Chapter 49
Critical Chain Method in Traditional Project and Portfolio Management Situations

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ABSTRACT

Critical Path (CP) method has been under scrutiny in recent years as the next evolution of project schedule development, the Critical Chain (CC) project management is gaining attention. Advocates of the Critical Chain method cite the Critical Path method's failure to address uncertainty properly. The purpose of this paper is to apply some of the features of the Critical Chain concepts to traditional approach of Critical Path for projects. More importantly, this research effort aims to demonstrate the applicability of CCPM to managing a portfolio of projects. The analysis, based on a critical review of past studies, experiments in both Critical Path and Critical Chain techniques, and a case study, presents recommendations to gain benefits of Critical Chain in a traditional Critical Path scheduling environment and to manage portfolio of projects or programs using some of the concepts of the Critical Chain Method.

INTRODUCTION

In the present global economy of intense competition, organizations are compelled to accord importance on how they practice project management to realize and sustain competitive advantage (Anantatmula & Thomas, 2009). It is well known that project management profession is gaining importance as global spending on projects is in the order of many billions of dollars annually; nonetheless, project failures are common (Anantatmula, 2010; Williams, 2005). Advances and proliferation of project management concepts and practices have not improved project success rate as 2009 Standish Chaos Report suggests.

The Critical Path Method (CPM) has been the traditional method for project scheduling since it evolved after World War II due to the merger of scientific management principles to meet specific

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needs of construction, engineering, and defense industries. Tasks are supposed to be estimated based on subjective estimates of the probabilities associated with factors that might delay the task and resources are accountable for completing the task in that time (Blackstone, Cox III, & Schleier, 2009; p. 7030). However, The CPM generally focuses on tasks and their dependencies and not necessarily on uncertainty and resource availability. Furthermore, in today's work environment of multi-projects and multitasking, traditional methods of PERT/CPM may not be effective (Agarwal, Borchers, & Crane, 2010). As such, managing multiple projects simultaneously is a major concern (Morris & Pinto, 2004).

In a multi-project environment, allocating resources to different ongoing projects and completing them successfully is becoming an increasingly challenging prospect (Steyn, 2002). The complexity of resource management increases in multi-project environments where demand for scarce resources could be a political concern (Lechler, Ronen & Stohr, 2005). Fricke and Shenhar (2000) observed that ineffective management of uncertainties associated with resource dependencies and their prioritization contribute to project failures. Recent studies argue that theses flaws can be addressed in the next evolution in project scheduling, known as the Critical Chain Project Management (CCPM).

Critical Chain (CC) is a schedule network analysis technique that modifies project schedule to account for limited resources (PMBOK, p.155). The philosophy behind CC and CPM differs due to application of the theory of constraints (TOC) in the former approach. Consequently, these two approaches lead to different set of management practices (Lechler et. al, 2005); they claim that due to application of TOC concepts, CC focuses at improving performance by laying out policies on resource management in multi-project environments that are not addressed by CP, which is primarily focused on a single project perspective. Lechler et. al further assert that unlike CP that manages uncertainty using tradeoff among triple constraints, CC attempts to avoid the need for tradeoff among cost, time, and scope. However, this approach might lead to higher cost, because cost is no longer a consideration.

Obviously, project managers who use traditional CPM are often suggested to transition to the CCPM methodology as TOC focuses on bottlenecks or constraints that prevent a process from increasing its output rather than increasing efficiency of each component. Protagonists believe that the new way of thinking can lead to superior results in terms of reducing delivery time and increasing the ability to meet schedule and budgets commitments (Raz, Barnes, & Dvir, 2001, p.1).

Unfortunately, the adoption of CCPM has been limited due to the significant economic costs and the fact that CPM methodologies are engrained within established business functions. Another hurdle is that organizations may not be ready for an influx of resources during the feeding buffer durations of the schedule. As such application of CC is complex and costs associated with training and infrastructure change are significant (Lechler et. al, 2005). Citing successful use of CC for construction industry, Jyh-Bin (2007; p. 32) suggests that it is important to educate all project team members and collaborators about the method along with its new managerial approach, shorter project duration, and centralized contingency protection. It is no wonder that organizations are reluctant to adopt, what is being considered, a new and effective methodology.

The result is an impasse where most organizations continue to apply first aid to a flawed traditional methodology, and reluctant to adopt a new methodology in spite of researchers preaching that the only solution is complete adoption of it. A solution is to find a common ground between CPM and CCPM, which minimizes the economic and cultural impact to organizations while improving the ability to meet schedule and budget commitments. In attempting to find this common ground, several questions arise. Is CCPM really a new methodology with radically new core concepts or just the traditional methodol-