

Can Managerial Military Experience Affect Corporate Innovation? : Evidence from an Emerging Market

Lang, Xiangxiang, Assistant Professor,

School of Business, Dalian University of Technology, China

You, Dandan, Postgraduate, School of Business, Dalian University of Technology, China

Cui, Li, Associate Professor, School of Business, Dalian University of Technology, China

Peng, Zhe, Doctoral Student, Lazaridis School of Business and Economics,

Wilfrid Laurier University, Canada

Abstract

Military experience has a great impact on a soldier ability to handle risks. Therefore, when those soldiers become managers, they may behave differently in making risky corporate decisions, especially in activities like the R&D investment. However, studies on how military experience affect R&D have been largely missing in the largest emerging economy, i.e. China, despite that the country hires a higher percentage of military managers than the US. In addition, it remains a question whether military managers affect the state-owned enterprises (SOEs) in China, as many of the corporate decisions are made by the government. This paper tries to address these questions. The imprinting theory and the upper echelon theory suggest that managers' personal experience can affect their behaviour, which in turn influences their corporate decisions. In this paper, we examine whether managers with military experience lead to higher R&D investment and whether such an effect exists in state-owned enterprises. Based on a sample of listed firms in China's A-share market over 2008 - 2017, we make two findings. First, companies with military managers have high R&D investment. By dividing managers' military positions into high and low rank, we find that companies tend to have higher (lower) R&D investment if their managers hold a high-rank (low-rank) position. Second, the effect of high-rank military managers on R&D

* Received: July, 10th, 2020 Revised: Aug. 15th, 2020 Accepted: Aug. 28th, 2020

Acknowledgement: This study was supported by the National Natural Science Foundation of China (71903019 and 71702021), the Key Projects of the National Natural Science Foundation of China (71731003), China Postdoctoral Science Foundation Funded Project (2018M631826) and Fundamental Research Funds for the Central Universities (DUT19RW112).

Corresponding Author : Cui, Li(cuili@dlut.edu.cn)

investment is more pronounced if the manager is also the founder and the company is a non-state-owned enterprise. For low-ranking military managers, a stronger effect on R&D investment is also observed if they are also the founder, but whether their companies are state-owned or not has no impact on R&D investment. This study identifies managers' military experience as a contributing factors to corporate R&D investment in the largest emerging economy. This paper tests an implication of the imprinting theory and the upper echelon theory, i.e., managers' personal experience can affect their behaviour, which in turn influences their corporate decisions. Specifically, we focus on one aspect of personal experience - military experience - and look at whether it is beneficial to firms' technological innovation, therefore enriches the literature of managerial heterogeneity. Our findings on the influence of managers' military experience on firms' technological innovation can help us better understand the role of managers play in corporate decision making, and how managers' individual traits interact with the firm's characteristics.

Key words: Military experience; R&D investment; State ownership; Military ranks; Founder manager; Imprinting theory

1. Introduction

In an era full of opportunities and challenges, innovation is key to business survival. Man-agers, being the decision makers of corporate innovations, play a crucial role in R&D activities (Balsmeier, B. Fleming, L., and Manso, G., 2017). Evidence has shown that the way managers influence R&D depends on their individual characteristics, such as their degree of risk-taking and managerial ability (García-Granero, A., Llopis, O., Fernández-Mesa, A., and Alegre, J., 2015). Cho et al. (2016) and Cho and Kim (2017) argue that these characteristics are shaped by the managers' experience at a younger age, which echoes the imprinting theory in psychology, according to which one's early experience has a lasting impact on future behavior. Among a manager's early life experiences, military exposure deserves special attention. Soldiers, through rigorous recruit training, field exercises or even real combats, are prepared for various unexpected, highly stressful scenarios. Together with strict military discipline, they are directed to a higher level of perseverance and commitment. When these soldiers become CEOs, the qualities imprinted on them through their military experience tend to affect their corporate decision-making, including R&D investment.

