Chapter 22
Antecedents of Collaborative Arrangements in the Innovation and Production System

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ABSTRACT

R&D cooperation and production cooperation are regarded as two key dimensions of collaborative arrangements in the innovation and production system. Different from prior studies focusing on performance outcomes, this study emphasizes the antecedents which have impacts on firms’ decisions of R&D cooperation and production cooperation. The antecedents are identified and categorized into organizational characteristics (market orientation and technological capability), technical characteristics (technology clockspeed and technology-production fit), and relational characteristics (asset specificity). Through statistical analyses on survey data of Chinese manufacturing firms, this study finds that two factors including technology clockspeed and asset specificity have significant effects on firms’ decisions of R&D cooperation, while technological capability, technology clockspeed, and technology-production fit are confirmed to have significant effects on decisions of production cooperation.

INTRODUCTION

Technology-driven companies now engage more and more in inter-organizational collaborative arrangements especially in the innovation and production system. In this fast-paced and constantly changing market, it is hard to succeed by relying only on internal knowledge and resources for technology development and production. The increasing requirements for product diversification, the compression...
of product life cycles and the intense competition environment force the companies to seek external complementary resources from their partners and relocate all the internal and external resources to facilitate technological innovation and improve operational efficiency (Tyler & Kevin Steensma, 1995). As Chesbrough (2003) points out, companies are now shifting from traditional closed innovation to open innovation by breaking down the boundaries of organizations. Meanwhile, cooperative production are encouraged to support the output of innovation achievements (Marxt & Link, 2002). Until now, the cooperative relationships across organizations have been recognized to be an effective way to achieve competitive advantages (Dyer & Singh, 1998).

As a continuum between outsourcing and vertical integration, scholars and practitioners have seen various forms of inter-organizational cooperation. Many terms including partnering (Hagedoorn, 1993), alliance (Eisenhardt & Schoonhoven, 1996), collaboration and integration (Teece, 1986) are used to describe the cooperative relationships. In this research, we divide collaborative arrangements into two categories: cooperative R&D and cooperative production. In the system of technology development, several organizational modes like joint ventures with equity involvement, and alliances with formal or informal agreements are identified, of which the main focus is to attain common or complementary knowledge of innovation (Chiesa & Manzini, 1998; Wu, 2012). Since production is always aligned with technology development in the area of innovation management (Hacklin, Marxt, & Fahrni, 2006), the research also pays attention to the cooperative relationships in the production system. Just-in-time (JIT) exchanges (Frazier, Spekman, & O’Neal, 1988), original equipment manufacturing (Lin, 2004) and original design manufacturing (Lin, Ou-Yang, & Juan, 2009) are the common forms of cooperative production which aim at successful implementation of technical innovation achievements.

While the benefits of cooperative relationships have been widely discussed in the strategic management literature (Doz & Hamel, 1998; Dyer & Singh, 1998), researchers ignore the determinants or the contexts to build and keep the relationships. Cooperative relationships are not always beneficial for the innovation performance for the reason of coordination difficulties and transactional hazards (Williamson, 1981), which finally makes managers confused about “when to collaborate with external organizations”. To deal with this problem, Miotti & Sachwald (2003) analyze the factors affecting R&D cooperation in the perspective of partners based on resource-based view, and Mora-Valentin, Montoro-Sanchez, & Guerras-Martin (2004) conduct an empirical research on the determining factors in the success of R&D cooperative agreements. Veugelers & Cassiman (2005) also test other factors like cost and risk, appropriability and internal capacities. However, the understandings on the collaborative arrangement are still not comprehensive and clear.

The objective of this research is to identify the antecedents that impact on firms’ decisions of collaborative arrangements in innovation and production system. This research differentiates itself from prior studies in three aspects. Firstly, we focus not only on one side of the innovation and production system like R&D cooperation; instead, we provide the framework for both cooperative R&D and cooperative production. Secondly, the research take into account organizational, technical and relational factors and analyze their effects based on knowledge-based view (KBV), resource-based view (RBV), transaction cost theory (TCT) and information processing theory (IPT). Thirdly, the empirical analysis is based on a Chinese survey of firms’ experiences on innovation and production management. Considering China is a big manufacturing country with strong innovation potential, the research in the Chinese context will help scholars to build a more comprehensive understanding on the cooperative R&D and cooperative production.
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