ABSTRACT

In order to make the strategy for research and development (R&D) purchase system better serve the personalization of material requirements in R&D process, the authors propose to develop a strategy set which will satisfy the internal as well as external constraints simultaneously. Social network analysis is used to analyze the vertical and horizontal relationships among the project, department and enterprise layers. Through a case study, the authors display the regulatory relationship of participants under given organization pattern and supply chain configuration. To disclose the restricted equilibrium mechanism of participants involved, changes under different strategies are compared, which can assist enterprises to enforce the decision making and to improve the R&D purchase system ability. The authors outline some of the managerial implications arising from the research findings at the end of this paper.

Keywords: Purchase System, R&D Supply Chain, Social Network Analysis, Strategic Design

1. INTRODUCTION

The product’s innovability is the fundamental guarantee to win competitive advantages, which is the most complex challenge for today’s organizations (Dahlgaard-Park & Dahlgaard, 2010). At present, the R&D supply chain configuration has become more important for its changing role in cooperation and innovation performance (Burt & Soukup, 1985; Wu, Steward, & Hartley, 2010). The investigation of China electronic manufactures’ purchase behavior reported that R&D department rather than material supply department has ever increasingly stronger discursive power in purchasing R&D components (China Electronics Fair & CNT Networks, 2011). Given the above situation, more and more manufacturers have begun to pay attention to activities related to R&D purchase process. For example, Huawei has made a detailed guidance brochure on R&D purchase and achieved prominent R&D performance.

The R&D material purchase is not a new research area. As early as 50 years ago, Rothwell (1972) had found statistically that purchase plays a remarkable role in the success of the
R&D project. From the point of the result, most literature on early supplier involvement (ESI) focused on R&D project management, team performance and technological innovation (Wyntra Weggeman, & van Weele, 2003; van Echtelt, Wynstra, van Weele, & Duysters, 2008), but effective strategic design for the R&D purchase system may be more important. Schiele (2010) defined the research scope of early purchase involvement (EPI) to strengthen the significance of early procurement in new product development (NPD) from the perspective of best practices under the matrix organizational structure. These studies have been tacked on certain aspects of the R&D supply chain, but few studies have challenged the entire shape of the strategic design under a given supply chain configuration. So new methods are required.

Faced with the current research gap, we use the SNA model to answer the following research questions:

• What are the challenges of R&D purchase when faced with a traditional R&D supply chain configuration?
• How to address this challenge through strategic design to satisfy the internal as well as external constraints simultaneously?

To help enterprises make correct decisions in operational management level, we will explore the R&D purchase activity and compare the effect of different strategic designs from the supply network perspective.

The paper begins by reviewing the existing literature on relevant research of the R&D purchase system. Then, after examining the applicability of research methodology, we collect data from FT company and build a hierarchical SNA model to display the regulatory relationship within the R&D purchase system. The data are analyzed at the project-level, department-level and enterprise-level respectively. Finally, based on the interpretation of the quantitative SNA results, we discuss the implications for the management of the R&D supply chain.

2. LITERATURE REVIEW

The objective of this research is to better design the intelligent R&D supply chain to meet special material requirements in the modern R&D, such as personalization, irregularity and timeliness, ensuring that high-level corporate strategies are reflected by business activities and the underlying process execution platforms (Siurdyban & Møller, 2012). We first briefly address the main research streams about the changing role of purchase in R&D activity, and then present some literature that has involved EPI/ESI specific to the R&D activity. It is anticipated that some concepts or models in the related fields are useful or effective for the research. Finally, expectations and limitations are summarized.

2.1. The Changing Role of Purchase in the R&D Activity

The previous R&D literature has long emphasized the role of purchase, including information communication, promoter and trouble-shooter (Burt & Soukup, 1985; Melander & Nicolette, 2012). Burt and Soukup (1985) discussed that the R&D purchase is not only the promoter connecting the R&D project and the supplier’s development ability, but also the provider providing reliable information like the optional material’s cost, performance and quality in the R&D and investigation stages. As the promoter between buyer and supplier, the purchase manager was identified, and how they tackle with the daily problems in the R&D project was described in detail (Wu et al., 2010). These researches have achieved the same conclusion about the important role of R&D purchase at strategic level, but they fail to reach a consensus on the best practice to manage such involvement. Fujita, Amaya and Akai (2013) has focused on a strategy-level integrated design problem of product family and supply chain. The debate became white-hot between what strategy is suitable for R&D purchase and what content is appropriate for the involvement.
Business Processes for Enhancing Coordination in Supply Networks
www.igi-global.com/article/business-processes-for-enhancing-coordination-in-supply-networks/126337?camid=4v1a