How managers' military experience influences their corporate decision-making has attracted much attention in recent years. For example, some studies show that military managers are related to aggressive corporate decisions. Malmendier et al. (2011) found that managers have higher preference for risk. Lai et al. (2016) noted that managers with military backgrounds favour a higher debt level and higher leverage in financing decisions, which leads to lower operating performance in their companies. Lin et al. (2011) found that companies with military managers engage more frequently in mergers and acquisitions (M&As) and choose to pay a higher premium in mergers. However, other studies have reached opposite conclusions. Benmelech and Frydman (2015) found that military managers are more inclined to make conservative financial decisions and that their companies invest less in R&D. The existing literature, while devoted to the relationship between managers' military experience and M&As, financial policies and financing decisions, has paid limited attention to how military managers affect R&D investment, especially in emerging economies where innovation has not yet reached full bloom. China, for instance, is at a critical stage of constructing an innovative country; that is, its entire economic development is expected to be spurred by innovation. In this context, innovation has become an intrinsic force driving firms to develop and grow in a sustainable and healthy way and allowing them to sharpen their core competitiveness. Therefore, the focus of this paper is to explore the relationship between managers' military experience and innovation in China, the largest emerging market.

In addition, China provides a unique context for studies on military managers. First, according to the higher echelon theory, managers' personal characteristics will have an impact on corporate decision-making. Second, a large number of personnel retire from the military each year and enter the business world by independent job-seeking or through government-led settlement. From a statistical point of view, military experience among CEOs is more common in China than in the US, as China has a higher percentage of military managers. According to our sample of listed firms over 2010 - 2016, 3% of CEOs have a military background, a figure that is higher than 0.1%, the US statistic over the same period. In addition, China sees an increasing portion of military managers, while the US observes an opposite trend. From 2010 to 2016, the percentage of military CEOs grew from under 0.5% to 2.27%; in the US, the number shrank from 0.6% to less than 0.1% from 1980 to 2005.

Based on this Chinese context, we examine the relationship between managers' military experience and corporate R&D investment and the output in property rights using the data of all

the listed companies on China's A-share market during 2008 - 2017. The main findings of this paper can be boiled down to two points. First, military managers have a positive effect on R&D investment. By dividing the positions these managers held in the military into high ranking and low ranking, we can see that high-ranking positions are positively related to the company's R&D investment, while the low-ranking positions are negatively related to the R&D investment. Second, having held a high-ranking position in the military has a stronger effect on the company's R&D investment if the manager is also the founder and the company is non-state-owned. On the other hand, the effect of having held a low-ranking position on a company's R&D investment is also stronger if the manager is also the founder, but whether the company is state-owned or not does not make a difference.

The contributions of this research are two-fold. First, we examine to what extent a critical aspect of managerial experience – military experience – affects a company's R&D investment, therefore providing a new angle for the study of on R&D and corporate innovation. Second, we analyze in-depth how the military positions managers used to hold affect different types of property rights. Third, we examine whether such positions reinforce the effect other managerial characteristics, e.g., if the manager is also the founder, have on corporate R&D investment. The rest of this paper is organized as follows. Section 2 proposes a few hypotheses based on the existing literature. Section 3 introduces the data and econometric models. Section 4 elaborates on our empirical findings. Section 5 concludes and ends with some further discussion.

2. Theory and Hypothesis Development

In recent years, innovation has been recognized as an important strategy for enterprises to achieve and maintain their competitive advantages (Nelson and Winter, 1985; Baer, 2012; Sakakia and Jory, 2019). However, innovation by itself is risky and unpredictable (Holmstrom, 1989) and driven by various factors (Bhattacharya and Ritter, 1980; Waegenare et al., 2012; Aghion et al., 2013; Chava et al., 2013; Bernstein, 2015; Cornaggia et al., 2015). From a macro perspective, factors that promote R&D or innovation include the intellectual property system (Lederman and Maloney, 2003), cross-border M&As, foreign direct investment (Piperopoulos, P., Wu, J., and Wang, C., 2018), and industry characteristics. From a micro perspective, factors contributing to a higher level of innovation include asset liquidity (Pham et al., 2015),

management shareholding (Hellmann and Thiele, 2011), the presence of institutional investors (Rong et al., 2017), number of independent directors (Balsmeier et al., 2017; Lu and Wang, 2018), interlocking directorate (Chen et al., 2016), female directors (Torchia et al., 2018), and previous working experience in R&D (Haneda and Ito, 2018).

