Available online at www.sciencedirect.com
ScienceDirect
International Journal of Project Management xx (2014) xxx – xxx
International Journal of Project Management
www.elsevier.com/locate/ijproman

Assessing the effect of requirement definition and management on performance outcomes: Role of interpersonal conflict, product advantage and project type

Li-Ren Yang [a,*], Jieh-Haur Chen [b], Xing-Liang Wang [a]

[a] Department of Business Administration, Tamkang University, New Taipei City, Taiwan
[b] Graduate Institute of Construction Engineering and Management, National Central University, Chungli, Taoyuan, Taiwan

Received 16 August 2013; received in revised form 20 February 2014; accepted 25 February 2014

Abstract

Early planning in many cases is not performed well in new product development (NPD). Most NPD literature has focused more on the product rather than on the development process (Funk, 1992). Thus, the primary purpose of this research was to investigate the relationships among requirement definition and management (RDM) practice, interpersonal conflict, product advantage, and NPD performance in terms of project and market performance. The structural equation modeling (SEM) approach was used to validate the research model. The results suggest that RDM practice in terms of RDM implementation process and training & improvement is associated with requirement quality and stability. The findings also indicate that the number of groups moderates the relationship between requirement quality & stability and project performance.

Keywords: Requirement definition and management; Interpersonal conflict; Product advantage; Project performance; Market performance

1. Introduction

Many studies have shown that preproject planning effort may contribute to project performance in terms of cost, schedule, and quality performance (Damian and Chisan, 2006; Kauppinen et al., 2004). Thus, preproject planning process is critical to the success of any types of projects (Brooks, 1987). The development of project requirement definition is one of the major subprocesses. It is the process by which projects are defined and prepared for implementation. Additionally, it is the stage where project risk assessments are undertaken and the specific project execution methods are analyzed. Success during the following phases of a project is highly dependent on the level of effort expended during this stage (Zowghi, 2002).

Requirement quality affects work performed in subsequent phases of a project. Thus, the compliance with requirements is crucial to the success of a project (Procaccino et al., 2002). In recent years, there has been a growing trend towards increased requirement definition and management (RDM) effort on new product development (NPD) projects (Cooper et al., 1998; Tomes et al., 1996). Some product development firms adopt the best industry practices for project planning in an attempt to reduce the cost and schedule of a project. These firms also examine their operations for ways to improve stakeholder satisfaction. However, since the importance of requirement definition and management practice can be rather intangible, this has slowed the adoption of RDM practice in NPD process. Accordingly, the importance of requirement definition and management has been one of the major issues for both industry and academic fields. Many studies indicated that one of the major challenges in new product development is the definition and management of project requirements (Ernst and Teichert, 1998; Kauppinen and Kujala, 2001). In order to understand the issue, there is a need for

* Corresponding author. Tel.: +886 2 26215656; fax: +886 2 26209742.
E-mail address: iry@mail.tku.edu.tw (L.-R. Yang).

http://dx.doi.org/10.1016/j.ijproman.2014.02.012
0263-7863/00 /

quantification of the associations between RDM effort and NPD performance. Research on the relationships should offer guides to NPD process.

Early planning in many cases is not performed well in new product development. Most NPD literature has focused more on the product rather than on the development process (Funk, 1992). In addition, this lack of process discipline is often the most critical obstacle to successful new product development (Page, 1993). While requirement engineering (RE) is widely accepted in software development, empirical evidence that supports the importance of RDM practice in new product development is lacking. In addition, the literature in new product development has ignored the relationship between RDM practice and NPD performance. This study attempts to fill the gap in the literature by identifying the roles of interpersonal conflict, product advantage, and project type in the relationship between requirement quality and stability and NPD performance in terms of project performance and market performance. In order to explore the benefits of RDM effort, an industry-wide survey was used to investigate NPD projects in the Taiwanese high-tech industry.

