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The Viable System Model for Diagnosing and Handling IT-Project Interdependencies in Large Portfolios

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ABSTRACT

Adequately considering project interdependencies has shown to be a determinant of how successful IT/IS project portfolios are managed. However, this can be especially troublesome since there is no universal way to handle many project interdependencies that continue to change over time due to environmental uncertainty or unexpected decisions. This can seriously disrupt portfolio performance. In this article, the authors used the systems perspective to address the problem of managing multiple IT-project interdependencies in complex IT/IS portfolio environment. In particular, the authors propose using the cybernetic model Viable System Model to facilitate thinking and reasoning concerning the difficulty of managing IT-project interdependencies. To validate their approach and to ensure the appropriateness of it, the authors used real-world problem situations drawn from multiple case studies conducted in four leading organizations in Saudi Arabia. The findings support that the Viable System Model can be applied to assist in diagnosing and handling of IT-project interdependencies.

KEYWORDS

Complexity, IT Projects, Project Interactions, Project Interdependencies, Project Interdependency Management, Project Management, Project Portfolio Management, The Viable System Model, VSM

INTRODUCTION

To date, most IT/IS Project Portfolio Management (PPM) research has been focused on how to identify, evaluate and prioritize projects that can contribute to organizational objectives. This, in turn, gave rise to various approaches, such as those proposed in (Anantatmula & Webb, 2014; Bardhan & Sougstad, 2004; Eilat, Golany, & Shtub, 2006; Fliedner & Liesiö, 2016; Killen & Hunt, 2013; Killen, 2017; Medaglia, Graves, & Ringuest, 2007; Verma & Sinha, 2002), to help making portfolio choices more efficient. At the heart of this quest has been an emphasis on how to design project interdependencies to secure their synergistic effects on portfolio performance. For example, a project portfolio aimed at delivering new banking services may benefit more from sharing knowledge that could be later incorporated to develop more innovative services. As this example implies, the interdependencies

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between projects can play a vital role in bringing about increased benefits, and thus contribute to portfolio success in one way or another. Despite the widely recognized importance of project interdependencies (PIs) in the context of IT/IS project portfolios, little is known about how PIs can be managed efficiently when they get more and more complex. This can seriously disrupt work in the portfolio. Thompson (1967) was a pioneer in drawing attention to interdependencies in organizational systems. Thompson categorized interdependencies into three forms representing different degrees of contingency: pooled, sequential, and reciprocal. In pooled interdependency, each organizational unit contributes independently to and is supported by the whole organization. To the contrary, in sequential interdependency an output of one organizational unit is an input for another unit, while in reciprocal interdependency each unit's output is input for the other units. Pooled interdependencies can be handled using standardized routines while sequential and reciprocal interdependencies can be handled using schedules and plans, and mutual adjustments respectively (Thompson, 1967). In this sense, managing a multitude of interproject dependencies with varying degrees of complexity can become overwhelming and very difficult to handle (Fliedner & Liesiö, 2016). Several other authors have noted that the complexity of the project portfolio increases by a number of factors including: number of projects, the degree of interdependency between the projects, and the magnitude and frequency of change in projects and interdependencies (Blecic, Cecchini, & Pusceddu, 2008; Danilovic & Browning, 2007; Teller, Unger, Kock, & Gemünden, 2012; Voss & Kock, 2013). However, only a few authors have offered to examine the complexity aspects of managing PIs. For example, Bardhan, Bagchi, & Sougstad (2004) introduced a model that accounts for the complexity in valuing project portfolios while considering the impact of PIs on portfolio value. Another author (Killen, 2013) found that graphical representations of projects and their interdependencies can help in identifying and reducing the complexity of managing these interdependencies. Despite the efforts to incorporate PIs in many approaches it remains unclear how to overcome the complexity of managing these interdependencies along the PPM lifecycle and further handle them during unexpected events.

Our previous work notes that PIs often create challenges for the manageability of IT/IS project portfolio (Bathallath, Smedberg, & Kjellin, 2016a, 2016b, 2017). We empirically found that insufficient understanding of human responsibilities in the whole portfolio and unpredictability of the environment and technology constraints can be a source of increasing difficulty of managing IT-PIs in different IT/IS project portfolio contexts (Bathallath et al., 2017). In a recent study, we concluded that critical systems thinking and the cybernetic model Viable System Model (Beer, 1985) can be used to identify where, when and how interdependencies occur and thus support in quantifying, describing and managing them (Bathallath et al., 2016b). This study is part of a continuous effort on how the complexity resulting from PIs can be effectively managed.

RESEARCH QUESTION

In connection to the previous section, the study reported in this article addresses the importance of PIs in achieving PPM success. This entails challenges including those dealing with multiple PIs that continue to change over time due to environmental uncertainty or unexpected decisions. Failure to consider PIs may throw the portfolio off balance and hence the viability of the portfolio can be significantly affected. The viability of systems, according to Beer (1985), holds that for any system to stay viable it should maintain a flexible structure capable of adapting to its environment while maintaining its inter-element connectivity. Thus, we aim at investigating an efficient way to manage IT-PIs, thereby maintain the viability of the portfolio. The research question that this study puts forward is: How can multiple project interdependencies within a portfolio of IT/IS projects be effectively diagnosed and handled?

The paper is organized as follows. In the next section, the research method is discussed, followed by a comprehensive literature review on the topics included in the study. Afterwards, the empirical