From the micro perspective, we expect that managers' personal characteristics would affect their intention to invest in R&D. In fact, for business decisions in general, the upper echelon theory proposed by Hambrick and Mason (1984) implies that managerial characteristics have an impact on business decisions (Dittmar and Duchin, 2015; Bernile et al., 2016). Studies show that the following characteristics are positively related to the company's R&D investment: managerial capabilities (Yang et al., 2016; Samuel et al., 2017; Rajapathirana and Hui, 2018), duration of the manager's tenure (Cho and Kim, 2017), overseas experience (Yuan et al., 2018), managerial power (Sariol and Abebe, 2017; Sheikh, 2018), a manager's hobbies (Sunder et al., 2017), a harmonious relationship between managers and the board of directors (Liu et al., 2018), etc. In addition, Ruiz and Fuentes (2016) found that in small and medium-sized enterprises, the manager's gender has a mediating effect on corporate innovation. In contrast, some studies have found that some managerial characteristics are detrimental to innovation. For example, Hou et al. (2017) found that managers with a political background engage in lower innovation. Concerning military experience, Benmelech and Frydman (2015) found that military managers are inclined to invest less in R&D.

Now back to our question. That is, we want to determine how a specific managerial characteristic—military experience—affects corporate innovations as measured by R&D investment. In other words, we try to address the issue: Do managers with military experience make different R&D investment decisions than those without?

The imprinting theory underscores that early experience, developed within a short critical window, can have a lasting impact on a person's subsequent behaviour, despite changes in time and circumstances (Marquis and Tilcsik, 2013; Simsek et al., 2015). At the individual level, Mal-mendier et al. (2011) find that catastrophic events that occur in childhood have a significant impact on a person's risk appetite and decision-making. The research of Dokko et al. (2009) on professional experience also shows that the mindset and behavioural norms formed in a particular organizational environment in one's early life would continue to affect the person's performance in the subsequent stages his or her career. Fich and Nguyen (2020) find that acquisitions by supply chain CEOs also exhibit higher synergies, better post-deal accounting

performance, and less goodwill written off.

Referring to our focus of military service, we expect such exposure to help form individual characteristics after a person is demobilized from the army and to manifest when he or she becomes a corporate executive. As Torchia et al. (2018) argue, military experience reinforces some aspects of managerial characteristics and leadership styles. The reason is that military training makes a person more adaptive and sensitive to changing environments and therefore more aware of development opportunities, more willing to innovate and more daring to be an avant-garde in their industry. In sum, we maintain that military experience has the potential to positively affect R&D investment, whereby we propose Hypothesis 1.

Hypothesis 1: A manager's military experience has a positive impact on the company's R&D investment.

3. Data and Methodology

3.1 Sample Selection and Data Sources

We start with all the companies listed on China's A-share market (both Shanghai and Shenzhen Stock Exchanges) from 2008 to 2017. The data are from the GTA's China Stock Market and Accounting Research (CSMAR) Database and the RESSET Financial Database; missing records from the two databases are supplemented by company annual reports. In addition, we exclude any stock if it has missing data for 5 consecutive years, is in the financial industry, or is labelled as special treatment (ST). To eliminate outliers, we implement a 1% winsorization on all continuous variables. This data cleaning procedure results in 7,070 firm-year observations.

3.2 Variable definitions

(1) Explained variable. We use R&D investment intensity, defined as the ratio of R&D expenditures to sales revenue, as the explained variable; this follows the method of Griffiths and Webster (2010).

(2) Explanatory variables: We hand collect a dummy variable called “Military” to indicate whether a manager has military experience or not. To obtain this measure, we select keywords such as military, soldier, police, armed forces and military service and perform a comprehensive search through a company’s annual reports, manager resumes and major financial websites. Furthermore, whenever the chairman or general manager of a company has military experience, Military takes on a value of one; otherwise, it takes the value zero. Table 2 shows the number and percentage of managers with military experience from 2010 to 2016, where we can see an increasing trend for both series. In China, the chairperson and the general manager also play an important role in corporate strategic decisions; consequently, we use the term “managers” to denote both types of executives. In addition, we divide military managers into two types: low ranking and high ranking. That is, if the manager has served as a soldier or is generally recorded as having “served in the army,” he or she is considered to be a low-ranking military manager; otherwise, if he or she has graduated from a military school or has been a military officer, a staff officer, director, etc., then the person is recognized as a high-ranking military manager.

