Original Article

Determinants of international innovation performance in Chinese manufacturing firms: An integrated perspective

Received 15 May 2010; revised 8 February 2011; accepted 28 March 2011

Ziliang Deng^a, Ruey-Jer 'Bryan' Jean^b and Rudolf R. Sinkovics^{c,*}

^aSchool of Business, Renmin University of China, 59 Zhong Guan Cun Avenue, Beijing, 100872, People's Republic of China.

E-mail: ziliang.deng@ruc.edu.cn

^bDepartment of International Business, National Chengchi University, 64, Sec.2 Zhi-Nan Road, Taipei, 11605, Taiwan.

E-mail: bryan@nccu.edu.tw

^cManchester Business School, The University of Manchester, Booth Street West, Manchester M15 6PB, UK.

E-mail: Rudolf.Sinkovics@manchester.ac.uk,

Web: <http://www.personal.mbs.ac.uk/rsinkovics/>

*Corresponding author.

Abstract In an increasingly dynamic global business environment, it is of fundamental theoretical and managerial interests to understand how firms can successfully adapt to changing marketplaces through new product development. The article examines the impact of internal resources, external networks and export activities on the international innovation performance of Chinese manufacturing firms. The effect is tested simultaneously by drawing on data from a firm-level World Bank survey involving 998 manufacturing firms. A Tobit model is adopted to examine the export performance of new products. Findings from the hierarchical regressions demonstrate that local competition contributes to innovation, as do firms' external networks. Firms involved in exporting can leverage their learning and this can be a key driver for innovation. Although higher R&D intensity may be hampered when local competition is high, returnee managers can stimulate the international innovation performance of firms in highly competitive environments.

Asian Business & Management (2012) **11**, 31–55. doi:10.1057/abm.2011.26;
published online 16 November 2011

Keywords: international innovation performance; R&D intensity; returnee managers; collaboration; networks

INTRODUCTION

In an increasingly dynamic global business environment, understanding how firms can successfully adapt to changing marketplaces through new-product development is of fundamental theoretical and managerial interest. Driven by globalisation-related competitive pressures, many multinational enterprises (MNEs) have started not only to manufacture, but also develop new products in emerging countries. For example, more than 400 of the top 500 MNEs have established R&D centres in China (Jin, 2004). Yet in a transition economy such as China, firms face more resource and management challenges when pursuing product innovation strategies. Although extant literature has helped to significantly advance our understanding of product innovation, most prior studies have focused on firms in North America and Europe (Wei and Morgan, 2004); research on new product innovation in emerging and transition economies has been limited (Li and Atuahene-Gima, 2001). After 30 years of ‘incremental and experimental’ marketisation reform (Prasad and Rajan, 2006), China is still in transition towards a real market economy (Robins, 2010). For example, there still exist widespread and various policy discriminations against private enterprise (Huang, 2008), and intellectual property rights protection remains a significant challenge (United States Trade Representative, 2009). In addition, driven by globalisation, significant numbers of Chinese companies have adopted internationalisation strategies, including international new-product programmes. Although some prior studies have examined firms’ innovation strategy and innovation performance, most focus on domestic innovation performance (De Brentani *et al*, 2010). Research on firms’ international innovation strategy is limited. Hence, it is of special significance to examine the international innovation performance of Chinese manufacturing in this transition economy context.

Given such shortcomings in existing literature, the purpose of this article is to enhance understanding of drivers of international new-product success for Chinese firms in a highly dynamic and competitive transition economy. Our research question asks: How do various resources, including internal capabilities, external networks and exporting behaviour, jointly affect the international innovation performance of Chinese manufacturing firms under intensive business competition? Drawing on the resource-based view (RBV) (Barney, 1991), relational view (Dyer and Singh, 1998) and industrial organisation perspective (Porter, 1979, 1981), we develop and test a model that investigates internal resources, external relationships, export intensity and competition on the international innovation performance of Chinese manufacturing firms. Some of these factors have previously been explored as determinants of new-product innovation performance, but their simultaneous effects on innovation performance have not been fully examined. For example, Vega-Jurado *et al* (2008) only examine internal and external drivers; they do not include a firm’s

export behaviour as a determinant of innovation performance. Furthermore, studies have mostly focused on examining drivers of domestic innovation performance in Chinese firms (for example, Liu and Buck, 2007). However, a firm must take much greater risks to achieve as good international innovation performance as in domestic innovation, due to differing customer demands and market uncertainties (Guan and Ma, 2003). Given the increasing internationalisation of Chinese firms, there is a need to seek a better understanding of Chinese firms' international new-product innovation performance. As Chinese assembly manufacturing has long been locked at a relatively low position in the international production network (Athukorala, 2009), there are appealing policy and management implications for a scrutiny of factors driving the upgrade of China's manufacturing export.

Moreover, competition has intensified in emerging markets like China. Many local companies have tried to grasp business opportunities emerging from the government's market-based economic reforms (Li and Atuahene-Gima, 1999; Atuahene-Gima and Li, 2004). Prior studies have highlighted the importance of environmental dynamism in shaping firm resources and capabilities (Teece *et al.*, 1997; Fang and Zou, 2009), yet sound conceptualisations and empirical evidence on the impact of local competition and the influence of firms' internal resources on innovation are still limited. We therefore examine the moderating effect of local competition on the determinants of international new-product success for Chinese firms.

The contribution of this study to knowledge in this important domain is thus threefold. First, factors and inter-relationships providing an in-depth understanding of international new-product success in Chinese firms are identified and examined. Specifically, we investigate relationships and interconnections between firms' internal capabilities, external networks, export intensity, competition and innovation performance against the dynamic transitional context of Chinese manufacturing companies. Second, we examine whether human resources, specifically returnee entrepreneurs, can enhance firms' international innovation performance in the context of intense local competition. This perspective pursues an extension of the RBV, that is, the dynamic capabilities view that has received some empirical support. Finally, there is no consistent body of theory related to factors determining innovation performance. By jointly examining internal firm resources, external networks and industrial competition in international innovation performance, this study contributes to the innovation literature by linking RBV, relational view (Teece *et al.*, 1997) and industrial organisation perspective (Porter, 1981), while identifying determinants of international innovation performance.

