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How does TMT attention to innovation of Chinese firms influence firm innovation activities? A study on the moderating role of corporate governance[☆]

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ABSTRACT

Drawing on upper echelon theory, this study examines how TMT attention to innovation (TMTAI) influences a firm's innovation activities in China. We predict that the impact of executive attention to innovation on firm innovation activities is moderated by the characteristics of corporate governance. We develop and test hypotheses derived from the prediction using 1747 firm-year observations collected from 394 Chinese manufacturing companies over 6 years between 2006 and 2011. The results show that TMTAI is positively associated with a firm's patent application, and that the positive relationship is stronger when a firm is a private enterprise, has a large board, or has few independent directors.

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1. Introduction

Top managers are believed to make a huge difference in influencing the path and outcomes of firm innovation, through means such as building and managing an innovative culture, nurturing an innovative environment, championing innovations and designing pro-innovation policies (Chatman & Cha, 2003; Frambach & Schillewaert, 2002). For instance, Wu, Levitas, and Priem (2005) demonstrate that executive tenure is related to a company's patent approvals.

While top managers may exert a variation of impact on their companies across developed countries (Crossland & Hambrick, 2007, 2011), studies on how corporate executives in emerging markets such as China influence firm innovation are rare (e.g., Chen, Tjosvold, & Liu, 2006; Tan, 2001). Further, no research has examined the effect of executive attention and innovation (Yang, Liu, Gao, & Li, 2012). Such a missing is really surprising given that one objective of the Chinese government is to introduce market-based transactional system so as to espouse innovation (Yang et al., 2012).

While managing innovation is primarily centered on management attention (Van de Ven, 1986), top managers of different companies may allocate their resources and attention to different areas (Hambrick,

Finkelstein, & Mooney, 2005; Mintzberg, 1973). Because top managers often have limited attentional resources (Dutton & Ashford, 1993), they need to direct their attention to the most crucial strategy initiatives (Kaplan, 2008). Only recently how TMT attention influences firm innovation has gained momentum (Kaplan, 2011). For instance, TMT attention on innovation has been found to be positively associated with the number of patents granted (Kaplan, 2008), entrepreneurial orientation (Cho & Hambrick, 2006), and innovative actions (Yadav, Probhu & Chandy, 2007). However, some managers may be constrained by external and internal forces and therefore tend to follow the old scheme while other executives may heed to changes and be innovative (Kaplan, 2008). The situation may be exacerbated in countries with dynamic institutional environments such as China where significant transitions and tremendous changes have happened over the past decades. The environmental dynamism in China has created institutional heterogeneity that can both limit or enhance the influence of top management team's attention to innovation (TMTAI). Therefore, it is interesting to research if the attention–innovation relationship exists in China.

Furthermore, we study the contingency role of corporate governance on the attention–innovation relationship. Scholars have argued that even though top managers matter to a company's innovative strategies and outcomes (Thomas, 1988; Wu et al., 2005), they manage with constraints that often result from managerial characteristics, internal forces and task environment (Boyd & Gove, 2006). Very few studies have made the connection between top managers and company's innovation of Chinese companies. For example, Chen et al. (2006) find that leaders' values are positively related to innovation. However, such studies fail to consider those important factors of contingency (Yang et al., 2012).

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None of studies address the moderating role of constraints on TMT attention.

Constraints are embedded in contexts in that emerging economies such as China can be quite different than those developed economies in various aspects including culture, political and economic systems (Tan, 2001). Chinese companies may be subject to different levels of controls originated from task environment and government agencies. For instance, government bureaucracies may provide little legal protection on infringement of innovation, which may hinder a firm's innovative endeavor (Tan, 2001). Government agencies may also intervene a company's decision making through corporate governance like board composition (Cheung, Jiang, Limpaphayom, & Lu, 2010), leaving corporate governance structure "a contentious issue" in the transition to a market-based economy (Cheung et al., 2010, p98). Some unique corporate governance mechanisms such as the two-tier board structure designed to enhance a company's smooth strategy implementation and performance may instead impede a company's innovative outcomes by distracting top managers' attention to crucial innovative initiatives (Cheung et al., 2010; Sonnefeld, 2002; Xiao, Tylecote, & Liu, 2013). Through examining the moderating effect of corporate governance in China, we enrich executive attention research in that we establish the boundary of when TMTAI may be more effective in enhancing innovative activities.

We target at three contributions to the literature with the current research. First, our study builds on the executive attention research and extends the stream of research to research companies in China, an emerging economy (Kaplan, 2011). Second, our paper considers not only the relationship between attention and innovative outcomes, but also the contingency effect of corporate governance mechanism on innovations. Such research sets boundary for attention–innovation theory and helps build new theory (Colquitt & Zapata-Phelan, 2007). Third, the very few works that examine top managers and innovations conduct survey research defining innovations as innovativeness (Chen et al., 2006; Tan, 2001). Our dependent variable measures innovative activities as patent applications that can invite duplication studies.

2. Literature review

2.1. TMT attention to innovation (TMTAI) research

Management scholars have long recognized that attention is a limited cognitive resource (Dutton & Ashford, 1993; Parasuraman, 1998). It is believed that job demand of top managers is rather complex and challenging so the scarcity of cognitive resources is fully exposed, resulting in information overload for the job of top management (Hambrick et al., 2005; Mintzberg, 1973). Given the nature of their job demand, top managers are believed to resort to previous routines, the process of linking raw data to pre-existing schemas and world views stored in their memories, to reduce cognitive stress and increase efficiency in information processing (Simon, 1947; Van de Ven, 1986).

Kaplan and her colleagues (Kaplan, 2008; Kaplan, Murray, & Henderson, 2003) show that CEOs' attentional focus on new technologies affects the patent granted – a measure of innovation – to firms over a period of twenty years in high tech industries (biotechnologies and optical technologies). In a study of airlines after industry deregulation, Cho and Hambrick (2006) report that airlines companies with top managers paying more attention to entrepreneurial issues are more likely to undertake entrepreneurial actions such as entering new routes of flights. Yadav et al. (2007) show that CEOs focusing their attention on future events and on external issues in banking industries lead to active adoption of Internet-based technologies and services in their banks. According to Nadkarni and Narayanan (2007), complex schemas enable managers to develop a comprehensive awareness of new opportunities and hence to develop new resources and to change their competitive posture quickly by promoting better inference of continuously shifting competitor moves. Recently, Li, Maggitti, Smith, Telsluk, and Katila (2013) report that diversity in terrain sources

searched by TMTs in 61 publicly listed high-tech companies enables new product innovation in their organizations. Furthermore, it has been found that the intensity of search for innovation stimuli by top managers moderates the relationship between the diversity of search and the distance of search terrain.

As the above brief review of past literature suggests, TMT attention literature is still small and evolving. There has not been much evidence showing a direct influence of TMT attention on firm innovation (Kaplan et al., 2003). Furthermore, how attention works together with other possible influences of firm innovation has been under-investigated.