Table 1 presents the number of enterprises with military managers from 2008 to 2017, from which we can see that these managers concentrate in industrial enterprises. The observations of companies with military executives in our sample is 816, including 554 industrial enterprises and 120 utilities enterprises. The proportion of military managers on average is about 3.27%.

<Table 1> Number of military managers by industry

Years	Number of companies with military executives						Total number of companies	Proportion of military managers
	Industry	Utilities	Real estate	Conglomerate	Commercial	Total		
2008	46	11	10	2	6	75	1665	4.50%
2009	44	10	7	2	6	69	1811	3.81%
2010	56	16	6	4	6	88	2161	4.07%
2011	58	13	8	4	5	88	2390	3.68%
2012	63	12	7	5	5	92	2516	3.66%
2013	57	11	6	4	3	81	2560	3.16%
2014	54	12	7	4	3	80	2674	2.99%
2015	61	13	6	5	3	88	2859	3.08%
2016	66	13	8	4	2	93	3140	2.96%
2017	49	9	4	0	0	62	3178	1.95%
Total	554	120	69	34	39	816	24954	3.27%

<Table 2> Number of military managers by rank in the army

Years	Number of companies with military executives			Total number of companies	Proportion of military managers
	Lower position in the army	Higher position in the army	Total		
2008	0	1	1	108	0.93%
2009	1	1	2	146	1.37%
2010	4	3	7	294	2.38%
2011	9	6	15	457	3.28%
2012	13	15	28	875	3.20%
2013	11	14	25	901	2.77%
2014	10	16	26	966	2.69%
2015	12	21	33	1157	2.85%
2016	14	26	40	1271	3.15%
2017	11	22	33	895	3.69%
Total	85	125	210	7070	2.97%

The proportion seems small, but it does not mean that military managers is uncommon in real reality. In fact, many firms have managers with military experience. In our paper, we define the military executives as chairman or CEO with military experience, which narrowed down the scope of statistics.

Table 2 shows the number of enterprises with high- and low-ranking military managers. From table 2, we can see that the number of military executives who once have a higher position in the army is larger than the number of military executives who once have a lower position in the army in the companies with military executives, which means high-ranking military officers are more likely to be a chairman or CEO of listed companies.

(3) Moderators. We pick up two variables as mediators:

(i) Founder manager. We follow use a dummy variable for founder managers. If the manager participated in the IPO of the company, then the dummy takes 1; otherwise, it is zero.

(ii) Ownership type. A dummy variable that takes 1 if the company is privately owned and 0 if state owned.

(4) Control variables: We employ a classic set of controls, such as company characteristics, CEO characteristics and board characteristics. The notations, explanations, and definitions of all the variables mentioned above are summarized in Table 3.

<Table 3> Definition of Variables

Category	Variable	Notations	Definitions
Explained variable	Enterprise R&D investment intensity	R&D	=R&D investment / sales revenue
Explanatory variables	Managerial experience	Military	=1 if the CEO or general manager has military experience, zero otherwise
		High-rank	=1 if the manger used to hold a high-rank position in the army
		Low-rank	=1 if the manger used to hold a low-rank position in the army
Moderator variable	Founder manager	Founder	=1 if the manager is also the founder; zero otherwise
	Nature of business	POE	=1 if the enterprise is private-owned, and zero if state-owned
Control variable	Business scale	Size	=log of the total assets
	Equity concentration	Largest	the proportion of shares held by the company's largest shareholder
	Board size	Board	logarithm of the number of board members
	Proportion of independent directors	Independ	=number of independent directors / total number of board of directors
	Duality of chairman and general manage	Duality	=1 if the chairman and the general manager are the same person, zero otherwise
	CEO education level	Education	=1 if the manager only completed high school or below; =2 if completed technical college; =3 if completed a bachelor's program; =4 if completed Master's program; =5 if obtained a doctorate
	CEO gender	Sex	=1 if male, =0 if female
	CEO age	Age	log of CEO age

3.3 Econometric Models

Based on existing studies, this paper sets up a multiple regression model. Model 1 tests the influence of managerial experience on the R&D investment of a company. To test Hypothesis 1, we use the following model:

$$R\&D = \alpha_0 + \alpha_1 \text{Military} + \sum_i \beta_i \text{Control}_i + \varepsilon \quad (1)$$

Where R&D indicates the intensity of R&D investment, and Military is a dummy that equals one if a manager has military experience. The control variables include firm size, leverage (asset-liability ratio), net cash flow, the remuneration of the top 3 executives as a percentage of

the remuneration of all executives, management shareholding, concentration of ownership, size of the board of directors, proportion of independent directors, duality, the manager’s age, gender, tenure, and overseas background. We also add industry fixed effects and the year fixed effects in the full model.

