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Performance on agile teams: Relating iteration objectives and critical decisions to project management success factors

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ABSTRACT

Context: While project management success factors have long been established via the golden triangle, little is known about how project iteration objectives and critical decisions relate to these success factors. It seems logical that teams' iteration objectives would reflect project management success factors, but this may not always be the case. If not, how are teams' objectives for iterations differing from the golden triangle of project management success factors?
Objective: This study identifies iteration objectives and the critical decisions that relate to the golden triangle of project management success factors in agile software development teams working in two-week iterations.
Method: The author conducted semi-structured interviews with members across three different agile software development teams using a hybrid of XP and Scrum agile methodologies. Iteration Planning and Retrospective meetings were also observed. Interview data was transcribed, coded and reviewed by the researcher and two independently trained research assistants. Data analysis involved organizing the data to identify iteration objectives and critical decisions to identify whether they relate to project management success factors.
Results: Agile teams discussed four categories of iteration objectives: Functionality, Schedule, Quality and Team Satisfaction. Two of these objectives map directly to two aspects of the golden triangle: schedule and quality. The agile teams' critical decisions were also examined to understand the types of decisions the teams would have made differently to ensure success, which resulted in four categories of such decisions: Quality, Dividing Work, Iteration Amendments and Team Satisfaction.
Conclusion: This research has contributed to the software development and project management literature by examining iteration objectives on agile teams and how they relate to the golden triangle of project management success factors to see whether these teams incorporate the golden triangle factors in their objectives and whether they include additional objectives in their iterations. What's more, this research identified four critical decisions related to the golden triangle. These findings provide important insight to the continuing effort to better assess project management success, particularly for agile teams.

1. Introduction

Simply browse any Gartner survey or Gallup poll on project management (PM) success [e.g. 1] and one finds ample evidence that information technology (IT) projects often fail. While IT projects are becoming larger, on average, large IT projects tend to run 45% over budget, 7% over time and deliver 56% less value than predicted, with software projects experiencing the highest risk of cost and schedule overruns [2]. And irrespective of project size, about half of all projects fail due to functionality issues and substantial delays [3].

These figures are startling when we consider that the Project Management Institute has established global standards for PM guidelines and rules via its PMBOK Guide [4]. It seems likely that with such established standards, success on PM teams should be rampant. But how is PM success defined for IT and information systems (IS) projects? It has long been established that PM teams should use the simple golden triangle comprised of schedule (time), budget and quality to determine their project management success [5,6]. But while this golden, or iron, triangle evaluates the end product of a project, how can we evaluate whether or not our project is on track to be successful from a PM perspective during the project? Certainly it is true that PM teams create project plans, track project milestones and monitor budgets [7]. But still this

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doesn't seem to be enough as clearly so many projects still run over budget, over time and under-deliver.

Aside from using PM standards and tools, it would be useful for teams to understand how objectives map to the golden triangle of PM success factors. This may be particularly useful for agile software development (ASD) teams because these teams use iterative development via regular, short iterations of two-week periods, developing objectives for each iteration and then reviewing them at the end of the iteration [8]. We call these iteration objectives. As agile teams simultaneously designs products and processes rather than designing the process after product design [9], many organizations have transitioned to using ASD methods on project teams to allow for iterative development that (a) incorporates unpredictable events regularly throughout the project [10]; (b) delivers cost-effective and user-driven software to customers [11]; and (c) delivers high-quality products faster, leading to more satisfied customers [12].

Therefore, this paper will examine the following research questions (RQ):

1. What are agile teams' iteration objectives and how do they relate to the project management success factors in the golden triangle?
2. How do agile teams' critical decisions relate to the project management success factors in the golden triangle?

These research questions warrant investigation as research has demonstrated a decline in focus of interpersonal issues and quality management between 1996 and 2006, with an increase in focus on project evaluation and improvement. This increased focus includes topics such as relationship management, resource management, time management, cost management and risk management as major factors of interest and importance to project teams [13].