2.2. Corporate governance in China

The influences of TMTAI on the innovation activities of firms may be attenuated by the constraints that limit firm innovation actions prompted by TMTAI. Past literature on innovation and change suggests that in the environment of China, corporate governance may be a force that affects TMTAI on firm innovation (Cheung et al., 2010; Yang, Chi, & Young, 2011). Corporate governance can be classified into internal and external (Yang et al., 2011). Our research studies only internal governance because it often exerts direct and strong influence on company's strategies and performance.

Internal governance mechanism governs a company through ownership, board of director composition, CEO duality and compensation and various committees (Cheung et al., 2010). Internal corporate governance in Chinese companies has a few unique attributes that make the effect of corporate governance more evident. First, many companies are still owned and controlled by the state or central governments. By the end of 2009, about half of the publically listed companies were owned by governments (Yang et al., 2011) and many of them had local or state government as the major shareholders (Liu, 2006). Second, a publically listed firm is required to maintain certain proportion of outside directors on the board. This requirement may affect the power distribution among board members and between board and top management teams. Third, a firm may also maintain a supervisory board whose chairman is often the secretary of communist party in the organization and has power to influence firm policies such as human resources policies. As a result, the CEO–Chairman duality in state-owned firms may play a more important role in affecting the discretion of top management teams and subsequently a firm's behavior and strategy (Yang et al., 2011). Next, we develop hypotheses on the effect of these unique governance features in China.

3. Theoretical development

3.1. TMTAI and firm innovation

Based on the conceptualization of attention and attentional orientation in previous literature (Cho & Hambrick, 2006; Ocasio, 1997), we define the central construct of this study, TMTAI, as *the degree of attention that TMT of a firm pays to innovation stimuli*. The greater the TMTAI, the more attention a TMT will give to innovation related issues, which generally include, but not limited to, the generation and exchange of new ideas and knowledge, training, process of new product development and patent filing and protection, etc.

Innovation and TMT literature suggest that TMTAI may influence firm innovation activities in several ways. First, TMTAI directly affects firm policies on innovation and resources commitment to innovation. Managers paying more attention to innovation are more likely to develop policies and procedures to stimulate and institutionalize innovation practices, because their selective attention to innovation simply reflects manager's belief in innovation (Ocasio, 1997).

Second, innovation stimuli captivating attention of top managers would be the salient and abnormal issues captured by executive attention, which addresses frame violating stimuli perceived by a manager. These stimuli's novelty will prompt managers to rethink their firms'

situation, and push them to make correspondent changes or launch innovation. As a result, managers casting executive attention to capture novel innovation stimuli are more likely to commit resources, efforts and authorities to innovation (Peeters & Potterie, 2006).

Third, TMTs attention affects the overall sense making and attention of their organization through communication and through substantive and symbolic actions favoring or disfavoring innovation (Ocasio, 1997; Thomas, 1988). Siguaw, Simpson, and Enz (2006) argue that in firms whose TMTs are more innovation oriented, the culture of firms will be more entrepreneurial and customer oriented. Miron, Erez, and Nave (2004) report that individuals show their highest level of creativity when their companies build an organizational culture that encourages them to innovate. In addition, it will be easy to implement changes and innovation in organizations with cultures based on open system value (Zammuto & O'Connor, 1992).

Hypothesis 1. Other things being equal, TMTAI has a positive influence on firm innovation.

3.2. Moderating role of corporate governance in China

3.2.1. State ownership

State owned enterprises (SOEs) are unique because they are owned partly by not pure rent seeking investors who care more about returns (Li & Tang, 2010). In many occasions, government also uses SOEs to ensure the implementation of national policies to achieve long-term macro-economic goals, like those contained in their Five Year economic development plan, and to pursue collective social goals such as stability and *XiaoKang shehui* (moderately prosperous society) (Lin, 2011).

In general, managers in firms with state-ownership often behave conservatively to avoid the uncertainties in the outcomes of innovation that may jeopardize their career as state agencies or even their political lives (Clarke, 2003; Nee, Oppen & Wong, 2007). As TMT pass on their attention of innovation toward stakeholders, state representatives may alter the attention intentionally to keep the organization stay in course with government's objectives. The attention of TMT given to innovation will be harder to convert into activities of innovation in SOEs because of the intervention of state guardian.

In contrast, the discretion for managers in private firms is broader than that of their state-owned counterparts. Managing for owners with predominate interests in wealth growth, top managers of private firms are directly responsible for the outcomes of their own operation (Li & Tang, 2010). Their behaviors would be more market-oriented and self-interest driven, instead of being politically directed and publically driven. As a result, their attention to innovation would have a greater impact on the innovation activities undertaken by their firms.

Various studies have found that compensations of top managers in SOEs are not as strongly related to firm performance as they are in private firms (Firth, Fung, & Rui, 2007; Kato & Long, 2006). This seems to suggest that top managers in SOEs are less motivated to take risks to improve the performance of their firms. Their attention to innovation will motivate less intrinsic interests and efforts in investing in innovation.

Hypothesis 2. Other things being equal, the positive influence of TMTAI on firm innovation activities will be stronger in non-state owned firms than it is in state-owned firms.

The impact of TMTAI on firm innovation outcomes is also likely to be limited by the vigilance of monitoring behaviors of board of directors, who oversee the decisions and behaviors of top managers and to prevent agency problems like moral hazard, adverse selection, and hold-up (Jensen & Meckling, 1976; Liang, Wu, & Jung, 2009). To the extent that the effectiveness of board varies across firms, attention of TMTs is more likely to convert to actions under less effective board. Literature on the governance of firms by the board of directors has identified a few

compositional and contextual features of the board that disclose the effectiveness of board in monitoring the behaviors of top managers, including board size, board independence, and TMT power through CEO-Chair duality (Jensen, 1993; Lipton & Lorsch, 1992; Sonnefeld, 2002).

3.2.2. Board size

Lipton and Lorsch (1992) and Jensen (1993) argue that large boards can be costly because larger boards increase operational complexity. As board size increases, agency problems in the boardroom increase simultaneously, therefore leading to more director free-riding problems and internal conflicts among directors. Eisenberg, Sundgren, and Wells (1998) contend that when board size increases, coordination and communication problems become more widespread, causing greater problems in board functioning. Using data of Finnish medium-sized and small companies, Eisenberg et al. (1998) draw a similar conclusion: Too many directors have negative influence on its effectiveness of control over and alignment with top management.

In the case of Chinese companies, the board is generally expanded to include members with political connection. These boards members do not have professional expertise and experiences, and are "more of a decorative division than an effective committee" (Yang et al., 2011, p20). The larger the board of directors is in Chinese companies, the more likely non-professionals are sitting on the boards. When a board lacks in-depth business experiences, they are likely to accept and be in agreement with the information provided by TMTs. Such a tendency further weakens the large board's ability to monitor the cognitive influences of top managers. As such, TMTAI will be more likely to leave mark on firm innovation when a company has a large board. Conversely, when a TMT is monitored by a small board, board members examine more closely the decisions made by the TMT. Risky investment such as those into innovation initiatives are more likely to be challenged by smaller boards.