The remainder of this article is organised as follows. A conceptual model is developed that delineates the relationships between key constructs. The literature from RBV, relational view and industrial organisations perspective are reviewed

to provide support for linking the constructs. Hypotheses regarding the determinants of international innovation performance for Chinese manufacturing firms are offered. We then explore the moderating effect of competitive intensity. These hypotheses are then tested empirically, and results presented. We conclude with a discussion of findings and directions for future research.

THEORY AND HYPOTHESES

Theory development and conceptual framework

Identification of the determinants of innovation performance in a firm is a popular topic (for example, Bhattacharya and Bloch, 2004; Caloghirou *et al*, 2004). Extant studies have examined this issue through a number of theoretical lenses, most importantly the RBV, relational view and industrial organisation perspective.

Studies in the RBV field focus on unique resources and capabilities within a firm that drive its competitive advantage (Barney, 1991). A firm's unique internal resources are defined as those that are valuable, scarce, imperfectly tradable and hard to imitate. Studies that build on RBV usually identify a number of internal resources and capabilities as possible determinants of innovation (Del Canto and González, 1999; Del Canto and de la Fuente, 2003). Physical resources such as technological capabilities, relative scale and capital intensity have been linked to firm innovation (Liu and Buck, 2007). Intangible resources like knowledge protection and human resources have also been examined as determinants for innovation (Del Canto and González, 1999). Moreover, firm internationalisation activities such as export are seen as internal strategy decisions that can enhance innovation (Liu and Buck, 2007).

Many firms today rely more extensively on external linkages to acquire new technological knowledge, using strategies such as technology licensing and collaborative agreements (Giroud, 2007; Jindra *et al*, 2009). Researchers have argued that these critical resources and capabilities can span firm boundaries and be embedded within inter-organisational process and activities (Dyer and Singh, 1998; Jap, 1999). According to the relational view (Dyer and Singh, 1998), firms can gain competitive advantages through using different inter-organisational mechanisms, including relational-specific investments, effective governance and inter-firm knowledge-sharing networks. This perspective is in line with social capital theory, which captures the beneficial effect of social networks on organisational performance. Corporate social capital can be defined as a set of resources, tangible or virtual, accruing to a corporate player through social relationships, and facilitating the attainment of strategic goals (Nahapiet and Ghoshal, 1998; Inkpen and Tsang, 2005). Drawing from relational view and social capital literature, most prior research has investigated how different types

of external networks and collaborations can enhance innovation performance (Tsai, 2009). For example, enterprise alliances including suppliers, customers and R&D alliances have been linked to firm innovation performance, as well as collaboration with universities and research institutions (Lee *et al.*, 2001).

Against the RBV and relational view, the industrial organisation perspective highlights firms' external environmental dynamics and market structure that can shape innovative activities. According to the industrial organisation perspective, firms can reap certain benefits from competitive pressure due to a monopolistic market structure and larger firm size. Schumpeter suggests that imperfect competition provides the best environment to internalise R&D benefits (Greenhalgh and Rogers, 2006). Some theoretical and empirical studies suggest that competitive pressure can actually erode a firm's innovative activities because imitators can sell similar products at a lower price in a highly competitive and transitional environment where patents are unable to provide good protection (Arrow, 1962; Greenhalgh and Rogers, 2006). Other research confirms the above contrasting views and show that the relationship between perceived competition and innovation performance is mixed, depending on the type of innovation and competition (Tang, 2006). Hence, to shed light on the mixed results in the relationship between innovation and competition, it is worthwhile to draw on the industrial organisation perspective (Porter, 1979) to investigate the impact of local competition on the international innovation performance of Chinese firms.

On the basis of these theoretical perspectives, we suggest an integrative theoretical framework that explains the drivers of international innovation performance in Chinese manufacturing firms. As shown in Figure 1, we argue that internal resources, external networks, firm exporting and local competition have an impact on Chinese manufacturing firms' international innovative outcome. According to RBV, we focus on two firms' internal resources and capabilities, including technological capabilities and human resources. Specifically, we use R&D intensity as a proxy of a firm's technological capabilities, which has already been widely examined. Regarding human resources, this study focuses on returnee entrepreneurs, which has been identified as an important channel for knowledge transfer and innovation. Particularly for firms in emerging economies like China, where few managers are exposed to international markets, the expertise of return entrepreneurs may be especially valuable (Filatotchev *et al.*, 2009). Moreover, given the emerging internationalisation behaviour of emerging-country firms (Aulakh, 2007), we include export intensity as a determinant of international innovation performance.

In terms of firm external linkages, this study examines co-operative arrangements of Chinese firms with international partners, specifically contract manufacturing arrangements and R&D collaborations. It is crucial for emerging-country firms to engage with MNEs as part of their value-chain activities, ranging from original equipment manufacturers (OEMs) to R&D

Figure 1: Conceptual framework.

arrangements. It has been argued that international collaboration can facilitate innovative behaviour in emerging-country firms. Moreover, given the strong technician and scientist base in China's universities (Eun *et al*, 2006), we also include university collaborations as an external network driver of Chinese manufacturing firms' innovation.

Drawing on the industrial organisational perspective (Porter, 1979), prior studies have noted that competitive pressure can influence innovative capabilities and performance (for example, Zheng Zhou, 2006). Hence, our model also proposes the direct impact of local competition on a firm's international innovation performance.

Since competitive pressure can shape the way a firm allocates resources and capabilities and thus impacts on firm innovation, our proposed model examines the moderating effect of local competition on the impact of a firm's internal resources on international innovation performance. This is consistent with the development of RBV, which seeks to explain how and why firms achieve competitive advantage in situations of rapid and unpredictable change (Teece *et al*, 1997). According to Eisenhardt and Martin (2000), it is the capabilities with which managers integrate, build and reconfigure a firm's internal and external competencies and resources to address the changing environment, that are the real source of competitive advantage.

Hypothesis development

Internal resources and the international innovation performance of a firm

A growing body of literature has linked internal resources and capabilities to innovation. Technological capabilities are identified as drivers of innovation

performance. Firms with higher technological capabilities possess specific technological knowledge and production skills that are valuable and difficult to imitate by competitors. R&D activities constitute the necessary condition for a firm's successful exploitation of knowledge and its conversion to new products or services. Extant literature supports the argument that technological capability is a key driver of firm innovation (Lee *et al.*, 2001); Vega-Jurado *et al.* (2008) find that technological competences derived from R&D intensity are the main drivers of product innovation for Spanish manufacturing firms.