Essentially, this research examines whether the golden triangle of project management success is discussed in iteration objectives and critical decisions and what other objectives may be discussed beyond the golden triangle PM success factors as little research has focused on how objectives relate to PM success factors and how critical decisions relate to the same. This research examines iteration objectives, the objectives that agile teams make for iterations. Objectives are defined as something specific and measurable that one is trying to do or achieve [14] that is more precise than a goal which refers to more generic actions that may not be as measurable or tangible as an objective. Given ASD's focus on improved quality and schedule [11,12], it seems likely that agile teams will discuss these in their iteration objectives, thereby relating them to the golden triangle of PM success factors. Within this manuscript, the PM success factors refer to the golden triangle of schedule (time), budget and quality. "PM success factors" and the "golden triangle" terms are used interchangeably to refer to each other. But we may find that these teams discuss other objectives as well.

Further, we examine the critical decisions agile teams make because these are the decisions that stretch the expert team member's knowledge and skills, thereby eliciting specific, detailed information about the important cues, choice points, options, action plans and the role of experience in decision making [15,16] on agile teams. Critical decisions indicate the important cues that trigger knowledge and reasoning in a given situation [16] and are the decisions that the team would have made differently to ensure PM success.

The remainder of this manuscript is structured as follows. Section 2 reviews the literature on both PM success factors and agile software development. Section 3 discusses the research design and methods used to conduct this study. The findings of the three case studies conducted with hybrid agile teams to examine how iteration objectives and critical decisions relate to the golden triangle are revealed in Section 4 and discussed in Section 5. Section 6 provides the limitations of this study and potential avenues for future research. The manuscript ends with the overall conclusions discussed in Section 7.

2. Project management success for agile software development teams

This section reviews the literature on both the golden triangle of PM success factors and ASD to indicate why this research examines how iteration objectives on agile teams relate to that team's PM success factors.

2.1. Project management

In order to understand how we define the success of PM, we must first define PM. The PMBOK Guide [4] defines a project as a temporary group activity that produces a unique product, service or result with PM being:

> The application of knowledge, skills and techniques to execute projects effectively and efficiently. It's a strategic competency for organizations, enabling them to tie project results to business objectives – and thus, better compete in their markets.

PM refers to the planning, monitoring and controlling of all aspects of a project, with the people involved in the project aiming to achieve the objectives on time and on budget to a specific quality standard [17]. It is the method for solving complex organizational problems and handling organizational activity [18]. One of the earliest perspectives defines PM as the use of tools and techniques applied to diverse resources in order to accomplishment a unique, complex, one-time task within time, cost and quality constraints [19].

As can be seen, multiple definitions exist for PM, though they all have common elements. Essentially, PM refers to the tools and processes used to accomplish a temporary and unique piece of work, a project, within specific time, budget and quality controls. Thus, it is no wonder how the golden triangle came to signify the success of PM. For if there are schedule (time), budget and quality controls established it makes sense that a PM team can measure those controls, particularly the time and budget elements.

2.2. Project management success

Let us now turn to defining the three components of this golden triangle in more detail as PM success is assessed by this triangle to evaluate a project's adherence to schedule, budget and specified requirements [6,20,21]. First, we must distinguish between project success and PM success as these are different terms. Project success is measured against a project's overall achievement of the project's objectives, whereas PM success is measured using the traditional and oft-used measures of time (schedule), cost (budget) and quality [22,23]. Thus throughout this manuscript, the term "golden triangle" refers to the PM success factors of schedule (time), budget and quality and "PM success factors" refers to this golden triangle. The time element naturally refers to the scheduling of tasks and completion dates, whereas the budget refers to the overall costing of the project. Finally, quality refers to how well the finished product functions. Often these three components compete against one another as higher quality generally requires more time and budget to complete [4].

The golden triangle was developed to help project managers assess the management of their projects [22]. It provided them with a framework for tracking and monitoring their projects by balancing these three competing demands. Over time, it became the default method for measuring PM success as the triangle