Hypothesis 3. Other things being equal, the larger the board of directors, the stronger the positive influence of TMTAI on firm innovation activities.

3.2.3. Board independence

The extent a TMT's judgment can be converted into firm action is essentially determined by a power play between the TMT and its monitoring board. The legitimacy of board power might be significantly neutralized when a board cannot stay independent from the top manager's (Westphal & Zajac, 1995). The more independent a board is, the more likely that perception and attention of TMTs resulting in risky moves such as innovation will be sufficiently examined.

Independent directors who do not hold managerial positions in the firm where they serve, give out clue about the distribution of power as to controlling over the decision making of the board and the alignment of interests between managers and owners (Jaskiewicz & Klein, 2007; Liang, Liu, Wu, & Zhang, 2012). However, the literature in this area is unclear as to the directions that independent directors will push the firms to go using their vigilance regarding innovations. Some argue that independent directors are short-term gain seekers who tend to emphasize financial control and have a myopic viewpoint of firm innovation. If independent directors are viewed as short-term benefit seekers, they will be unlikely to appreciate and be able to comprehend the innovation issues attended by top managers.

However, other researchers argue that independent directors, especially delegates from institutions, look for long term gains and may seek out investment in firms that are inherently more innovative (Jensen, 1993). Shareholders taking a long term view of business will encourage attention to innovation and change and are receptive to ideas of change and innovation. Therefore, from an agency perspective, the impact of TMTAI on firm innovation is likely to be strengthened with the existence of independent directors.

Empirical evidence has offered more support for the first, myopic view of outsider control. Hill and Snell (1988) have shown that firms

spend less on R&D as independent director representation increases (Hill & Snell, 1988). A meta-analysis by Deutsch (2005) also reports that outsiders on the board and R&D expenditures are negatively associated. Given the empirical evidence, we predict that board independence will negatively moderate the relationship between TMTAI and firm innovation, which is essentially uncertain and risky.

Hypothesis 4. Other things being equal, the positive influence of TMTAI on firm innovation will become weaker as the independence of board increases

3.2.4. CEO duality

Chair-CEO duality means that the chairman of board and the CEO are held by the same individual (Rechner & Dalton, 1991). Such duality is believed to be another determining factor of board monitoring vigilance on top management (Young, Stedham, & Beekun, 2000) and hence could be another moderating mechanism of TMTAI – firm innovation connection. Dual appointment often increases the chance that TMTs' perception and attention will be more influential on firm activities. Duality consolidates power and creates unity between two groups of top decision makers in organizations. It is easier to push a top management team's decision through the board when CEO is also in charge of the board. Top managers can sell their attention and innovation agenda easily to the board. As a result, the relationship between TMTAI and firm innovation will be more evident in the presence of CEO duality. Tuggle, Sirmon, Reutzel, and Bierman (2010) discover that in the presence of CEO duality, board attention to monitoring decreases based on the transcript of board meetings in 178 publically listed firms. They attribute such decrease to the control of CEO-chair on agenda and location during board meetings. Li and Tang (2010) also report that CEO-chair duality enhances the influence of CEO hubris on firm risk taking, suggesting that CEO-chair duality decreases monitoring vigilance of board.

Hypothesis 5. Other things being equal, Chairman-CEO duality positively moderates the relationship between TMTAI and firm innovation activities.

4. Methods

4.1. Sample

We extracted our sample from the manufacturing companies actively listed on Shanghai Stock Exchange Market from 2006 to 2011. We selected those years because data before 2006 were not so reliable because the non-tradable share reform was implemented in 2005 (Yang et al., 2011). Our final sample consists of 394 companies, with 1747 company-year observations after cases with missing data are deleted. These companies represented about half of the companies publically listed in Shanghai Stock Exchange. They were located in eight industries, ranging from food processing to consumer electronics. About one third of firms carried state investment. On average, firms in our sample had been publically listed for over 9 years.

4.2. Measurement of variables

4.2.1. Dependent variable-innovation activities

We used the number of patent applications as the measure of innovation (Yang & Kuo, 2008). Compared with other popular measures of firm innovation (e.g. R&D expenses and the number of patent granted) the number of patent application represents a broader scope of efforts devoted by firms to innovation. In addition, patent applications indicate more of managerial activities while patent approvals can be the results of managerial efforts and it can also result from governmental regulations (Wu et al., 2005). Since our focus in this research is innovation

initiatives that the managers pursue, patent applications deem to be more proper than number of patents granted.

We obtained the data from the official website of State Intellectual Property Office of the People's Republic of China. We counted patent applications filed by a firm each year over a five-year period from 2007 to 2011. We then matched that with the independent variables, attention to innovation and corporate governance, and other control variables (detailed below), which were collected for the period from 2006 to 2010. This way, our dependent variable is modeled one year after the independent variables. This one year lag allows enough time for TMTAI to be manifested by their firms' innovation strategies (Ahuja, 2000).

4.2.2. Independent variables-TMTAI

Like previous studies (e.g. McClelland, Liang and Barker, 2010), we adopted archive-based approach to reconstructing TMTAI in our sample by counting words that manifest innovations in firm annual reports to shareholders. Some researchers have argued annual reports are often the works of public relationship department rather than the reflection of senior managers, questioning the connection of content of annual reports and cognition of top managers (Fiss & Zajac, 2006). Several studies conducted in response to this criticism have confirmed such a connection (Fiol, 1995; Huff & Schwenk, 1990; Kaplan et al., 2003). We calculated TMTAI as the ratio between innovation-related words in firm annual reports and total words contained in those reports.

Since we studied Chinese companies and the letters to shareholders are in Chinese, what key words to include presented as a challenge. Chinese words are rather unique compared with English words. Unlike English where words of similar meaning share 'roots', such as 'tech' in technology and technological, Chinese word like 'jishu'(technology) rarely have words of derivative. In addition, there are much fewer words in Chinese, making the dictionary development for content analysis much easier. Six key innovation related words make the dictionary of word search for content analysis: zhishichanquan (intellectual property), zizhuchuangxin (indigenous innovation), zhuanlibaohu (patent protection), zhuanliqinquan (patent infringement), jishuchuangxin (technology innovation) and hexinjishu (core technology).

Using text analysis, we searched for the above key words in companies' annual reports from 2006 to 2010 and allow for one year lag in building causal relationship. In total, we examined close to 1 million characters using Chinese word processing software.

We calculate the TMTAI of firm i in year t as follow,

$$TMTAI_{it} = \frac{\sum W_{itj}}{AW_{it}}$$

Where W_{itj} is the frequency of j th innovation key word appeared in year t of firm i 's annual report. AW_{it} is the total number of words contained in the annual report of firm i in year t .

