

Chapter 63

The Relationships Among Environmental Turbulence and Socio–Technical Risk Factors Affecting Project Risks and Performance in NPD Project Teams

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ABSTRACT

This study proposes a research framework to empirically examine the relationships among environmental turbulence, socio-technical risk factors, project risk, and project performance for a New Product Development (NPD) project team in the telecommunications industry. In addition, the moderating effect of communication on the relationship between project risk and project performance is also analyzed. The samples were collected from NPD team projects in 17 of Taiwan's telecommunication public firms. Our results indicate a positive relationship between: (1) environmental turbulence and social-related risks, (2) social-related risks and technical-related risks, (3) socio-technical related risks and project risks, and (4) a strong negative relationship between project risks and project performance. Meanwhile, although statistically insignificant, the moderating effect of communication could weaken the relationship between project risk and project performance.

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INTRODUCTION

In light of the fact that product innovation as an effort to gain global competitive advantage, organizations have been struggling to discover the most efficient and effective ways to develop new products (Salomo, Weise, & Gemunden, 2007). Although the implementation of project strategies has been suggested to improve New Product Development (NPD) project outcomes (Yang, 2012), the reality is, many NPD projects still fail. NPD projects are indeed very risky and costly, with staggering high failure rates. According to statistics, about 80% of NPD projects were considered to have failed before project completion, and more than 50% of the efforts have not gained returns on the investment of money and time (Cooper, 2003).

To overcome these high failure rates, both industries and academia have recognized the value of project risk management (Kutsch & Hall, 2010). Recent studies have acknowledged the importance of project risk management practices on the performance of projects (Oehmen, Olechowski, Kenley, & Ben-Daya, 2014; Pimchangthong & Boonjing, 2017; Yim, Castaneda, Doolen, Tumer, & Malak, 2015). Nevertheless, a successful NPD project requires not only knowing the risks, but also effectively gaining access to information in turbulent environments (Nieto & Santamaria, 2007). In a high turbulence environment, the ability to identify and mitigate potential risks such as quick depreciation of technology and changes in the market is an important part of ensuring the success of NPD projects (Dayan, Di Benedetto, & Colak, 2009; Stewart & Fortune, 1995).

This study integrates risk factors, including environmental turbulence and socio-technical factors, that are crucial to NPD team project management and relates them to project risk and performance. To the best of our knowledge, previous studies that have incorporated both environmental turbulence and socio-technical theory in studying NPD project risk and project performance are lacking, nor are there similar previous studies that have examined the detailed dimensions or carried out empirical investigations of the relationship among such factors. The objectives of this study are therefore three-fold: 1) To evaluate the impact of project risk based on the socio-technical systems theory (SST), 2) to investigate the influence of environmental turbulence on the SST model, and 3) to test the moderating effect of communication on project risk and NPD project performance. In so doing, this study contributes to the project risk management literature particularly in regard to the topic of environmental turbulence and SST and to how these factors will affect project risks and performance, specifically in the case of NPD project teams. The research framework of this study is depicted in Figure 1. This paper will be organized as follows: the relevant literature is discussed. The conceptual framework and hypotheses of this research are tested using a Partial Least Square Structural Equation Modeling data analysis approach. The results are reported, followed by a discussion, implications, limitations, and the conclusion of this study.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

NPD Project Performance

The assessment of the success of an NPD project is essential for each stakeholder; however, the assessment is difficult since success may be interpreted in various ways (Aladwani, 2002). Researchers have pointed out two factors by which to measure new product development projects, namely process quality

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