To test Hypothesis 2 and Hypothesis 3, we establish the following model:

$$R\&D = \alpha_0 + \alpha_1 Military + \alpha_2 Moderator + \alpha_3 Military \times Moderator + \sum_i \beta_i Control_i + \varepsilon \tag{2}$$

Where the moderator is a dummy that indicates whether the managers is also the founder; the control variables are the same as in Model (1).

4. Empirical Analysis

<Table 4> Variable descriptive statistics

Variable	N	Mean	Std Dev	Min	Max
R&D	7070	4.3865	3.2343	0.0600	19.0800
Military	7070	0.0297	0.1698	0.0000	1.0000
Founder	7070	0.7526	0.4315	0.0000	1.0000
POE	7070	0.7973	0.4020	0.0000	1.0000
Size	7070	21.7620	1.1012	19.9412	25.2508
Largest	7070	0.3369	0.1357	0.0959	0.7042
Board	7070	2.3004	0.2870	1.6094	3.0910
Independent	7070	0.3835	0.0948	0.1818	0.6364
Duality	7070	0.3513	0.4774	0.0000	1.0000
Education	7070	3.3687	0.9168	1	5
Age	7070	3.8773	0.1404	3.2958	4.3175
Sex	7070	0.9355	0.2456	0.0000	1.0000

Notes: R&D is investment divided by sales revenue; Military is a dummy that indicates whether the CEO or general manager has military experience; Founder is a dummy that indicates whether the manager is also the founder; POE is a dummy that equals one if the company is privately owned; Size is the log of the total assets; Leverage equals total liabilities divided by total assets; Largest is the proportion of shares held by the company’s largest shareholder; Board is the log of the number of directors; Independent is the percentage of independent directors; Duality is a dummy that equals 1 if the chairman coincides with the general manager; Age is the log of the manager’s age; Sex is the gender of the manager. To eliminate the impact of outliers, all the continuous variables are winsorized at the 1% at 99% percentiles.

4.1 Descriptive statistics

Table 4 shows descriptive statistics for the variables. We can see that the average R&D investment intensity of Chinese listed companies is 4.39. In terms of control variables, the average logarithm of firm size is 21.76, the average shareholding ratio of the largest shareholder is 0.34, and the average ratio of independent directors is 0.38. In terms of managerial characteristics, 93.55% of the managers are male.

4.2 Multicollinearity test

We also run a variance inflation factor (VIF) test on each variable; the test results are given in A.10, where we find that the maximum VIF among all the explanatory variables is 1.26. Since it is far less than the threshold of 4, we conclude that there is no evidence of multicollinearity among the variables.

4.3 Analysis of managers' military experience and R&D investment

The first and second columns of Table 5 show the estimation results of Model (1), which captures how managers' military experience affects corporate R&D investment. The R&D investment is measured by the ratio of a company's R&D expenditure to its operating income. As the baseline model in column (1) shows, in the whole sample, a manager's military experience has a significant, positive correlation with the R&D investment, which lends support to Hypothesis I. This shows that military experience, which affects the managers' consciousness of changing business conditions, may empower them to boost the innovation of their companies.

Columns (3) and (4) of Table 5 show the results on how managers' positions in the army affect their decisions on R&D investment. We can see that if they used to hold a high-ranking position (High-ranking=1), then they are likely to spend more on innovative projects. Conversely, if they held a low-ranking position in the army, they are more likely to reduce investment in innovation, which contradicts the results for the entire sample. A possible explanation is that managers in higher positions in the army had more exposure to unexpected situations and critical decision-making and therefore have higher risk-tolerance and are more risk-seeking. In contrast, managers in lower-rank military positions had to abide by strict military discipline (Wang,

2010). As what they have acquired from their military experience was obedience to orders, they may be more prudent when making major innovation decisions for their companies.