4.2.3. Moderating variables

State ownership was coded as dichotomously, with 1 indicating state ownership and 0 suggesting otherwise. Board size is simply the number of board members. Board independence is the proportion of independent directors (Directors who assumed no top management positions in the firms they oversaw). We judged duality based on the titles of officers listed in the annual reports and coded duality as a dichotomous variable (1 if a CEO was also the chair of board and 0 if the person was not). Interaction terms were standardized to prevent the issue of multicollinearity. We obtained the above data from China Stock Market and Accounting Research (CSMAR) database which had been empirically validated (e.g. Bai, Liu, Lu, Song, & Zhang, 2004).

4.2.4. Control variables

We controlled for two indicators of firm inertia, firm age and size. Firm age was measured as the number of years since the firms initially went public. Firm size was measured as the natural log of total assets. Debt

ratio and firm performance (measured as ROE) were also controlled for. We coded the industry control with high-tech industries as 1, including biotechnologies and information technology industry and low technology industries as 0, including all other industries. We also created control variable of economic condition as 1 for before 2008 and 0 for 2008 and after.

5. Results

Table 1 presents descriptive statistics and correlation coefficients among the variables. Table 2 reports the Poisson regression estimates of TMTAI's impact on patent application. We ran fixed-effects Poisson regressions by assuming that individual effects are correlated with our dependent variables (i.e. cognition). Model 1 in Table 2 includes all the control variables and moderators. Model 2 in Table 2 tests the main effect of the TMTAI on patent application. The coefficient of TMTAI variable is positive and significant ($p < .001$). Thus, Hypothesis 1 is supported. The stronger the TMT's attention to innovation, the greater the number of firm patent applications they will file. We entered the four moderators in Models 3, 4, 5, and 6 respectively to test Hypotheses 2, 3, 4 and 5. Model 3 examines the effect of interaction between TMTAI and state ownership. The coefficient of interaction term is found to be negative and significant ($p < .001$). Hence, Hypothesis 2 is supported. This suggests that state owned companies do file fewer patent applications than those in private sectors. Model 4 shows the coefficient of interactive term between board size and managerial cognition to be positive and significant ($p < .001$). Therefore, Hypothesis 3 receives supports. That is, big board and managerial attention to innovation yield the most patent applications. Model 5 examines the effects of interaction between TMTAI and the proportion of independent directors. The coefficient of interaction term is found to be negative and significant ($p < .001$). Hence, Hypothesis 4 is supported. Model 6 evaluates the effect of the interaction between TMTAI and chair-CEO duality on innovation. The coefficient is not significant, though positive in the expected direction. Model 7 includes all the variables to evaluate the possibility of multi-collinearity among interaction terms. The results show consistent findings with those presented in Models 3 to 6.

To visualize the patterns of the significant interaction effects that we found, we plotted the interactions (in Figs. 1–4) to show the moderating effects of the four governance variables. We followed Aiken and West's approach (1991) by plotting one standard deviation below and above the mean as low and high levels of the independent variable, TMTAI. Fig. 1 shows that the slope is much steeper when the firm isn't state-owned enterprises (SOEs). In other words, as TMTAI increases from one standard deviation below the mean to one standard deviation above, the number of patent applications increases significantly faster when a firm is privately owned than when a firm is state owned. Figs. 2 and 3 depict the moderating effect of board size and Board independence respectively.

6. Discussion

Recently research on how TMT attention influences firm innovation has seen a rise (Kaplan, 2011). However, such research suffers two weaknesses. First, all studies on the topic were conducted in developed countries and hence the question if such research can be generalizable to emerging countries. The answer is a resounding yes. Our first finding of direct impact of TMTAI on firm innovation lends further support for Van de Van's insight that attention is a limited cognitive resource of strategists and should be managed effectively to stimulate innovation in firms. The more this resource of attention is directed to innovation, rather than to other competing stimuli such as organizational politics and compensation, the more likely the firm will be more innovative. Without sufficient attention given to innovation matters, strategic judgment related to innovation would not be developed in a timely and appropriate fashion, causing the influence of top managers on their firms' future into question. Thus, the significant and persistent direct impact of TMTAI on firm patent filing in our study puts theoretical prediction that top managers influence firm performance through attention, or cognition in general, on a more solid stand (Hambrick & Mason, 1984). The external validity of the impact of TMTAI on firm innovation is confirmed when our research is examined together with the report from Kaplan and her colleagues (Kaplan et al., 2003).

Second, attention research has mainly focused on establishing relationship between attention and innovation without considering the effect of corporate governance (Kaplan, 2011). Given that innovation is a risky process (Li & Tang, 2010) and that managers are subject to constraints (Hambrick & Finkelstein, 1987), how corporate governance can limit or enhance top managers' attention to innovation deems to be important. Our study demonstrates that corporate governance mechanism modifies the relationship between TMTAI and firm innovation, albeit in more complicated ways that seem to reflect the nature of theories in this area. Agency theory especially argues that concerns for agency problems generally make a board monitor the behaviors of TMTs more effectively (Fama & Jensen, 1983). However, literature on agency theory is unclear as to which direction the effective monitoring of board will guide TMTs toward with respect to the pursuit of risk. If the board is presumably risk-averse, it would negate a tendency of firms to pour resources into risk taking actions such as innovation. On the other hand, if the board is risk-taking, as traditional agency theory argues for institutional owners, it would push for more innovation so that firms can pursue long-term goals. Our results show that state ownership inhibits the innovative behaviors of firms through limiting the transfer of TMTAI to action. Hence, our finding is consistent with the view that the state government tries to exercise their ownership control of firms to pursue social and political objectives such as employment by reducing the risk-taking behaviors of TMTs and firms (Li & Tang, 2010).

Table 1
Descriptive statistics and correlations.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Patent application	27.425	83.547	1										
2. Firm age	9.358	3.918	0.026	1									
3. Firm size	21.783	1.074	0.437**	0.082**	1								
4. ROE	0.078	0.129	0.099**	-0.094**	0.183**	1							
5. Debt ratio	0.497	0.168	0.091**	0.075**	0.355**	-0.068**	1						
6. Industry	0.203	0.402	-0.018	0.011	-0.170**	-0.005	-0.225**	1					
7. Year	0.203	0.402	-0.079**	-0.290**	-0.157**	0.028	-0.034	0.008	1				
8. State ownership	0.262	0.440	0.004	-0.019	0.079**	0.005	0.039	-0.116**	-0.023	1			
9. Board size	9.436	1.719	0.102**	-0.054*	0.219**	0.033	0.135**	-0.023	0.035	0.154**	1		
10. Board independence	0.356	0.048	0.091**	-0.023	0.081**	-0.017	0.016	0.082**	-0.079**	0.04	-0.167**	1	
11. Chair-CEO duality	0.103	0.303	-0.022	-0.043	-0.024	0.04	-0.019	0.130**	0.003	-0.085**	-0.067**	-0.02	1
12. TMTAI (10^{-4})	7.51	9.49	0.271**	0.037	0.173**	0.051*	0.037	0.004	-0.137**	0.037	0.026	-0.022	0.002

$n = 1747$. One-tailed tests for hypotheses, two-tailed tests for others.