Intangible resources such as human capital and firm reputation, which are rare and difficult to imitate, have been identified as the most important resources driving competitiveness. Human capital entails teams of scientists and technicians with suitable qualifications and experience in R&D. Specifically, human resources, comprising returnee entrepreneurs, have been identified as key drivers of innovation success in emerging markets. Returning entrepreneurs may bring with them general knowledge about products, technology and access to finance from the advanced economies in which they were previously embedded. For example, local entrepreneurs in Chinese high-tech industries benefit from knowledge transfer from abroad through business transactions with foreign companies (Filatotchev *et al.*, 2009). Such knowledge obtained from abroad may be particularly salient for firm innovative activities in an emerging economy such as China, where most enterprises lack advanced technicians and scientists.

Hypothesis 1a: Technological capabilities represented by R&D intensity are positively associated with international innovation performance.

Hypothesis 1b: Human resources represented by returnee entrepreneur are positively associated with international innovation performance.

External network relationships and the international innovation performance of a firm

Research suggests that a firm can advance product innovation by interacting with different collaborators such as suppliers, customers and research organisations (Guan *et al.*, 2009; Tsai, 2009). According to the relational view and social capital theory, co-operative alliances can facilitate knowledge-sharing and provide complementary resources for product development, thereby leading to successful product innovation. In transition economies, it has been argued that relationship-based management capabilities are possible substitutes for lacking institutional infrastructures (Li and Atuahene-Gima, 2001). For example, Chinese enterprises have engaged with partners from

developed countries to seek technical, managerial and financial resources, which in turn can enhance international innovation performance. This study focuses on two types of international business partnerships, including contract manufacturing arrangements and R&D collaborations with foreign partners.

Firms from emerging economies have used contract manufacturing as a strategy to participate in MNEs' global production networks (Sturgeon *et al*, 2008). For example, Taiwanese electronics firms have served as OEM suppliers for MNEs in a way that helps them upgrade their production and innovation capabilities (Hsu and Chiang, 2001). Contract manufacturing may help firms from emerging economies share production and design know-how with their MNE customers. Working with customers not only benefits OEMs in identifying market opportunities for technology development, but also reduces the likelihood of poor design in the early stages of product development. Thus, contracting manufacturing arrangements with MNEs is seen as an effective channel for knowledge transfer for emerging country firms, which in turn drives firms' innovation (Jean *et al*, 2008, 2010a, b; Jean and Sinkovics, 2010).

R&D co-operation has been widely used as a strategy for enhancing product innovation. R&D co-operation can help firms reduce the time and risk involved in technological innovation (Belderbos *et al*, 2004). In co-operating with foreign partners, Chinese firms are less scarce in resources and thus benefit through gaining knowledge and complementary assets from developed-country partners. Prior empirical studies show that different types of R&D collaborations can lead to firm innovation (Belderbos *et al*, 2004; Tsai, 2009).

Collaboration with universities and research institutes provides a means of developing technical knowledge for Chinese firms. In China, local universities are rich in talented scientists and technical personnel, who offer firms external technological resources. University graduate students participating in R&D projects with firms can also move easily to the company when they are familiar with the projects. Co-operation with universities or research institutes may assure a critical mass of R&D for projects considered too expensive or risky for a company. Universities have been seen as a viable channel for knowledge transfer that can lead to firm innovation. Empirical research also provides some evidence on links between universities and research institute collaborations and firm innovation (Belderbos *et al*, 2004; Caloghirou *et al*, 2004). Therefore:

Hypothesis 2: Partnership-based linkages (specifically to international contracting manufacturing arrangements, international R&D collaboration and collaborations with universities and research institutes) are positively associated with international innovation performance.

Exporting activities and the international innovation performance of a firm

Studies have also investigated the impact of exporting activities on firm innovation (for example, Del Canto and González, 1999). Participation in foreign markets increases a firm's need for technological inputs and more rigorous requirements induce them to invest in R&D activity for continuous updating and product adaptation. Moreover, exporters are more likely to access diverse knowledge about competing products and customer preferences through export intermediaries, customer feedback and other foreign agents, thus facilitating innovation. There is empirical evidence of a positive relationship between a firm's export activities and innovation performance (Roper and Love, 2002). For example, research shows that Chinese firms can obtain market information from foreign partners through learning by exporting, which helps local firms to innovate (Liu and Buck, 2007). These findings lead us to propose the following hypothesis:

Hypothesis 3: Exporting activities represented by export intensity are positively associated with international innovation performance.

Local competition on the international innovation performance of a firm

Local competition refers to competitive intensity and behaviour of local firms and foreign entrants to the local market, something that is difficult to predict. Local competition plays a crucial role in innovative activities (Chang and Xu, 2008). Competition is regarded as a driver for firms to increase productivity and improve technology and innovation (Davis and Meyer, 2004). A highly competitive environment forces firms to compete with rivals either through achieving cost efficiency or by increasing product differentiation.

Dysfunctional competition refers to the extent to which the competitive behaviour of firms in a market is opportunistic, unfair and thus detrimental to innovation (Li and Atuahene-Gima, 2001). In a transition economy with inadequate legal frameworks defining and protecting intellectual property rights, firms are more likely to engage in opportunistic behaviour. For example, patent and copyright violations and unfair competitive practices are widespread in China (Hanel, 2006; Sinkovics *et al.*, 2009), making product innovation highly risky and thus discouraging innovative behaviour. Therefore, despite the potential benefits of a competitive environment in terms of the upgrading and positive exploration/exploitation effects of 'competitive rivalry' (Porter, 2008), we argue that local competition is more likely to be detrimental to Chinese firms' innovativeness, due to the inadequate legal framework (Clark, 2004; Swike *et al.*, 2008).

Hypothesis 4: Local competition is negatively associated with international innovation performance.

Moderating effect of local competition on firms' internal resources on international innovation performance

Literature from the dynamic capabilities view argues that a competitive environment can affect how firms allocate resources and capabilities (Teece *et al*, 1997; Fang and Zou, 2009). Therefore, it follows that firm resources and capabilities, which drive innovation, are contingent upon market competition. Dynamic capabilities, which refer to the ability to integrate internal and external competences and cope with rapidly changing environments, are key drivers of competitiveness, especially in a competitive environment (Teece *et al*, 1997). Firms should thus develop specific resources and capabilities appropriate to deal with environmental opportunities and help them retain and sustain competitive advantage.