2. Literature review and hypothesis development

A considerable body of research has been conducted on the innovation front end and the front-end phase of project life cycle. The relevant studies are associated with the use of front-end tools, guides to front-end decision-making, and the benefits associated with effort during the front-end phase. Concerning the use of project planning tools and guides to project planning and decision-making, Artto et al. (2011) addressed management control in the front end of innovation projects. Their research results showed a variety of management control mechanisms that can be considered as integrative organizational arrangements. Nobelius and Trygg (2002) studied management of the early phases in product development projects and analyzed the early phases to determine the appropriateness of using one Front End model. Dumont et al. (1997) focused on developing a tool for assessing the levels of project definition. The tool, project definition rating index (PDRI) for projects, can assist in calculating a total score representing the level of project definition. Ahmed et al. (2003) explored the applicability of quality function deployment (QFD) in project planning process and suggested that QFD can be employed in the project planning process as a road map to keep track of the original requirements and facilitate good communication across the hierarchy. Moreover, QFD is also a useful tool for evaluating project alternatives. Ozdoganm and Birgonul (2000) built a decision support framework for project planning and found that the decision support framework can help project companies define the risk sharing scenarios under which a project becomes viable and identify effective risk mitigation strategies. Gidado (2004) proposed a simple systemic approach that can be used in practice to improve and standardize the process of project planning and concluded that the implementation of the system of preproject planning may produce value in project system implementation. In addition, Laufer et al. (1999) developed a valuable tool to manage the decision-making process during the planning of a project. Gibson et al. (1995) also presented a validated process map describing the major subprocesses of preproject planning. Finally, Williams and Samset (2010) explored several important issues in front-end decision making on projects including the need for alignment between organizational strategy and the project concept, dealing with complexity, consideration of the ambiguity implicit in all major projects, taking into account psychological and political biases within estimation of benefits and costs, consideration of the social geography and politics within decision-making groups, and preparation for the turbulence within the project environment. While the above authors promoted the adoption of project planning tools and provided guides to project planning and decision-making (Dumont et al., 1997; Laufer et al., 1999; Williams and Samset, 2010), other researchers have also been active in exploring the relationships between project planning and project outcomes. Kaka et al. (2003) evaluated the effects of project planning on the cost flow curves. Lee et al. (2005) examined the relative impacts of selected practices on project cost and schedule and argued that pre-project planning is one of the critical practices indicating dominant impact on both cost and schedule performance. Hamilton and Gibson (1996) focused on measurement and benchmarking of the preproject-planning process and concluded that a complete scope definition prior to project execution may contribute to project success. Griffith and Gibson (2001) identified the important characteristics of alignment during the preproject phase of projects and suggested that alignment effort has a positive effect on project performance. In summary, the above prior studies indicated that success during the following phases of a project is highly dependent on the level of effort expended during the front-end phase (Griffith and Gibson, 2001; Hamilton and Gibson, 1996; Kaka et al., 2003; Lee et al., 2005).

Preproject planning process is critical to project success (Brooks, 1987). In addition, requirement engineering process is one of the major subprocesses. The requirement engineering process refers to a series of activities consisting of articulating the initial concept, problem analysis, feasibility and choice of options, analysis and modeling, and requirement documentation. Improving the requirement engineering process is a key issue for the delivery of effective software systems that meet user expectations and are delivered on time and developed within budget. The use of requirement engineering techniques is becoming increasingly important, especially as many groups are involved in the product development tasks and virtual enterprises become more common (McKay et al., 2001). For specific types of product (for example, software and electronic), there are some well established methods and data formats for the specification of requirements (McKay et al., 2001).

Besides the discussions concerning use of requirement engineering techniques, there is a substantial literature that focuses on factors influencing RE process. Prior research has discussed the issues relating to the success of RE process improvement (Calvo-Manzano Villalón et al., 2002; Hutchings and Knox, 1995). One of the major factors influencing the institutionalization of a process is the involvement of future process users and management in development of the process

Please cite this article as: L.-R. Yang, et al., 2014. Assessing the effect of requirement definition and management on performance outcomes: Role of interpersonal conflict, product advantage and project type, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2014.02.012