* $p < .05$.

** $p < .01$.

Table 2
Results of Poisson regression with one-year lag between TMTAI and patent filing.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Firm age	0.006*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	0.009*** (0.001)	0.007*** (0.001)	0.01*** (0.001)
Firm size	0.809*** (0.004)	0.810*** (0.004)	0.811*** (0.004)	0.812*** (0.004)	0.813*** (0.004)	0.814*** (0.004)	0.815*** (0.004)
ROE	1.156*** (0.039)	1.152*** (0.039)	1.155*** (0.039)	1.142*** (0.039)	1.097*** (0.039)	1.152*** (0.039)	1.082*** (0.039)
Debt ratio	−0.327*** (0.032)	−0.307*** (0.032)	−0.31*** (0.032)	−0.305*** (0.032)	−0.331*** (0.032)	−0.307*** (0.032)	−0.335*** (0.032)
Industry	0.479*** (0.013)	0.442*** (0.013)	0.442*** (0.013)	0.446*** (0.014)	0.462*** (0.013)	0.442*** (0.013)	0.47*** (0.014)
Year	−0.178*** (0.011)	−0.139*** (0.011)	−0.143*** (0.011)	−0.142*** (0.011)	−0.139*** (0.011)	−0.139*** (0.011)	−0.151*** (0.011)
State ownership	−0.128*** (0.011)	−0.139*** (0.011)	−0.119*** (0.011)	−0.137*** (0.011)	−0.157*** (0.011)	−0.139*** (0.011)	−0.125*** (0.011)
Board size	0.036*** (0.002)	0.031*** (0.003)	0.031*** (0.003)	0.03*** (0.003)	0.034*** (0.003)	0.031*** (0.003)	0.032*** (0.003)
Board independence	0.842*** (0.082)	0.727*** (0.082)	0.682*** (0.083)	0.717*** (0.082)	1.272*** (0.088)	0.727*** (0.082)	1.249*** (0.087)
Chair-CEO duality	−0.102*** (0.017)	−0.065*** (0.017)	−0.063*** (0.017)	−0.061*** (0.017)	−0.064*** (0.017)	−0.065*** (0.017)	−0.056*** (0.017)
TMTAI		146.021*** (1.938)	146.025*** (1.91)	130.69*** (4.265)	158.226*** (2.018)	146.087*** (2.409)	138.574*** (4.229)
TMTAI × State ownership			−22.946*** (4.336)				−34.442*** (4.301)
TMTAI × Board size				10.836*** (2.682)			14.266*** (2.729)
TMTAI × Board independence					−731.23*** (48.135)		−785.931*** (47.923)
TMTAI × Chair-CEO duality						0.759 (16.392)	0.831 (16.964)
Constant	−15.978*** (0.079)	−14.966*** (0.079)	−14.983*** (0.079)	−14.97*** (0.079)	−15.371*** (0.083)	−14.966*** (0.079)	−15.449*** (0.083)
Model χ^2	66,626.22***	70,378.74***	70,407.32***	70,395.22***	70,630.26***	70,378.74***	70,720.43***
Pseudo R2	0.427	0.451	0.451	0.451	0.452	0.451	0.453
Log likelihood	−44,792.54	−42,916.28	−42,901.99	−42,908.04	−42,790.52	−42,916.28	−42,745.43

N = 1747, standard errors are in parentheses.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

Interestingly, when board vigilance is investigated via a different angle, i.e. board independence, we find results that seem to contradict the prediction that the interests of general owners are to pursue long term profit goals. As the outsider representation on a board increases in the firms we sampled, TMTAI becomes increasingly unlikely to transfer into actions of innovation. This finding is consistent with other empirical evidence that show board members are generally risk-averse in performing corporate governance (e.g. Deutsch, 2005).

Not surprisingly, board size exerts a positive impact on TMTAI's influence on firm innovation. The result lends support to the argument

that large board is ineffective in performing the role of corporate governance because it is harder for large board to coordinate and reach consensus (Eisenberg et al., 1998). The fact that our sample is based on a group of Chinese firms in transition economy suggests that the ineffectiveness of large board is a common phenomenon not bounded by market and institutional conditions.

There is no significant impact of the CEO-Chair duality on TMTIO-firm innovation relationship. This indicates that the role of CEOs in driving innovation is unclear. Contrary to the argument raised by agency theory

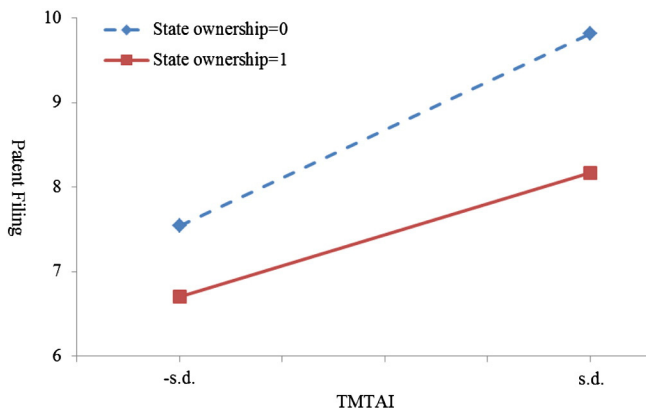


Fig. 1. Moderating effect of state ownership.

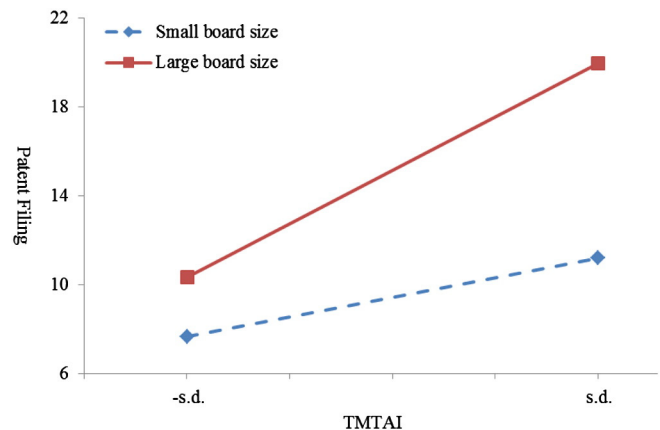


Fig. 2. Moderating effect of board size.