In a highly competitive market in a transition economy, dysfunctional competition can drive firms to engage in opportunistic behaviour, such as violating intellectual property rights due to inadequate legal institutional structures. Therefore, in China's high local competition environment, firms with higher R&D intensity may suffer from imitative behaviour; hence, firms with higher R&D intensity may be unable to create effective innovativeness. According to RBV, firm technological capabilities, due to their commodity nature, are more easily imitated by competitors and lose value in a competitive market. Hence, we argue:

Hypothesis 5a: The relationship between R&D intensity and international innovation performance is mitigated when local competition is high.

On the other hand, returnee entrepreneurs, as firm intangible resources, are better able to cope with competitive behaviour in China. Returnees – those who acquire degrees from foreign countries or have foreign working experience – can serve as a channel of effective knowledge transfer for Chinese firms (Filatotchev *et al*, 2009). Specific know-how and knowledge gained from foreign experience may serve as a protective mechanism maintaining a firm's competitive position. Therefore, in a highly competitive market, returnees can provide a firm with a window of opportunity to identify market prospects and reduce dysfunctional competition, enabling the firm to utilise market knowledge and enhance innovation. Therefore, we propose:

Hypothesis 5b: The positive relationship between returnee entrepreneur and international innovation performance is enhanced when local competition is high.

METHODS

Sample

Firm-level data were derived from a World Bank firm-level survey covering the year 2000. The database contains detailed information of 998 manufacturing firms in China, randomly selected from five manufacturing sectors: apparel and leather goods (222 firms, 22.2 per cent), consumer goods (165, 16.5 per cent), electronic components (203, 20.3 per cent), electronic equipment (192, 19.2 per cent), and vehicles and vehicle parts (216, 21.7 per cent).

Variables

Dependent variables

There are various methods to measure innovation performance and debates recur over which measures it better (Coombs, 1996). As the focus of our research is to identify potential determinants and moderators of the international performance of new products, we employ the relevant information in the data-set and design a variable to proxy it, that is, the share of new product export in total export volume (denoted as *New Product Export Performance*). This variable is potentially more advantageous than an alternative, the share of new-product export in total sales, in two aspects. First, the latter can easily be highly correlated with a firm's export intensity, which makes testing against the role of export intensity unreliable. As shown below, the coefficient of correlation between the former variable and export intensity is only 0.164. Second, Chinese assembly manufacturing has long been relatively low on the international production ladder (Athukorala, 2009). By examining the share of new-product export in total export, we can acquire a better understanding of what factors can drive the upgrading of China's manufacturing exports.

Control variables

As the focus of this research is to examine the impact of internal factors and external factors on a firm's innovation performance, we also controlled for variables traditionally included in the innovation literature. *Age* measures how many years a firm has been in the market until 2000. *Firm Size* is measured by total employment. Research intensity is measured by *R&D Expenditure per head*, calculated by dividing total expenditure over the previous 3 years by average employment during that period.

Internal factors

We used a continuous variable, *Returnee Managers*, to measure the percentage of managers with an overseas education background in the total number of managers in the firm.

External factors

Collaboration with University is a dummy variable taking the value 1 if a firm has had a contractual or long-standing relationship with a local university in the past 3 years, and zero otherwise. *OEM Partnership* is also a binary variable equal to 1 for firms that are OEMs. An OEM manufactures products or components that are purchased, re-branded and marketed by another firm. A firm is labelled 'OEM' if it answered 'yes' to any one of the following three questions:

- (a) Does your plant produce parts, sub-assemblies or other inputs to production for a foreign firm?
- (b) Does your plant manufacture final products for a foreign firm?
- (c) Does your plant manufacture products to the specifications of a foreign firm?

Similarly, a new dummy variable, *Technological Partnership*, measures if a firm has established a technological partnership with any foreign firms. This variable takes the value of 1 if a firm answered 'yes' to one of the following two questions and zero otherwise:

- (a) Does your plant produce goods of your own design that are used as inputs in a foreign firm's production process?
- (b) Does your plant provide design services or engage in R&D for a foreign firm?

Finally, *Export Intensity* was introduced as a variable to measure the degree of internationalisation in a firm. It is calculated by the ratio of total exports to total sales.

A Tobit, instead of an ordinary least squares, model is adopted to examine the export performance of new products, as the former can accommodate a large portion (84.9 per cent) of zero observations in the dependent variable (*New Product Export Performance*).

ANALYSIS AND RESULTS

Table 1 reports descriptive statistics for the variables used in the analysis and matrix of correlation coefficients. Among the independent variables, the

Table 1: Descriptive statistics and correlation matrix of variables

	<i>Mean</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>
1. New product export performance	6.759	21.208	1									
2. Age	14.292	15.881	0.004	1								
3. Firm size (employment)	594.251	951.863	0.112 ^a	0.160 ^a	1							
4. R&D expenditure per head	19.249	91.774	0.057 ^b	-0.079 ^a	-0.142 ^a	1						
5. Local competition	0.287	0.334	-0.110 ^a	-0.071 ^b	-0.065 ^b	1						
6. Returnee Managers	0.079	0.203	0.105 ^a	-0.185 ^a	0.041	0.049 ^c	1					
7. Collaboration with University	0.153	0.360	0.102 ^a	0.054 ^b	0.225 ^a	0.161 ^a	-0.147	0.012	1			
8. Contract mfg./OEM partnership	0.478	0.500	0.245 ^a	-0.028	0.198 ^a	-0.035	-0.176	0.204 ^a	0.016	1		
9. Technological partnership	0.415	0.493	0.272 ^a	-0.079 ^a	0.194 ^a	0.087 ^a	-0.198	0.207 ^a	0.116 ^a	0.473 ^a	1	
10. Export intensity	0.235	0.377	0.164 ^a	-0.173 ^a	0.106 ^a	-0.064 ^b	-0.008	0.302 ^a	-0.158 ^a	0.484 ^a	0.240 ^a	1

^{a,b,c}Significant at 1, 5 and 10 per cent levels, respectively.

correlation coefficients between *Technological Partnership* and *Export Intensity* and between *Technological Partnership* and *OEM Partnership* are relatively high (0.484 and 0.473, respectively), with the rest of the correlation coefficients at lower levels.

