


Exploring Project Management Complexity Dimensions, Factors, and Strategies

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ABSTRACT

Constant changes in the internal and external environmental factors impact organizations, people, systems, and processes. This impact increases complexity in projects exponentially. The more diverse tools, systems, and people involved in a project, the more interdependent and complex the project will be. This study explores complexity from several vantage points. It examines complexity from a project type, technological, organizational, and environmental perspective. Next, it examines human behavior, stakeholders, resource capability, and leadership as factors to project complexity. Moreover, it reviews emotions, biases, and emotional intelligence in decision making as sources of complexity. Finally, analysis of uncertainty as a leading factor of project complexity is performed through appropriate risk management, project planning, and proactive project monitoring and controlling mechanisms.

KEYWORDS

Emotional Intelligence, Leadership Project Complexity, Stakeholder, Uncertainty

INTRODUCTION

Complexity is inherent in every project. A project may be complex due to all or one of the three elements including the number of interacting elements (multiplicity), the connection between those elements (interdependence) or the degree to which they differ (diversity) (Surgut & McGrath, 2011). A project involving two people with significant differences of opinion and approach may be far more difficult to achieve than a project with a hundred people who are on the same page. The expected outcome in the earlier case can be a lot harder to predict because the behavior of the individuals are unpredictable. For instance, put a meat-eater and a vegetarian together and ask them to decide on a catering menu for an upcoming event. It is very difficult to anticipate if they will reach a compromise or one will sacrifice their wills for the other. They may never be able to achieve the desired objective. However, if you put ten, twenty or more people of the same group together, they will find it fairly easier to decide. This example suggests human behavior plays an important role in project complexity. As a result, an important research question that should be addressed is what are some of the factors that lead to project complexity?

In this study attempts to examine the host of factors that cause complexity and recommends various methods to navigate such factors to ensure project success. It also aims to extend the previous study on project complexity conducted by Cleveland and Hinojosa (2019). Examination of the literature yielded seven complexity dimensions consisting of a host of factors that contribute to project complexity.

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Moreover, the study proposed a number of strategies to address the complexity. The paper concludes with examination of limitations and provides recommendations for future research.

ORGANIZATIONAL COMPLEXITY

Definition

To understand complexity in organizations first it is important to understand the term complexity. Sargut and McGrath (2011) discusses the key differences between complicated and complex systems. Based on their discussion, the fundamental difference lies in our ability to predict the behavior of a system. Complicated systems, despite consisting multiple elements, behave in a “patterned way” and predictable way. Complex systems on the other hand are defined by one or all of the three key factors discussed earlier including multiplicity, interdependence, and diversity.

According to PMI's Pulse of the Profession: In-Depth Report: Navigating Complexity (2013) complexity is constantly increasing in projects that consequently impact budgets and risks. The detailed study finds that multiple stakeholders, ambiguity, political authority and unknown project features, resources and phases are among the top factors contributing to complexity in organizations. Returning to the earlier example, a vegetarian group will end up with a catering menu filled with vegetarian options but it is hard to predict what the meat-eater and vegetarian will decide.

Organizational Complexity Factors

Complex adaptive systems (CAS) make the core of the discussion on complexity in organizations. Anish and Gupta (2015) suggest that organizations are independent complex adaptive systems in an environment. They define complex adaptive systems as the systems that portray particular behaviors such as self-organization and emergence, learning and adaptive behavior, and co-evolution. What is vital in this discussion is recognizing and appreciating these key behaviors of complex adaptive systems so that organizations can enable their members to use their fullest potentials to fill the gaps, take actions in a timely manner, cooperate, continuously learn and adapt behavior to navigate complexity.

Strategies for Organizational Complexity

According to PMI's Pulse of the Profession report (PMI, 2013), leadership, technical project management, strategic and business management skills have been ranked as the core competencies to manage complex environments. Effective estimating practices, decision making approaches, and risk management and mitigation strategies have been discussed as some specific considerations by Sarguth and McGrath (2011) to minimize the negative impact of complexity in organizations and projects. Figure 1 summarizes the various components of project complexity. Each of these components will be addressed throughout the remainder of the study.

PROJECT COMPLEXITY

Definition

Baccarini (1996) proposed two definitions of complexity with projects: 1) Consisting of many varied interrelated parts, where project complexity consists of the number of varied elements, e.g. tasks, specialists, and the degree of interrelatedness between these elements; 2) Complicated, involved, intricate, where it is explained by the criticality of project, project visibility and accountability; clarity of scope definition.

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