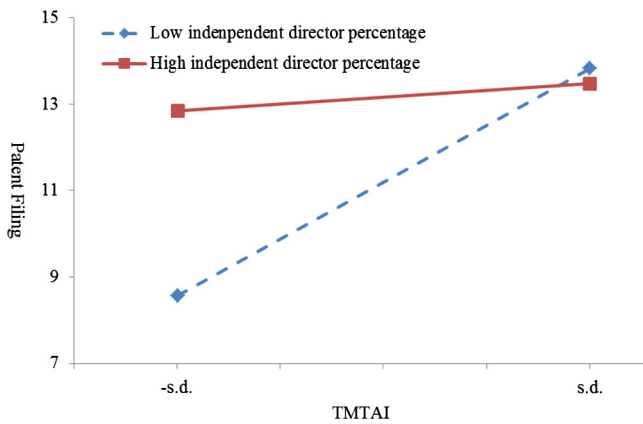


Fig. 3. Moderating effect of board independence.

that CEOs will take advantage of duality role to pursue the self-interests of agents, a perspective raised by stewardship theory (Finkelstein & D'Aveni, 1994) argues that in a duality setting, CEOs may just as well behave as a stewards to the principle and are concerned about the interests of principle. We believe that the unique situation faced by companies in our sample seem to impose a strong demand for stewardship role of CEOs in CEO-Chair duality setting. According to Young, Peng, Ahlstrom, Bruton, and Jiang (2008), corporate governance in transitional economies is characterized by concentration of ownership. This is particularly the case in Chinese publically listed firms (Yang et al., 2011). If a firm has a dominant owner, its CEO/chair of the board is forced to have a close tie with the dominant owner, which will only allow a CEO/chair duality to happen when the representatives of owner are absolutely confident in the CEO to behave in the owner's interests. Song, Yuan, and Gao (2006) find that when state ownership is high in Chinese firms, firm performance will be positively associated with CEO duality; when state-ownership is low,

no such association will exist. This report from Song et al. (2006) can be interpreted as concentrated state-ownership directs CEO duality to a positive influence on performance by aligning CEO interests with those of state. In addition, Lee and O'Neill (2003) show that national cultural background, particularly the collectivism culture, favors a stewardship, rather than agents, verdict of CEOs in dealing with R&D investment for concentrated shareholders. In the context of innovation in China, concentrated ownership may enhance stewardship by consolidating the chair of board and CEO position. If the concentrated owners are more conservative, their stewards would also behave to curtail firm innovation. Hence, the insignificant outcome of CEO-Chair duality seems to be consistent with the conflicting obligations carried by CEO-Chair in China's unique institutional environment.

6.1. Limitations and future direction

Our research is limited in several areas. First, we studied only manufacturing companies and our findings may not be generalizable to other industries. However, other scholars have established a relationship between patent application and cognition in other industries (e.g., Cho & Hambrick, 2006). We call for more research in various industries to verify our results. Second, we measured top management cognition using content analysis of shareholder letters. Even though scholars have found evidence that those letters indeed are the reflections of executives' attention (Kaplan, 2008), in our specific application our dictionary reflecting innovation may not be comprehensive enough. Future research may use alternative measurement of cognition such as survey to verify our results. Lastly, we collected data of Chinese companies only. We encourage researchers to verify our findings in other transitional economies. For instance, managers in transitional economies have to make decisions with institutional voids. Hence political risks and connections can be crucial factors in a company's strategy formulation and implementation. Scholars in the future may want to see if political connections matter to patent applications in other emerging markets.

Appendix. DV: patent granted

Table 3
Descriptive statistics and correlations.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Patent granted	20.583	65.680	1										
2. Firm age	9.358	3.918	0.008	1									
3. Firm size	21.783	1.074	0.405**	0.082**	1								
4. ROE	0.078	0.129	0.081**	−0.094**	0.183**	1							
5. Debt ratio	0.497	0.168	0.067**	0.075**	0.355**	−0.068**	1						
6. Industry	0.203	0.402	−0.015	0.011	−0.170**	−0.005	−0.225**	1					
7. Year	0.376	0.484	−0.098**	−0.098**	−0.157**	0.028	−0.034	0.008	1				
8. State ownership	0.262	0.440	−0.004	−0.019	0.079**	0.005	0.039	−0.116**	−0.023	1			
9. Board size	9.436	1.719	0.066**	−0.054*	0.219**	0.033	0.135**	−0.023	0.035	0.154**	1		
10. Board independence	0.356	0.048	0.082**	−0.023	0.081**	−0.017	0.016	0.082**	−0.079**	0.04	−0.167**	1	
11. Chair-CEO duality	0.103	0.303	−0.026	−0.043	−0.024	0.04	−0.019	0.130**	0.003	−0.085**	−0.067**	−0.02	1
12. TMTAI (10 ^{−4})	7.51	9.49	0.260**	0.037	0.173**	0.051*	0.037	0.004	−0.137**	0.037	0.026	−0.022	0.002

n = 1747. One-tailed tests for hypotheses, two-tailed tests for others.

* p < .05.

** p < .01.

Table 4
Results of Poisson regression with one-year lag between TMTAI and patent granted.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Firm age	−0.011*** (0.001)	−0.01*** (0.001)	−0.01*** (0.001)	−0.01*** (0.001)	−0.01*** (0.001)	−0.01*** (0.001)	−0.009*** (0.001)
Firm size	0.809*** (0.004)	0.810*** (0.004)	0.811*** (0.004)	0.812*** (0.004)	0.813*** (0.004)	0.814*** (0.004)	0.815*** (0.004)
ROE	0.82*** (0.045)	0.801*** (0.046)	0.805*** (0.046)	0.803*** (0.046)	0.786*** (0.046)	0.802*** (0.046)	0.786*** (0.046)
Debt ratio	−0.714*** (0.036)	−0.702*** (0.037)	−0.705*** (0.037)	−0.703*** (0.037)	−0.708*** (0.037)	−0.702*** (0.037)	−0.712*** (0.037)

(continued on next page)

Table 4 (continued)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Industry	0.472*** (0.015)	0.435*** (0.015)	0.435*** (0.015)	0.434*** (0.016)	0.441*** (0.016)	0.435*** (0.015)	0.443*** (0.016)
Year	−0.403*** (0.013)	−0.371*** (0.013)	−0.376*** (0.013)	−0.37*** (0.013)	−0.371*** (0.013)	−0.371*** (0.013)	−0.378*** (0.013)
State ownership	−0.185*** (0.012)	−0.199*** (0.012)	−0.175*** (0.013)	−0.2*** (0.012)	−0.205*** (0.013)	−0.199*** (0.012)	−0.178*** (0.013)
Board size	−0.009** (0.003)	−0.018*** (0.003)	−0.019*** (0.003)	−0.018*** (0.003)	−0.017*** (0.003)	−0.018*** (0.003)	−0.018*** (0.003)
Board independence	0.23* (0.095)	0.097 (0.096)	0.046 (0.096)	0.1 (0.096)	0.257* (0.104)	0.097 (0.096)	0.238* (0.104)
Chair-CEO duality	−0.226*** (0.02)	−0.192*** (0.02)	−0.19*** (0.02)	−0.193*** (0.02)	−0.192*** (0.02)	−0.191*** (0.021)	−0.186*** (0.021)
TMTAI		151.453*** (2.261)	151.304*** (2.227)	154.061*** (4.707)	154.953*** (2.408)	150.702*** (2.82)	153.818*** (4.755)
TMTAI × State ownership			−26.775*** (5.102)				−30.629*** (5.15)
TMTAI × Board size				−1.891 (2.994)			−0.106 (3.099)
TMTAI × Board independence					−205.603*** (53.121)		−256.618*** (53.771)
TMTAI × Chair-CEO duality						−8.605 (19.29)	−21.134 (19.959)
Constant	−15.191*** (0.09)	−14.116*** (0.09)	−14.133*** (0.09)	−14.116*** (0.09)	−14.236*** (0.095)	−14.113*** (0.091)	−14.281*** (0.096)
Model χ^2	48,445.49***	51,395.51***	51,423.74***	51,395.91***	51,410.86***	51,395.71***	51,447.83***
Pseudo R2	0.394	0.418	0.418	0.418	0.418	0.418	0.419
Log likelihood	−37,228.69	−35,753.68	−35,739.57	−35,753.48	−35,746.01	−35,753.58	−35,727.52

N = 1747, standard errors are in parentheses.