<Table 5> Return of manager's experience in military service and enterprise's R&D investment

	Dependent variable: R&D			
	(1)	(2)	(3)	(4)
Military	0.564* (2.49)	0.486* (2.26)		
High-ranking			-0.839* (-2.50)	
Low-ranking				1.378*** (4.99)
Size		-0.794*** (-20.74)	-0.800*** (-20.91)	-0.791*** (-20.71)
Largest		-0.0098*** (-3.61)	-0.0098*** (-3.60)	-0.0097*** (-3.58)
Board		-0.580*** (-4.04)	-0.587*** (-4.08)	-0.580*** (-4.04)
Independent		0.0051 (1.27)	0.0054 (1.33)	0.0055 (1.37)
Duality		0.435*** (5.38)	0.412*** (5.11)	0.446*** (5.52)
Education		0.555*** (13.67)	0.551*** (13.56)	0.549*** (13.54)
Sex		0.0484 (0.32)	0.0303 (0.20)	0.0345 (0.23)
Age		0.560* (2.05)	0.586* (2.15)	0.523 (1.92)
Year	Yes	Yes	Yes	Yes
_cons	4.284*** (13.79)	18.17*** (14.35)	18.24*** (14.40)	18.26*** (14.43)
R ²	0.0045	0.1091	0.1092	0.1116
Adj R ²	0.0031	0.1068	0.1070	0.1093
N	7070	7070	7070	7070

Notes: R&D is investment divided by sales revenue; Military is a dummy that indicates whether the CEO or general manager has military experience; Founder is a dummy that indicates whether the manager is also the founder; POE is a dummy that equals one if the company is privately owned; Size is the log of the total assets; Leverage equals total liabilities divided by total assets; Largest is the proportion of shares held by the company's largest shareholder; Board is the log of the number of directors; Independent is the percentage of independent directors; Duality is a dummy that equals 1 if the chairman coincides with the general manager; Age is the log of the manager's age; Sex is the gender of the manager. To eliminate the impact of outliers, all the continuous variables are winsorized at the 1% at 99% percentiles.

We proceed to examine whether being a POE affects a military manager's decision on R&D. Columns (1), (3), and (5) of Table 6 present how the ownership of the enterprises interacts with a manager's military experience to affect a company's R&D investment. We can see from column (1) that in non-SOEs (POEs), a manager's military experience has a stronger effect on R&D investment, while for SOEs, managers' military experience does not have a significant effect on R&D investment; thus, the evidence for Hypothesis 2 is mainly driven by non-SOEs. For managers who held low-rank military positions (Low-rank=1), the positive relationship between military experience and corporate R&D investment is not affected by the ownership type of their companies. For managers who held high-rank positions (High-rank=1), the positive relation between military experience and R&D is more pronounced, and such an effect is even stronger if their company is a non-SOE.

Columns (2), (4), and (6) in Table 6 explore the role of a founder manager in a company's R&D investment. The results show that if a military manager has also participated in the IPO activities and if the company is an industrial enterprise, then the company will have higher R&D investment. That is, compared with a non-founder military manager, a founder military manager has a larger say on corporate innovation spending, which validates Hypothesis 3. Additionally, regardless of the rank a manager had in the army, being a founder is always related to higher R&D investment.

<Table 6> Differences in the influence of managers' military experience in different situations

	Dependent variable : R&D					
	(1)	(2)	(3)	(4)	(5)	(6)
Military	-0.681 (-1.21)	-0.168 (-0.48)				
Military*POE	1.363* (2.23)					
Military*Founder		1.183** (2.67)				
High-rank			0.713 (0.40)	-1.793** (-2.79)		
Low-rank*POE			-1.615 (-0.90)			
Low-rank*Founder				1.374* (1.83)		
High-rank					-0.837 (-1.41)	0.512 (1.24)