Due to the presence of a large group of firms that do not export their new products, the average *New Product Export Performance* is only 6.8 per cent. However, if we remove those zero observations we get a much higher average among firms exporting new products – 44.9 per cent (not shown in Table 1). The average age of the firms is 14.3 years. The average size (594) is relatively large. In terms of competition from local rivals, about 28.7 per cent of a firm's competitors are local (the same city area). Managers with a foreign education background account for 7.9 per cent of total managers. 15.3 per cent of sample firms have had a contractual or long-standing relationship with a local university in the past 3 years. The percentage of firms that supply overseas companies as an OEM is 47.8, whereas 41.5 per cent provide innovative products for overseas companies. Finally, the average export intensity (export divided by total sales) is 23.5 per cent.

The results of formal tests of the hypotheses are shown in Table 2. Model 1 is the regression with control variables only. We report this so we can examine whether consecutive hierarchical inclusion of the main explanatory variables can contribute to explaining the variation of dependent variables.

As we can see from Table 2, the inclusion of the entrepreneurial variable *Returnee Managers* in model (2) results in an R^2 value increase of 0.010. This incremental R^2 is seemingly trivial, but with a significant F value (8.121), suggesting that the addition of *Returnee Managers* significantly improves the explanatory power of the regression model. However, the impact of returnee managers on international innovation performance is not significant. This finding rejects hypothesis H1b; we will discuss possible reasons for this in the next section. The inclusion of three external factors (that is, *Collaboration with Universities*, *OEM Partnership*, and *Technological Partnership*) and an internationalisation factor (that is, *Export Intensity*) improves the model significantly.

We noted that *R&D Expenditure per Head* is insignificant across all regression models, which does not support hypothesis H1a. This suggests that innovation input itself does not contribute to the export performance of a firm's new products. Exporting new products involves sunk costs incurred in market research, advertising, distribution and so on, which may deter entry into international markets and limit post-entry performance. But for an export-oriented firm that has already devoted substantial resources to exploring international markets, R&D expenditure could then have positive impact on the export performance of new products. This hypothesis is supported by the significantly positive coefficient of the interaction term of

Table 2: Innovation performance: results of hierarchical Regression analysis (Tobit models)

<i>Dependent variables</i>	<i>New product exports by total exports (continuous variable)</i>					
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
Firm age	-0.025 (0.279)	0.148 (0.279)	0.243 (0.273)	0.397 (0.265)	0.390 (0.261)	0.384 (0.257)
Firm size (employment)	0.009 (0.002)***	0.008 (0.002)***	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
R&D expenditure per head	0.031 (0.043)	0.025 (0.040)	0.037 (0.039)	0.048 (0.041)	-0.005 (0.035)	0.022 (0.037)
Local competition	-51.717 (15.394)***	-46.320 (15.454)***	-25.684 (14.812)*	-28.768 (15.442)*	-40.005 (17.016)**	-30.798 (16.292)*
Returnee Managers		0.608 (0.188)***	0.245 (0.177)	0.096 (0.177)	-0.152 (0.203)	-0.155 (0.202)
Collaboration with Universities			19.561 (9.550)**	29.777 (9.665)***	31.555 (9.438)***	33.330 (9.345)***
Contract manufacturing/OEM partnership			52.300 (9.087)***	39.245 (9.527)***	39.222 (9.446)***	33.330 (9.345)***
Technological partnership			44.825 (8.862)***	43.535 (8.699)***	42.362 (8.467)***	36.994 (9.173)***
Export intensity				50.999 (11.158)***	40.314 (11.315)***	43.305 (8.464)***
R&D expenditure per head × export intensity					0.759 (0.192)***	0.916 (0.186)***
						1.268

Table 2 continued

Dependent variables	New product exports by total exports (continuous variable)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Returnee Managers $\times$ Local competition					1.567 (0.734)***	1.553 (0.727)**
R&D expenditure per head $\times$ local competition						-0.384 (0.168)**
Constant	-81.979 (9.941)***	-87.548 (10.556)***	-137.326 (13.424)***	-142.596 (13.772)***	-135.692 (13.464)***	-135.258 (13.269)***
No. of observations	847	812	812	772	772	772
Industry dummies	Included	Included	Included	Included	Included	Included
R^2	0.003	0.013	0.107	0.111	0.147	0.151
Adjusted R^2	0.001	0.001	0.094	0.095	0.130	0.133
ΔR^2		0.010	0.094	0.004	0.036	0.004
F value of ΔR^2		8.121***	27.991***	3.421*	16.038***	3.58*

Note: (a) Standard errors in parentheses. (b) ***, **, * Significant at 1, 5 and 10 per cent levels, respectively.

R&D Expenditure per Head and *Export Intensity*. Another interaction term of *R&D Expenditure per Head* and *Local Competition*, however, has a negative coefficient. This contradicts hypothesis H5a, which suggests that if a firm faces overly strong competition from local rivals, too much innovation input will not generate immediate effects in terms of improving export performance, but only exhaust the firm's resource base and hamper its export capability. This finding echoes and extends prior research in an international context that argues that firm innovation performance may be inhibited and deterred in intensely competitive environments (Zheng Zhou, 2006).

The role of *Returnee Managers* turns out to be unclear when we extend Model 2 to Models 3 and 4. However, if we interact this variable with a market environment variable (*Local Competition*), we observe a significantly positive coefficient for the interaction term. The finding supports H5b, which suggests that returnee managers may be encouraged to exhibit stronger entrepreneurship in promoting the export of new products in adverse environments.

As we add further explanatory variables to the regression, the signs and significance of several variables' coefficients remain unchanged throughout, namely, *Local Competition*, *Collaboration with University*, *OEM Partnership*, *Technological Partnership* and *Export Intensity*. These results strongly support our theoretical hypotheses 2, 3 and 4. These findings confirm that external relationships play crucial roles in developing firm innovation performance into an export market for Chinese firms. In addition, the significant and positive relationship between export intensity and international innovation performance is consistent with studies highlighting the role of the degree of internationalisation in enhancing firm international innovation performance (De Brentani *et al*, 2010).

The variance inflation factors (VIF) for all coefficient estimates in Model 1 and 6 are far below the critical value 10, showing that multi-collinearity does not have any significant impact on the results, as suggested by Mason and Perreault (1991).

