

Chapter 8

Metrics for Project Management Methodologies Elicitation

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ABSTRACT

This chapter presents an overview of the project management field, and a set of metrics useful to evaluate the goodness of different project management methodologies considering specific features of the enterprise, project, and goals. It is a multidisciplinary problem that covers the technical analysis of main methodologies, requirements, and management perspectives. It aims to translate semantical and subjective appreciations into a combination of well-determined equations giving an approximation through automatic processing, and a systematic appreciation. The confidence levels are introduced in the indicators associated with the metrics. The entire approach considers information taken from documents and tacit biases made explicit through a questionnaire specifically defined. As will be shown below, one of the benefits of using these metrics is the possibility of assessing the strong association between project success and documents' scope quality. Also, a number of parameters are relevant to select a management methodology and to improve risk determination.

INTRODUCTION

From the fusion of Science and Management emerges software project management (PM) approaches. It covers management strategies, determination of scope, management of stakeholders, risks, planning and control of activities, requirements and establishment of business objectives. PM is related to Informa-

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tion Technology (IT), and it mostly tries to avoid significant loss due to failures (Chaos Report, 2020). It is motivated by the fact that just 31% of the projects run in the planned conditions and requirements (Hoch & Dulebohn, 2013; Andrias, Matook & Vidgen, 2018), and the critical cause is considered to be the stakeholders' attitudes and how the risk is handled by the leaders (Berssaneti & Carvalho, 2015; Adywiratama et al., 2022). But there are several experts that it considers it is not possible to know in advance the success degree, since the evaluation is based on subjective evaluations of the involved people (Ramos & Mota, 2014; Montequin et al., 2016).

The process of PM for IT processes is complex because people and technology have multiple and diverse links with its environment. According to Lehtinen the complexity derives in dysfunctional communication (Lehtinen et al., 2014) and deviations in the project activity. The solution could be to evaluate carefully the technical team and its habits in the workspace prior to start the job. Many authors found that it also helps the application of good work practices (Fareed, Su, & Awan, 2021; Adywiratama et al., 2022; Westenberger, Schuler, & Schlegel, 2022)

Among the best known PM in the market are PMBOK (PMI, 2017), PRINCE2 (Prince, 2009; Böhm, 2009), APM (Highsmith, 2010) ISO 21500 (ISO, 2012), SCRUM (Sutherland, 2014; Van Solingen & Van Lanen, 2014), KANBAN (Lei et al., 2015), and CRISP-DM (Shearer, 2000; Shafique & Qaiser, 2014). The main goal in all cases is the proper evolution of the tasks in order to fall within the predetermined resources and timeline.

This article introduces several metrics and indicators, many of them previously published. They are presented here as a tool-set to systematically evaluate requirements that allow determining critical aspects of the various components of PM methodologies. Typically, the most important part of project information is expressed textually in seminal documents during the management of the project. The collection of variables and their considerations, presented in the course of this research, establishes a framework for comparative analysis, where metrics allow a quantitative cross-evaluation of different methodologies. Then it is possible to get a suitability scoring for every methodology under consideration at every project stage. The metrics defined here are based on requirement documentation expressed in natural language by the personnel involved in the leading process. There are also indicators complementing the set, to decide on the adoption of one or another project management methodology.

This article presents and analyzes the state of the art in the field of generating evaluation metrics for PM methodologies. It also presents the set of metrics and indicators mentioned previously, for guiding in project management elicitation stage. Note that some metrics are compatible with the ones in the classical bibliography of this subject. But others are innovative, designed using subtler concerns gathered from traditional expert's criteria. The following shows the state of the art in metrics and evaluation of management control methodologies (section II), presentation metrics/indicator formulated for managing the scope of a project (section III), approach and case studies (sections IV and V respectively), and conclusions (section VI).

LITERATURE REVIEW

The reasons for success or failure in IT-related projects is a well-studied topic. From the literature between 1981 and 1987 (DeLone & McLean, 1992), six interdependent dimensions of Information Systems (IS) success were identified: system quality, information quality, usage, user satisfaction, individual impact, and organizational impact. The list has been modified, to cover recent studies that introduce the pos-

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