	Dependent variable : R&D					
	(1)	(2)	(3)	(4)	(5)	(6)
High-rank*POE					2.827*** (4.22)	
High-rank*Founder						1.767** (3.19)
POE	0.00656 (0.06)		0.0543 (0.51)		-0.0136 (-0.13)	
Founder		0.634*** (6.63)		0.641*** (6.78)		0.652*** (6.88)
Size	-0.789*** (-19.98)	-0.736*** (-18.88)	-0.796*** (-20.15)	-0.746*** (-19.13)	-0.786*** (-19.93)	-0.729*** (-18.75)
Largest	-0.0099*** (-3.66)	-0.0109*** (-4.03)	-0.0096*** (-3.54)	-0.0108*** (-3.97)	-0.0098*** (-3.65)	-0.0108*** (-3.99)
Board	-0.562*** (-3.80)	-0.426** (-2.95)	-0.569*** (-3.85)	-0.441** (-3.05)	-0.550*** (-3.73)	-0.421** (-2.91)
Independent	0.0047 (1.18)	0.0034 (0.85)	0.0051 (1.28)	0.0036 (0.90)	0.0050 (1.24)	0.0038 (0.95)
Duality	0.436*** (5.29)	0.336*** (4.11)	0.405*** (4.92)	0.312*** (3.81)	0.454*** (5.52)	0.344*** (4.22)
Education	0.556*** (13.58)	0.571*** (14.11)	0.553*** (13.52)	0.569*** (14.03)	0.547*** (13.39)	0.561*** (13.86)
Sex	0.0543 (0.36)	0.0828 (0.56)	0.0324 (0.22)	0.0556 (0.37)	0.0354 (0.24)	0.0725 (0.49)
Age	0.568* (2.06)	0.399 (1.46)	0.601* (2.18)	0.428 (1.57)	0.506 (1.84)	0.368 (1.35)
Year	Yes	Yes	Yes	Yes	Yes	Yes
_cons	18.01*** (13.08)	16.71*** (13.06)	18.01*** (13.08)	16.87*** (13.16)	18.17*** (13.22)	16.67*** (13.06)
R2	0.1097	0.1165	0.1094	0.1159	0.1138	0.1197
Adj R2	0.1072	0.1140	0.1068	0.1134	0.1113	0.1172
N	7070	7070	7070	7070	7070	7070

Notes: R&D is investment divided by sales revenue; Military is a dummy that indicates whether the CEO or general manager has military experience; Founder is a dummy that indicates whether the manager is also the founder; POE is a dummy that equals one if the company is privately owned; Size is the log of the total assets; Leverage equals total liabilities divided by total assets; Largest is the proportion of shares held by the company's largest shareholder; Board is the log of the number of directors; Independent is the percentage of independent directors; Duality is a dummy that equals 1 if the chairman coincides with the general manager; Age is the log of the manager's age; Sex is the gender of the manager. To eliminate the impact of outliers, all the continuous variables are winsorized at the 1% at 99% percentiles.

4.4 Further research: Military experience and innovation performance

As we have shown, managers' military experience is positively correlated with their company's R&D investment. However, we test only a single measure of innovation. In this section, we look further into other aspects of a company's innovation performance using different proxies.

<Table 7> Military experience and innovation performance

Dependent variable: Patent application amount(PAT)			
Military	5.611* (1.75)		
Military-inferior		0.292 (0.06)	
Military-superior			9.156* (2.21)
Size	10.37*** (18.63)	10.33*** (18.57)	10.38*** (18.65)
Largest	0.213*** (5.49)	0.213*** (5.49)	0.214*** (5.51)
Board	3.474* (1.67)	3.440* (1.66)	3.472* (1.67)
Independ	-0.117* (-2.02)	-0.117* (-2.02)	-0.115* (-1.99)
Duality	5.517*** (4.73)	5.366*** (4.61)	5.513*** (4.73)
Education	2.635*** (4.51)	2.636*** (4.51)	2.596*** (4.44)
Sex	-3.056 (-1.41)	-3.056 (-1.41)	-3.113 (-1.43)
Age	-9.543* (-2.42)	-9.311* (-2.36)	-9.666* (-2.45)
Year	Yes	Yes	Yes
_cons	-187.4*** (-10.33)	-187.2*** (-10.32)	-187.0*** (-10.31)
R ²	0.0875	0.0870	0.0877
Adj R ²	0.0849	0.0845	0.0852
N	6124	6124	6124

Notes: R&D is investment divided by sales revenue; Military is a dummy that indicates whether the CEO or general manager has military experience; Founder is a dummy that indicates whether the manager is also the founder; POE is a dummy that equals one if the company is privately owned; Size is the log of the total assets; Leverage equals total liabilities divided by total assets; Largest is the proportion of shares held by the company's largest shareholder; Board is the log of the number of directors; Independent is the percentage of independent directors; Duality is a dummy that equals 1 if the chairman coincides with the general manager; Age is the log of the manager's age; Sex is the gender of the manager. To eliminate the impact of outliers, all the continuous variables are winsorized at the 1% at 99% percentiles.