DISCUSSIONS AND IMPLICATIONS

This study investigates the effects of internal resources and capabilities, external networks and exporting activities on the international innovation performance of Chinese manufacturing firms. We also examine the impact of local competition on international innovation performance. Our results indicate that external networks, including contract manufacturing partnerships with foreign partners, R&D collaborations with foreign partners and collaborations with universities and research institutes, are positively associated with Chinese firms' innovation performance in international markets. The results

are largely in line with findings in the literature (for example, Belderbos *et al*, 2004). They are also consistent with the relational view and social capital perspectives, which argue that effective relational management strategies can drive firms' product diversity. Consistent with literature arguing that learning by exporting can be a key driver of firm innovation (Liu and Buck, 2007), our results also indicate export intensity has a strong and positive relationship with Chinese firms' international innovation performance. Moreover, the negative impact of local competition on international innovation performance, similar to the findings of Deng *et al* (2011), indicates that given the inadequate institutional infrastructure in China, local competition may hamper a firm's international innovation performance.

Unexpected findings relate to the weak effects of internal capabilities, including R&D intensity and returnees on international innovation performance. Contrary to RBV, which suggests that internal firm resources and capabilities are key drivers of innovation, our results do not support the direct link between internal capabilities and innovation performance. One plausible explanation is that both R&D intensity and returnees need to be complemented by other firm resources and capabilities in order to drive innovation. Technological capabilities or human resources alone may not suffice for firms to successfully implement new product strategies. This may be particularly true for transition economies, where institutional infrastructures lag behind western economies.

More importantly, our findings support the view that internal capabilities and local competition interactively influence Chinese firms' international innovation performance. Specifically, the results show that returnees can stimulate international innovation performance in a highly competitive environment. This finding is consistent with the dynamic capabilities view, which suggests that firm resources and capabilities are contingent on environmental dynamism. Human resources, specifically returnees, due to their nature of embodying knowledge transfer, are critical resources, particularly in transition economies where relatively under-developed governmental, legal and financial institutions may lead to environmental turbulence as well as dysfunctional competition (Li and Atuahene-Gima, 2001). Chinese firms with greater numbers of returnees can serve as an effective mechanism of knowledge-sharing, which helps firms to integrate internal and external resources and respond to rapid change and unpredictable contingencies (Fang and Zou, 2009).

By contrast, the finding shows that higher R&D intensity may be detrimental to international innovation performance in a highly competitive environment. This implies that local competition can drain R&D efforts. It seems that in view of the inadequate protection of intellectual property rights, firms' R&D efforts may be degraded by dysfunctional competitive activities – competitors engaging in opportunistic behaviour, violating patents and

copyrights, limit innovation performance in China. Therefore, it seems that R&D infrastructure may be a necessary, but insufficient, condition for developing successful product innovation strategy in China.

This study altogether contributes to knowledge of innovation strategies among Chinese firms. We have explored the importance of internal capabilities, external networks, export activities and competition on international innovation performance in China, combining the RBV, relational view and industrial organisation perspectives that have been considered central in the explanation of firm innovation and performance. The results of our study suggest that the RBV, relational view and industrial organisation perspectives need to be considered simultaneously and integrated to better account for firms' international innovation performance. The study also contributes to a better understanding of competitive environments on firm innovation. The results suggest that in China, existing institutional infrastructures are inadequate to support innovation, as local competition may hamper innovative efforts. Finally, this study contributes to the emerging view of the dynamic capability perspective, which highlights that traditional RBV needs to take rapid environmental change into account when interpreting the influence of resources and capabilities in achieving competitive advantage. The finding that returnees enhance international innovation performance significantly and strongly under a highly competitive market is consistent with the dynamic capability perspective. That is, a firm's unique proprietary resources, especially intangible assets such as employee skills, are more valuable to firm competitiveness when facing unpredictable and changing environment.

In terms of practical implications, this study helps managers understand international innovative activities in emerging countries where institutional infrastructures are not yet well developed. Developing an international innovation strategy is inherently risky and absorbs many resources from corporations. Our findings indicate that external relationships, including international OEM partners and partnerships with universities, enable firms to obtain better intentional innovation performance. Further, internal resources, particularly the returnee human resource, play a crucial role in opening windows of opportunity and sharing critical knowledge, which in turn can facilitate international innovation performance. Overall, our findings provide evidence for companies to formulate innovation strategies for the international market in China.

LIMITATIONS AND FUTURE RESEARCH

A major limitation comes from the data used. The research is based on survey data collected in 2000, since when the Chinese market has been reshuffled,

mainly due to its accession to the World Trade Organisation. One would need to take into consideration the latest changes in the Chinese market in attempting to interpret the findings in a contemporary context. In the more decentralised economy, more enterprises have been granted export licenses and the proportion of exporters in all enterprises increased to 32 per cent in 2006, according to the Annual Report of Industrial Enterprise Statistics compiled by the National Bureau of Statistics of China – far higher than the 6.8 per cent of our data-set. As exporting becomes easier and ‘Made in China’ products more widely accepted internationally, we would expect better international innovation performance from Chinese manufacturing firms.

Meanwhile, market competition has become more intense with the fast marketisation pace. According to China Statistical Yearbooks, state-controlled, foreign-invested and private enterprises respectively accounted for 47, 27 and 26 per cent of total manufacturing products in China in 2000; in 2008 these figures stood at 28, 31 and 41 per cent. The phenomenal expansion of the private and foreign sectors and the decline of state monopoly power in the economy would make the market environment less friendly to firms that do not possess sufficient financial and intellectual resources to pursue innovation. In such cases, the international innovation performance of Chinese manufacturing firms, especially small- and medium-sized firms, may not be as favourable as in our study, with its year-2000 data-set.

Apart from the observable differences between the Chinese economy of 2000 and today, very few of the economic and political factors have changed fundamentally and a mature, well-regulated market economy is still far from being established. For example, intellectual property rights protection, despite various government measures, remains an issue (United States Trade Representative, 2009). Without due legislative protection, it remains, 10 years after the current research, doubtful whether innovation activities can lead to better international innovation performance.

We believe our research findings obtained from this retrospective study remain largely applicable to innovation practices today; but research with more up-to-date data may reveal a different and more realistic picture. Alternatively, a focus on institutional changes would potentially hold promise in exploring the determinants of international innovation performance. One could also consider constructing an objective variable to measure the degree of competition in both domestic and export markets, say the Herfindahl-Hirschman Index, rather than the subjective measure of competition employed here.