* p < 0.05.

** p < 0.01.

*** p < 0.001.

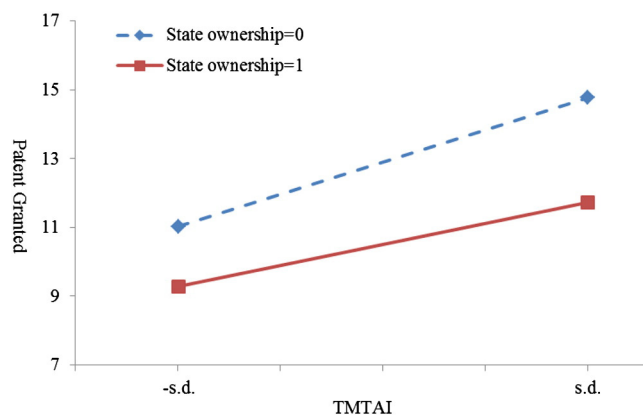


Fig. 4. Moderating effect of state ownership.

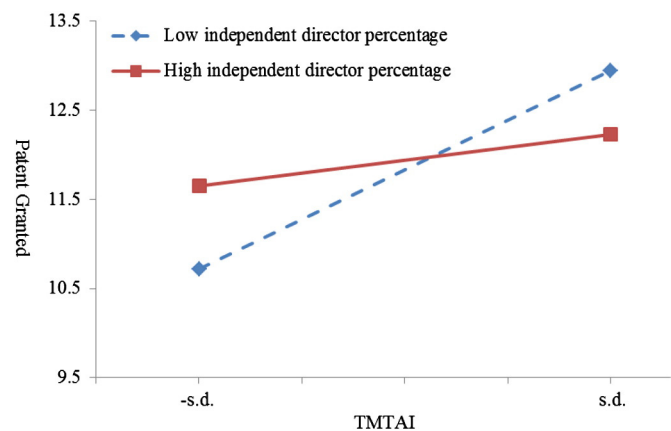


Fig. 5. Moderating effect of board independence.

(See Fig. 5.)

References

- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.
- Bai, Chong-En, Liu, Q., Lu, J., Song, F. M., & Zhang, J. (2004). Corporate governance and market valuation in China. *Journal of Comparative Economics*, 32(4), 599–616.
- Boyd, B. K., & Gove, S. (2006). Managerial constraint: The intersection between organizational task environment and discretion. In David J. Ketchen, & Donald D. Bergh (Eds.), *3 research methodology in strategy and management*, vol. 3. (pp. 57–95). Emerald Group Publishing Limited.
- Chatman, J. A., & Cha, S. E. (2003). Leading by leveraging culture. *California Management Review*, 45(4), 20–34.
- Chen, G., Tjosvold, D., & Liu, C. H. (2006). Cooperative goals and leader people and productivity values: Their contribution to top management teams in China. *Journal of Management Studies*, 43(5), 1177–1200.
- Cheung, Y., Jiang, Limpaphayom, P., & Lu, T. (2010). Corporate governance in China: A step forward. *European Financial Management*, 16(1), 94–123.
- Cho, T. S., & Hambrick, D. C. (2006). Attention as the mediator between top management team characteristics and strategic change: The case of airline deregulation. *Organization Science*, 17, 453–469.
- Clarke, D. (2003). Corporate governance in China: An overview. *China Economic Review*, 4, 494–507.
- Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the Academy of Management Journal. *Academy of Management Journal*, 50(6), 1281–1303.
- Crossland, C., & Hambrick, D. C. (2007). How national systems differ in their constraints on corporate executives: A study of CEO effects in three countries. *Strategic Management Journal*, 28, 767–789.
- Crossland, C., & Hambrick, D. C. (2011). Differences in managerial discretion across countries: How national-level institutions affect the degree to which CEOs matter. *Strategic Management Journal*, 32, 797–819.
- Deutsch, Y. (2005). The impact of board composition on firms' critical decisions: A meta analytic review. *Journal of Management*, 31(3), 424–444.
- Dutton, J. E., & Ashford, S. J. (1993). Selling issues to top management. *Academy of Management Review*, 18(3), 397–428.

