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# How organizational flexibility affects new product development in an uncertain environment: Evidence from China<sup>☆</sup>

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## ABSTRACT

This study builds a conceptual model to describe the relationships between resource flexibility (RF), operational coordination flexibility (OCF), and new product introduction capability (NPIC) in operations management, and to explain the moderating effects of resource availability (RA) on the relationships between both types of flexibility and NPIC. Using sample data from Chinese firms, this study finds an inverse U-shaped relationship between resource flexibility and NPIC, and a positive relationship between coordination flexibility and NPIC. Furthermore, this study finds that resource availability negatively moderates the relationships between both types of flexibility and NPIC

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## 1. Introduction

In recent literature, new product introduction capability (NPIC) has been viewed as one of the most important factors that ensure the success of new product development (NPD) (Dröge et al., 2000; Katila and Ahuja, 2002). In this study, NPIC is defined as the capability to introduce a new product quickly into a target market and provide satisfactory after-sale service (Nerkar and Roberts, 2004; Dougherty and Hardy, 1996). Recently, firms in emerging countries have faced increasing turbulence as a result of technology change and decreasing resource availability (RA) in NPD (Li et al., 2006a,b). Leonard-Barton (1992) notes that many firms have failed to introduce new products because of their inability to extend resources and capabilities to meet the needs of NPD. Similarly, Tatikonda and Rosenthal (2000) find that firms often fail to introduce new products because they cannot redeploy resources. Thus, organizational flexibility is definitely of importance in effectively enhancing NPIC,

and, as a result, more attention is being paid to the impact of organizational flexibility on NPIC (Sanchez, 1995; Hemphill, 1996; Bierly and Chakrabarti, 1996; Das, 2001).

However, although the extant literature acknowledges a relationship between organizational flexibility and innovation (Levy, 1993), there are different perspectives or explanations regarding precisely what effect it has (Li et al., 2008). From a resource-based point of view, Sanchez (1995) argues that organizational flexibility includes resource flexibility (RF) and coordination flexibility, and that both improve NPIC. But from a behavioral inertia point of view (Ghemawat, 1991), Kraatz and Zajac (2001) suggest that firms with high RF may be insensitive to environmental change and feel less pressured to be proactive than firms with low RF, thus implying that too much RF may have a negative effect on NPIC. We argue that a study of organizational flexibility must take into account the different types (Suarez et al., 1996; De Toni and Tonchia, 2005), and that these different types of flexibility should have different effects on NPIC. Until the present time, there has been a lack of study on the influences of different types of flexibility on NPIC (Das, 2001).

Unlike extant research, most of which has been done in western market economies, the present article focuses on the context of the Chinese transitional economy.

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Compared with Western firms, latecomers from China, the largest emerging country, are more resource deficient (Mathews, 2002). These firms operate under an environment much different from that of firms in developed countries (Li et al., 2006a,b), and the resulting higher environmental uncertainty compels the firms to emphasize flexibility in order to ensure efficient innovation and performance (Rajdeep and Tansuhaj, 2001; Li et al., 2008). Meanwhile, the lack of advanced technology makes it difficult for Chinese firms to establish competitive advantages in innovation (Mathews, 2002), and thus the availability of technology may influence the effect of organizational flexibility on new product introduction. Furthermore, the Chinese government's industry policy encourages many Chinese firms to seek opportunities to enter new industries in which they can use their resources and capabilities more efficiently (Li et al., 2007). Thus, it is important to explore further how Chinese firms overcome resource deficiency and then efficiently improve their NPIC. Here, we define RA as the extent to which a firm can obtain enough available resources in financial, technological, and policy opportunities when entering a new industry (Pfeffer and Salancik, 1978; Castrogiovanni, 1991; Mathews, 2002), and we argue that RA has an influence on the relationship between two types of flexibility and NPIC. Furthermore, because there are significant differences between RF and coordination flexibility (Sanchez, 1995), the effects of RA on these relationships should be different. This important issue has been ignored in existing literature.

To address these gaps, this article examines how the different types of flexibility (i.e., resource flexibility—RF—and operational coordination flexibility—OCF) affect NPIC, and how RA moderates the relationships between the two types of flexibility and NPIC in a transitional economy. This study makes two important contributions.

First, from a theoretical viewpoint, we develop a conceptual model to explain the relationship between two important kinds of organizational flexibility and NPIC, as well as the moderating effect of RA. This article enriches the literature by providing a more nuanced and in-depth understanding of the nature of both RF and OCF and their different effects on NPIC, finding that a firm's RF has a non-linear effect on NPIC while its OCF positively influences NPIC. Furthermore, based on analysis of the market environment of China, we examine the moderating effect of RA on the relationships between the two types of flexibility and NPIC, and explain the reason why RA differently moderates these relationships.

Second, by using the data painstakingly collected through face-to-face interviews with senior executives in charge of 220 Chinese firms, we empirically examine the inverse U-shaped relationship between RF and NPIC, and the positive effect of OCF on NPIC. Furthermore, RA negatively moderates the relationships between two types of flexibility and NPIC, a finding which enriches empirical study of flexibility and extends understanding of the effects of flexibility on NPIC in an emerging country.

## 2. Theoretic background and conceptual model

### 2.1. Type and definition of flexibility

In extant literature, the types of flexibility and their definitions have not been widely accepted (De Toni and Tonchia, 2005). In strategy management, for example, the strategic flexibility view suggests that in dynamic environments a firm can achieve competitive advantage by creating strategic flexibility in the form of alternative courses of action available to the firm (Sanchez, 1993). Based on this strategic flexibility view and the resource-based view (RBV) of a firm, Sanchez (1995) suggests that flexibility is constrained not only by resources but also by the ways a firm uses the resources, because it is not only the resources themselves but also the 'services' that the resources can render that contribute to the production process. Sanchez (1995, 1997) divides flexibility into RF and coordination flexibility, and explains that RF essentially describes the range of uses of resources available for a firm, while coordination flexibility describes the capabilities of defining, configuring (identifying and structuring), and deploying existing resources through organizational systems and processes. Coordination flexibility increases with a decrease in the cost, difficulty, and/or time required executing these actions.

However, the dynamic capability view argues that the RBV has not adequately explained how and why firms acquire competitive advantage in situations of rapid and unpredictable change. In order to obtain competitive advantage in a turbulent environment, a firm should focus particularly on improving capabilities, more than on exploiting firm-specific resources (Teece et al., 1997). Furthermore, Hitt et al. (1998) suggest that dynamic core competencies can help firms remain flexible and able to respond quickly to unpredicted and therefore unexpected changes in the environment. Li et al. (2008) also point out that coordination flexibility in the studies of Sanchez (1995, 1997) emphasize only the ability to redeploy resources and neglect the development of capabilities for the purpose of becoming more flexible.

Therefore, using the dynamic capability view (Teece et al., 1997), we argue that investment in enhancing capabilities in order to adapt swiftly to an uncertain environment should also be viewed as an element of coordination flexibility, in addition to the ability to redeploy existing resources.

In operations management, operational flexibility, in the sense of manufacturing flexibility (De Toni and Tonchia, 2005), has attracted much attention from scholars. Manufacturing flexibility refers to the ability to change or react with little penalty in time, effort, cost or performance (Upton, 1994). A firm's ability to shorten time and lower cost while organizing production of many kinds of new products reflects the flexibility of the firm's production and manufacturing management (Gerwin, 1993; Koste et al., 2004).

Upton (1994) distinguishes among the range, mobility and uniformity elements of operational flexibility. Range refers to the ability to provide a large range on the dimension of change, which may be represented as the

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