The study has some other limitations. First, it only relies on cross-sectional data to examine drivers of innovation. The insignificant direct effect of R&D intensity and returnee might arise only because the impact of these two resources on firm innovation takes some time to materialise. Therefore, future

research should try to use panel data to examine their impact on international innovation performance. Second, we do not examine the interaction effect of internal resources and external network. Future research might try a simultaneous test of interaction effects on firm innovation. In addition, our research does not examine the conditions under which external networks can enhance firm innovation. As the dynamic capabilities perspective implies, external networks can have different influences on firm innovation under different environmental dynamics. Future research could take this into account. Finally, in terms of measurement, this study measures international innovation performance by share of new-product export in total export volume. This approach narrowly treats export as a main internationalisation strategy. However, with the increasing internationalisation of Chinese firms, broader international operations may now be undertaken. Accordingly, future studies may take a broader approach to measuring a firm's international innovation performance, such as opening windows of opportunity, time to market and financial outcomes (De Brentani *et al*, 2010).

Acknowledgements

An earlier version of this article was presented at the 26th Annual Conference of the Euro Asia Management Studies Association in October 2009. The authors are grateful for the helpful comments from two anonymous referees of *Asian Business & Management*. The research was supported by the Fundamental Research Funds for the Central Universities, and the Research Funds of Renmin University of China (10XNC003).

About the Authors

Ziliang Deng is an Assistant Professor of International Business at Renmin University of China, China. Prior to this, he was a Lecturer at Keele University, UK and received PhD from the University of Nottingham (2009). His recent research has focused on international knowledge transfer and spillover, and recent papers have appeared in *International Business Review*, *Global Economic Review* and *Issues & Studies*. He published a monograph with Routledge titled 'Foreign Direct Investment in China: Spillover Effects on Domestic Enterprises' in 2011.

Ruey-Jer (Bryan) Jean is an Assistant Professor of International Business at National Chengchi University, Taiwan. He received his PhD from Manchester Business School, UK, where he also worked as a post-doctoral research fellow.

His research focuses on inter-organisational relationship management, with particular focus on online and international contexts. His work has appeared in journals such as *Journal of International Business Studies*, *Management International Review*, *International Business Review*, *International Marketing Review* and *Journal of International Marketing*.

Rudolf R. Sinkovics is Professor of International Business at Manchester Business School, UK. He received his PhD from Vienna University of Economics and Business (WU), Austria, in 1998. He has published on inter-organisational governance, the role of ICT in firm internationalisation and research methods in international business. Recent work focuses on rising powers, emerging markets firms and drivers of economic change. His work has appeared in journals such as *Journal of International Business Studies*, *Management International Review*, *Journal of World Business*, *International Business Review* and *International Marketing Review*.

References

- Arrow, K.J. (1962) Economic welfare and the allocation of resources for invention. In: R. Nelson (ed.) *The Rate and Direction of Inventive Activity*. Princeton, NJ: Princeton University Press.
- Athukorala, P.-C. (2009) The rise of China and East Asian export performance: Is the crowding-out fear warranted? *World Economy* 32(2): 234–266.
- Atuahene-Gima, K. and Li, H. (2004) Strategic decision comprehensiveness and new product development outcomes in new technology ventures. *Academy of Management Journal* 47(4): 583–597.
- Aulakh, P.S. (2007) Editorial: Emerging multinationals from developing economies: Motivations, paths and performance. *Journal of International Management* 13(3): 235–240.
- Barney, J. (1991) Firm resources and sustained competitive advantage. *Journal of Management* 17(1): 99–120.
- Belderbos, R., Carree, M. and Lokshin, B. (2004) Cooperative R&D and firm performance. *Research Policy* 33(10): 1477–1492.
- Bhattacharya, M. and Bloch, H. (2004) Determinants of innovation. *Small Business Economics* 22(2): 155–162.
- Caloghirou, Y., Kastelli, I. and Tsakanikas, A. (2004) Internal capabilities and external knowledge sources: Complements or substitutes for innovative performance? *Technovation* 24(1): 29–39.
- Chang, S.J. and Xu, D. (2008) Spillovers and competition among foreign and local firms in China. *Strategic Management Journal* 29(5): 495–518.
- Clark, D. (2004) Maximising IP value in Asia. *Intellectual Asset Management Magazine*. October: 3–6.
- Coombs, R. (1996) Core competencies and the strategic management of R&D. *R&D Management* 26(4): 345–354.
- Davis, L.N. and Meyer, K.E. (2004) Subsidiary research and development, and the local environment. *International Business Review* 13(3): 359–382.

- De Brentani, U., Kleinschmidt, E.J. and Salomo, S. (2010) Success in global new product development: Impact of strategy and the behavioural environment of the firm. *Journal of Product Innovation Management* 27(2): 143–160.
- Del Canto, J.G. and de la Fuente, J.M. (2003) Internal factors determining a firm's innovative behaviour. *Research Policy* 32(5): 715–736.
- Del Canto, J.G. and González, I.S. (1999) A resource-based analysis of factors determining a firm's R&D activities. *Research Policy* 28(8): 891–905.
- Deng, Z., Hofman, P. and Newman, A. (2011) Determinants of product innovation in Chinese small and medium-sized enterprises. Working paper, Renmin University of China.
- Dyer, J.H. and Singh, H. (1998) The relational view: Cooperative strategy and sources of inter-organisational competitive advantage. *Academy of Management Review* 23(4): 660–679.
- Eisenhardt, K.M. and Martin, J.A. (2000) Dynamic capabilities: What are they? *Strategic Management Journal* 21(10–11): 1105–1121.
- Eun, J.-H., Lee, K. and Wu, G. (2006) Explaining the 'university-run enterprises' in China: A theoretical framework for university-industry relationship in developing countries and its application to China. *Research Policy* 35(9): 1329–1346.
- Fang, E.E. and Zou, S. (2009) Antecedents and consequences of marketing dynamic capabilities in international joint ventures. *Journal of International Business Studies* 40(5): 742–761.
- Filatovchev, I., Liu, X., Buck, T. and Wright, M. (2009) The export orientation and export performance of high-technology SMEs in emerging markets: The effects of knowledge transfer by returnee entrepreneurs. *Journal of International Business Studies* 40(6): 1005–1021.
- Giroud, A. (2007) MNEs' vertical linkages: The experience of Vietnam after Malaysia. *International Business Review* 16(2): 159–176.
- Greenhalgh, C. and Rogers, M. (2006) The value of innovation: The interaction of competition, R&D and IP. *Research Policy* 35(4): 562–580.
- Guan, J. and Ma, N. (2003) Innovative capability and export performance of Chinese firms. *Technovation* 23(9): 737–747.
- Guan, J.C., Yam, R.C.M., Tang, E.P.Y. and Lau, A.K.W. (2009) Innovation strategy and performance during economic transition: Evidences in Beijing. *Research Policy* 38(5): 802–812.
- Hanel, P. (2006) Intellectual property rights business management practices: A survey of the literature. *Technovation* 26(8): 895–931.
- Hsu, C.-W. and Chiang, H.-C. (2001) The government strategy for the upgrading of industrial technology in Taiwan. *Technovation* 21(2): 123–132.
- Huang, Y. (2008) *Capitalism with Chinese Characteristics: Entrepreneurship and the State*. Cambridge: Cambridge University Press.
- Inkpen, A.C. and Tsang, E.W.K. (2005) Social capital, networks and knowledge transfer. *Academy of Management Review* 30(1): 146–165.
- Jap, S.D. (1999) Pie-expansion efforts: Collaboration processes in buyer-supplier relationships. *Journal of Marketing Research* 36(4): 461–475.
- Jean, R.-J.B. and Sinkovics, R.R. (2010) The role of virtual integration, commitment and knowledge-sharing in improving international supplier responsiveness. In: P. Dimitratos and M.V. Jones (eds.) *Resources, Efficiency and Globalisation*, Vol. 17. Basingstoke, UK: Palgrave MacMillan, pp. 27–43.
- Jean, R.-J.B., Sinkovics, R.R. and Cavusgil, S.T. (2010a) Enhancing international customer-supplier relationships through IT resources: A study of Taiwanese electronics suppliers. *Journal of International Business Studies* 41(7): 1218–1239.
- Jean, R.-J.B., Sinkovics, R.R. and Kim, D. (2008) Information technology and organisational performance within international business-to-business relationships. *International Marketing Review* 25(5): 563–583.

