Chapter 10

Project Complexity for the Uninitiated

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ABSTRACT

Complexity is a difficult concept to grasp. This chapter aims to provide a quick but thorough overview of the field of complexity for those project professionals and researchers who are interested in working with complex systems. In an effort to clearly express the constituent ontological world view of complexity a funneling approach is employed in this chapter i.e. the discussion is presented in the manner of going from the general to the specific. The chapter first presents a discussion on complexity in general and differentiates between complex, complicated, and simple systems. Then the discussion moves into the complexity within the domain of projects. The thoughts constituting project complexity are presented from the perspective of ‘complexity of projects’ and ‘complexity in projects’. Along the way the chapter also proposes a framework of complexity that may prove useful for understanding complexity further. After reading this chapter the reader will be in a better position to understand the contemporary debates in the literature on complexity.

INTRODUCTION

Project management is considered to be a fairly new discipline. Its origin lays in the interstice of the chemical industry of the 1930s (Williams, 2002), particularly in DuPont Corporation. Project management gained acceptance as a ‘practitioners discipline’ in the post-WWII developments taking place in the domains of technology and infrastructure (Cicmil & Hodgson, 2006, p. 3). In the years following the publication of the first academic article on project management by Gaddis (1959), the discipline has made significant strides on various fronts, such as: operations management, information systems, conflict and negotiations, relationships, etc.

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In recent years the discipline’s focus has turned towards an introspective critical examination through the lens of complexity.

Project management has been a target of sufficient criticism for its failure to deliver projects on time, within budget, and within acceptable bounds of quality. The brunt of the criticism, emerging propositions, and recent research trajectories are focused on the failure of traditional project management as it applies to contemporary project environments (Cicmil, Cooke-Davies, Crawford, & Richardson, 2009). Other authors have argued similarly, contending that traditional project management methodologies founded on control system thinking are no longer sufficient (Remington & Crawford, 2004; Remington & Pollack, 2008). It is therefore warranted to discuss projects from an alternative perspective i.e. that of complexity. However, this does not require starting anew by any means, as it has been argued that complexity theory of the form applied to organizations may be applied to projects (Remington & Pollack, 2008).

A general consensus found within the project management literature is that it is difficult to produce a precise definition of a complex project. Within the various definitions of complexity there exists a common theme of a number of parts or components and the interrelationships between them. Klaus and Liebscher’s (1979) definition of complexity, originating from the cybernetics camp, clarifies that ‘complexity is a character of a system defined by the type and number of relations existing between the elements, in contrast to the elaborateness of a system that is related to the number of different elements’. A hint of what these interrelationships are can be found in a helpful definition provided by the College of Complex Project Managers (2006), which states that ‘complex projects are open systems and are characterized by recursiveness and non-linear feedback loops, which make them sensitive to small differences in initial conditions and emergent changes’. The College goes on to identify certain characteristics of complex projects that differentiate them from traditional projects, these are:

- Disorderly
- Instable
- Emergent
- Non-linear
- Recursive
- Uncertain
- Irregular
- Random

Such systems, exhibit dynamic complexity where the interactions between the various elements comprising projects are varied and undefined; and there is uncertainty in objectives and methods.

In another definition, provided by the National Audit Office, a complex project is defined as one where either ‘at the outset there is uncertainty over the route to delivering the project outcome, or the project has aspects that have not previously been encountered; or there is high level of change in the outcome required during the projects lifetime’ (Morse, 2009). The report goes on to identify several contributors to a project’s complexity such as: number of stakeholders, linkages pertaining to procurement, project duration, technological novelty, novel financing, and delivery timetable.

Some researchers consider construction projects to be perhaps the most complex of all project types and argue that their complexity has been on a rise since the Second World War (Baccarini, 1996). Unfortunately, what precisely qualifies a construction projects as complex or the reasons for their increas-
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