Abstract. Determining software characteristics that will effectively support project planning, execution, monitoring and closure remains to be one of the prevalent challenges software project managers face. Functional size measures were introduced to quantify one of the primary characteristics of software. Although functional size measurement methods have not been without criticisms, they have significant promises for software project management. In this paper, we explore the contributions of functional size measurement to project management. We identified diverse uses of functional size by performing a literature survey and investigating how functional size measurement can be incorporated into project management practices by mapping the uses of functional size to the knowledge areas defined in project management body of knowledge (PMBOK).

Keywords: Software Project Management, Functional Size Measurement.

1 Introduction

Software project managers require knowledge on software product for effective management. Size is one of the key attributes for engineering projects and size measurement supports project management in many processes such as scope determination, cost and duration estimation, performance and quality measurement, and contract management. Software size has been associated with several attributes of software artifacts, documents and deliverables and software development practitioners have measured size using a wide range of metrics and methods. Fenton explains software size as a multidimensional attribute and describes it with the dimensions of length, functionality and complexity [1].

Unlike other engineering disciplines in which size is measured from the project initiation to the closure phase and measurements are effectively used for different purposes each project management process have, software size measurement has been mostly practiced in software cost and effort estimation and remained unfruitful in other project management processes.

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Among the various approaches developed to software size measurement, the measures and methods on quantifying the ‘functionality’ attribute have been widely accepted in practice. Software functional size measures the amount of functionality provided to the users. Functional Size Measurement (FSM) methods are utilized frequently in estimation of effort and cost for software development and maintenance projects. The need for well established estimation models is so imperative that the relation between FSM and software cost, effort and time estimation can easily cause the misinterpretation of FSM methods as estimation models. However, software project management essentially requires reliable size measurements for many other purposes including controlling and monitoring project scope and risks, assessing process performance and establishing organizational level standard measures.

In this study, we focused on the software functional size and explore its usability in various software project management practices. We investigated how methods and approaches based on the functional size can address the concerns and requirements of software project management, by going through the specific process knowledge areas (KAs) defined in the project management body of knowledge (PMBOK) [2] and by reviewing the literature for studies that specifically utilize FSM methods for various project management tasks. We selected the PMBOK to identify the project management tasks, as it is a well-known project management guide that provides process definitions along with inputs, outputs, relevant tools and techniques and the presentation of the interactions between processes. This representation and structure eased the identification of potential uses of functional size measures. In mapping the process KAs to FSM uses, process descriptions in each KA are reviewed and relevant applications of FSM in the industry and research studies are surveyed.

The remainder of the paper is structured as follows: Section 2 discusses the related research on the functional size measures, related measurement methods, and the uses of functional size in project management processes. Section 3 investigates how project management KAs in PMBOK can be supported with functional size measures. Section 4 concludes by presenting the uses of functional size that span across the project management processes.

2 Related Research

The research study involved the identification of potential uses of FSM methods in software project management practices. For this purpose, we have used PMBOK as a reference that is representative of the state of the art collection of project management practices and combines them in a well-defined structure. In the exploration of the uses of FSM, we selected three well known ISO/IEC conformant FSM methods, Mk II FPA [3], IFPUG FPA [4] and COSMIC FSM [5].

Project Management Body of Knowledge (PMBOK), published by Project Management Institute, is an internationally recognized collection of processes and KAs often accepted as a best practices reference. It is supported by an international standard, IEEE 1490-2003, published by the IEEE Standards Association [6]. The knowledge in PMBOK is organized into five project management process groups; initiating, planning, executing, controlling and monitoring, and closing. The processes are categorized into nine KAs; project integration management, project scope management, project time management, project cost management, project quality...