- Jean, R.-J.B., Sinkovics, R.R. and Kim, D. (2010b) Drivers and performance outcomes of relationship learning for suppliers in cross-border customer-supplier relationships: The role of communication culture. *Journal of International Marketing* 18(1): 63–85.
- Jin, Z. (2004) China becomes global 'brain'. *China Daily*, 4 April 2004, http://www.chinadaily.com.cn/english/doc/2004-04/13/content_322876.htm, accessed 29 October 2011.
- Jindra, B., Giroud, A. and Scott-Kennel, J. (2009) Subsidiary roles, vertical linkages and economic development: Lessons from transition economies. *Journal of World Business* 44(2): 167–179.
- Lee, C., Lee, K. and Pennings, J.M. (2001) Internal capabilities, external networks and performance: A study on technology-based ventures. *Strategic Management Journal* 22(6–7): 615–640.
- Li, H. and Atuahene-Gima, K. (1999) Marketing's influence and new product performance in Chinese firms. *Journal of International Marketing* 7(1): 34–56.
- Li, H. and Atuahene-Gima, K. (2001) Product innovation strategy and the performance of new technology ventures in China. *Academy of Management Journal* 44(6): 1123–1134.
- Liu, X. and Buck, T. (2007) Innovation performance and channels for international technology spillovers: Evidence from Chinese high-tech industries. *Research Policy* 36(3): 355–366.
- Mason, C.H. and Perreault, W.D.J. (1991) Collinearity, power and interpretation of multiple regression analysis. *Journal of Marketing Research* 28(3): 268–280.
- Nahapiet, J. and Ghoshal, S. (1998) Social capital, intellectual capital and organisational advantage. *Academy of Management Review* 23(2): 242–266.
- Porter, M.E. (1979) How competitive forces shape strategy. *Harvard Business Review* 57(2): 137–147.
- Porter, M.E. (1981) The contributions of industrial organisation to strategic management. *Academy of Management* 6(4): 609–620.
- Porter, M.E. (2008) The five competitive forces that shape strategy. *Harvard Business Review* 86(1): 78–93.
- Prasad, E.S. and Rajan, R.G. (2006) Modernizing China's growth paradigm. *American Economic Review* 96(2): 331–336.
- Robins, F. (2010) China: A new kind of 'mixed' economy? *Asian Business & Management* 9(1): 23–46.
- Roper, S. and Love, J.H. (2002) Innovation and export performance: Evidence from UK and German manufacturing plants. *Research Policy* 31(7): 1087–1102.
- Sinkovics, R.R., Hiebaum, T. and Clark, D. (2009) Die wirtschaftskrise und intellectual property im China – perspektiven aus der kfz-zulieferindustrie. In: T. Specker and F. Xiao (eds.) *Tongji-CDHAW: Theorie und praxis chinesisches-deutscher kooperationsprojekte*. Shanghai, China: CDHAW Chinsisch-Deutsche Hochschule für Angewandte Wissenschaften der Tongji-Universität, pp. 104–112.
- Sturgeon, T., Van Biesebroeck, J. and Gereffi, G. (2008) Value chains, networks and clusters: Reframing the global automotive industry. *Journal of Economic Geography* 8(3): 297–321.
- Swike, E., Thompson, S. and Vasquez, C. (2008) Piracy in China. *Business Horizons* 51(6): 493–500.
- Tang, J. (2006) Competition and innovation behaviour. *Research Policy* 35(1): 68–82.
- Teece, D.J., Pisano, G. and Shuen, A. (1997) Dynamic capabilities and strategic management. *Strategic Management Journal* 18(7): 509–533.
- Tsai, K.-H. (2009) Collaborative networks and product innovation performance: Toward a contingency perspective. *Research Policy* 38(5): 765–778.
- United States Trade Representative. (2009) *2009 Report to Congress on China's WTO Compliance*. Washington DC: United States Trade Representative.

- Vega-Jurado, J., Gutierrez-Gracia, A., Fernandez-de-Lucio, I. and Manjarres-Henriquez, L. (2008) The effect of external and internal factors on firms' product innovation. *Research Policy* 37(4): 616–632.
- Wei, Y.S. and Morgan, N.A. (2004) Supportiveness of organisational climate, market orientation and new-product performance in Chinese firms. *Journal of Product Innovation Management* 21(6): 375–388.
- Zheng Zhou, K. (2006) Innovation, imitation and new-product performance: The case of China. *Industrial Marketing Management* 35(3): 394–402.