- Eisenberg, T., Sundgren, S., & Wells, M. T. (1998). Larger board size and decreasing firm value in small firms. *Journal of Financial Economics*, 48, 35–54.
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics*, 26, 301–326.
- Finkelstein, S., & D'Aveni, R. A. (1994). CEO duality as a double-edged sword: How boards of directors balance entrenchment avoidance and unity of command. *Academy of Management Journal*, 37, 1079–1108.
- Fiol, C. M. (1995). Corporate communications: Comparing executives' private and public statements. *Academy of Management Journal*, 38, 522–536.
- Firth, M., Fung, P. M. Y., & Rui, O. M. (2007). How ownership and corporate governance influence chief executive pay in China's listed firms. *Journal of Business Research*, 60, 776–785.
- Fiss, P. C., & Zajac, E. J. (2006). The symbolic management of strategic change: Sense-giving via framing and decoupling. *Academy of Management Journal*, 49, 1173–1193.
- Frambach, R. T., & Schillewaert, N. (2002). Organizational innovation adoption: A multi-level framework of determinants and opportunities for future research. *Journal of Business Research*, 55, 163–176.
- Hambrick, D. C., & Finkelstein, S. (1987). Managerial discretion: A bridge between polar views of organizational fates. In B. Staw, & L. L. Cummings (Eds.), *Research in organizational behavior*. JAI Press.
- Hambrick, D. C., Finkelstein, S., & Mooney, A. C. (2005). Executive job demands: New insights for explaining strategic decisions and leader behaviors. *Academy of Management Review*, 30(3), 472–491.
- Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206.
- Hill, C. W. L., & Snell, S. A. (1988). External control, corporate strategy, and firm performance in research intensive industries. *Strategic Management Journal*, 9, 579–590.
- Huff, A., & Schwenk, C. (1990). Bias and sensemaking in good times and bad. In A. Huff (Ed.), *Mapping strategic thought* (pp. 89–108). Chichester, England: Wiley.
- Jaskiewicz, P., & Klein, S. (2007). The impact of goal alignment on board composition and board size in family business. *Journal of Business Research*, 60(10), 1080–1089.
- Jensen, M. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, 48, 831–880.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Kaplan, S. (2008). Cognition, capabilities, and incentives: Assessing firm response to the fiber-optic revolution. *Academy of Management Journal*, 51(4), 672–695.
- Kaplan, S. (2011). Research in cognition and strategy: Reflections on two decades of progress and a look to the future. *Journal of Management Studies*, 48(3), 665–695.
- Kaplan, S., Murray, F., & Henderson, R. M. (2003). Discontinuities and senior management: Assessing the role of recognition in pharmaceutical firm response to biotechnology. *Industrial and Corporate Change*, 12(2), 203–233.
- Kato, T., & Long, C. (2006). Executive compensation, firm performance, and corporate governance in China: Evidence from firms listed in the Shanghai and Shenzhen stock exchanges. *Economic Development and Cultural Change*, 54(4), 945–983.
- Lee, P. M., & O'Neill, H. M. (2003). Ownership structures and R&D investments of U.S. and Japanese firms: Agency and stewardship perspectives. *Academy of Management Journal*, 46(2), 212–225.
- Li, Q., Maggitti, P. G., Smith, K. G., Telsluk, P. E., & Katila, R. (2013). Top management attention to innovation: The role of search selection and intensity in new product introduction. *Academy of Management Journal*, 56(3), 893–916.
- Li, J., & Tang, Y. (2010). CEO Hubris and firm risk taking in China: The moderating role of managerial discretion. *Academy of Management Journal*, 53(1), 45–68.
- Liang, X., Liu, Y., Wu, S., & Zhang, S. (2012). Fending knights or masked kings: Toward a theoretical framework of interim CEO succession. *Corporate Governance*, 12(3), 367–377.
- Liang, X., Wu, S., & Jung, J. (2009). Recoupling compensation–performance relationship: A mediating role of performance. *International Journal of Human Resources Development and Management*, 9(4), 317–333.
- Lin, N. (2011). Capitalism in China: A centrally managed capitalism (CMC) and its future. *Management and Organization Review*, 7(1), 63–96.
- Lipton, M., & Lorsch, J. W. (1992). A modest proposal for improved corporate governance. *Business Lawyer*, 48(1), 59–77.
- Liu, Q. (2006). Corporate governance in China: Current practices, economic effects and institutional determinants. *CESifo Economic Studies*, 52(2), 415–453.
- McClelland, P. L., Liang, X., & Barker, V. L. (2010). CEO commitment to the status quo: Replication and extension using content analysis. *Journal of Management*, 36(5), 1251–1277.
- Mintzberg, H. (1973). *Nature of managerial work*. New York: Harper and Row.
- Miron, E., Erez, M., & Nave, E. (2004). Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other? *Journal of Organizational Behavior*, 25(2), 175–199.
- Nadkarni, S., & Narayanan, V. K. (2007). Strategic schemas, strategic flexibility, and firm performance: The moderating role of industry clockspeed. *Strategic Management Journal*, 28(3), 243–270.
- Nee, Victor, Oppen, Sonja, & Wong, Sonia (2007). Developmental state and corporate governance in China. *Management and Organization Review*, 3(1), 19–53.
- Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal*, 18(S1), 187–206.
- Parasuraman, R. (Ed.). (1998). *The attentive brain* (pp. 3–15). Cambridge, MA: MIT Press.
- Peeters, C., & Potterie, B. P. (2006). Innovation strategy and the patenting behavior of firms. *Journal of Evolutionary Economics*, 16(1–2), 109–135.
- Rechner, P. L., & Dalton, D. R. (1991). CEO duality and organizational performance: A longitudinal analysis. *Strategic Management Journal*, 12(2), 155–160.
- Siguaw, J. A., Simpson, P. M., & Enz, C. A. (2006). Conceptualizing IO: A framework for study and integration of innovation research. *Journal of Product Innovation Management*, 23(6), 556–574.
- Simon, H. A. (1947). *Administrative behavior*. New York: Macmillan.
- Song, F., Yuan, P., & Gao, F. (2006). Does large state shareholder affect the governance of Chinese board of directors? Working paper, Tsinghua University (In Chinese).
- Sonnefeld, J. (2002). What makes great boards great. *Harvard Business Review*, 80(9), 106–113.
- Tan, J. (2001). Innovation and risk-taking in a transitional economy: A comparative study of Chinese managers and entrepreneurs. *Journal of Business Venturing*, 16(4), 359–376.
- Thomas, A. B. (1988). Does leadership make a difference to organizational performance? *Administrative Science Quarterly*, 33(3), 388–400.
- Tuggle, Christopher S., Sirmon, David G., Reutzel, Christopher R., & Bierman, Leonard (2010). Commanding board of director attention: Investigating how organizational performance and CEO duality affect board members' attention to monitoring. *Strategic Management Journal*, 31(9), 946–968.
- Van de Ven, A. H. (1986). Central problems in the management of innovation. *Management Science*, 32(5), 590–607.
- Westphal, J. D., & Zajac, E. J. (1995). Who shall govern? CEO/board power, demographic similarity, and new director selection. *Administrative Science Quarterly*, 40(1), 60–83.
- Wu, S., Levitas, E., & Priem, R. L. (2005). CEO tenure and company invention under differing levels of technological dynamism. *Academy of Management Journal*, 48(5), 859–873.
- Xiao, Y., Tylecote, A., & Liu, J. (2013). Why not greater catch-up by Chinese firms? The impact of IPR, corporate governance and technology intensity on late-comer strategies. *Research Policy*, 42(3), 749–764.
- Yadav, M. S., Prabhu, J. C., & Chandy, R. K. (2007). Managing the future: CEO attention and innovation outcomes. *Journal of Marketing*, 71(4), 84–101.
- Yang, J., Chi, J., & Young, M. (2011). A review of corporate governance in China. *Asian-Pacific Economic Literature*, 25(1), 15–28.
- Yang, C. -H., & Kuo, N. -F. (2008). Trade-related influences, foreign intellectual property rights and outbound international patenting. *Research Policy*, 37(3), 446–459.
- Yang, J., Liu, H., Gao, S., & Li, Y. (2012). Technological innovation of firms in China: Past, present, and future. *Asian Pacific Journal of Management*, 29(3), 819–840.
- Young, M., Peng, M. W., Ahlstrom, D., Bruton, G., & Jiang, Y. (2008). Governing the corporation in emerging economies: A review of the principal-principal perspective. *Journal of Management Studies*, 45(1), 196–220.
- Young, G. J., Stedham, Y., & Beekun, R. I. (2000). Boards of directors and the adoption of a CEO performance evaluation process: Agency—and institutional—Theory perspectives. *Journal of Management Studies*, 37(2), 277–296.
- Zammuto, R., & O'Connor, E. (1992). Gaining advanced manufacturing technologies benefits: The roles of organization design and culture. *Academy of Management Review*, 17(4), 701–728.