, which perform following two practices, as targets of our approach to support quantitative management planning.

- Every project is planned and performed based on the development process which is defined as organizational standard, typically, in the form of WBS (Work Breakdown Structure).
- The indicator set for quantitative process management is prepared as an organization standard.

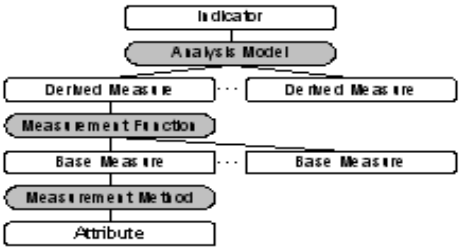


Fig. 1. Measurement information model in ISO/IEC15939