Table 7 presents the regression results of the military experience on the number of patent applications. We can see that military managers can improve the innovation performance of their companies, especially when they held a high-rank military position.

4.5 Robustness checks

Following Liu and Liu (2007), we use the ratio of R&D investment to total assets in the current year as a measure of innovation put, and the results are given in Table 8. Column (1) indicates that in the full sample, a manager's military experience positively relates to the innovation investment of the company. When a military manager is employed by an SOE, his or her military experience will not likely promote the innovation of the SOE.

<Table 8> Regression results after replacing the enterprise's innovation input level measurement indicators

	Dependent variable: R&D investment/total corporate assets		
	Full sample	State-owned enterprise	Non-state-owned enterprise
Military	0.00169* (1.63)	-0.00267 (-0.85)	0.00238* (2.22)
Largest	-0.0001 (-0.18)	-0.0003 (-1.08)	0.0002 (1.48)
Board	-0.0036*** (-5.47)	-0.0088*** (-5.22)	-0.0011 (-1.41)
In depend	-0.0001 (-0.30)	-0.0001* (-2.33)	0.0001 (0.93)
Duality	0.0018*** (4.84)	0.0009 (0.71)	0.0018*** (4.34)
Education	0.0015*** (7.91)	0.0010 (1.73)	0.0017*** (8.55)
Sex	0.0019** (2.71)	0.0055* (1.99)	0.0016* (2.27)
Age	-0.0005 (-0.42)	-0.0143** (-3.26)	0.0024 (1.78)
Year	Yes	Yes	Yes
_cons	0.0305*** (5.49)	0.100*** (5.42)	0.0111 (1.88)
R ²	0.0222	0.0544	0.0244
Adj R ²	0.0199	0.0430	0.0215
N	7070	1433	5637

Note: The values in parentheses are t values; *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

In contrast, if a military manager works in a non-SOE, then his or her military experience will have a positive impact on the firm's investment in innovation. This result is also consistent with Hypothesis 1 and Hypothesis 2, our main findings in this paper.

In this paper, the total number of military managers remains small, and these managers are not distributed evenly across different covariates. Therefore, to resolve potential endogeneity problems due to sample selection, we also apply the propensity score matching (PSM) method to eliminate confounding effects. The results of PSM are shown in Table 9. We can see that in the full sample, military experience leads to a significant innovation input. Military managers in non-SOEs tend to invest more than military managers in SOEs; moreover, military managers in SOEs have little influence on innovation input, which is consistent with our previous findings.

<Table 9> The impact of the sample inspection manager's military experience on the intensity of enterprise innovation investment

	Dependent variable : R&D		
	Full sample	State-owned enterprise	Non-state-owned enterprise
Military	0.606** (3.11)	0.00789 (0.48)	0.670** (2.96)
Size	-0.600*** (-6.33)	-0.00188 (-0.39)	-0.821*** (-6.41)
Largest	-0.00719 (-1.08)	-0.00108 (-1.95)	-0.00116 (-0.15)
Board	-0.253 (-0.70)	0.00757 (0.28)	-0.129 (-0.30)
In depend	0.0163 (1.23)	0.1382*** (4.09)	-0.0106 (-0.74)
Duality	-0.0101 (-0.05)	-0.00893 (-0.45)	-0.0364 (-0.16)
Education	0.301** (3.01)	0.00653 (0.56)	0.363** (3.25)
Sex	0.0842 (0.23)	-0.00451 (-0.09)	0.0946 (0.25)
Age	1.835** (2.76)	0.0557 (0.78)	2.054** (2.77)
Year	Yes	Yes	Yes
_cons	7.550* (2.56)	-0.216 (-0.76)	10.92** (3.00)
R ²	0.5843	0.9995	0.5667
Adj R ²	0.5730	0.9994	0.5527
N	682	108	574

Note: The values in parentheses are t values; *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

5. Discussion and Conclusion

5.1 Concluding remarks

This paper focuses on a sample of listed firms from 2008 to 2017 and analyses how managers' military experience affects the R&D investment of their companies. Our findings can be summarized as follows. First, military experience has a positive impact on R&D investment in general, which indicates that exposure to the army environment renders a manager more responsible and more willing to innovate. By dividing the positions military managers used to hold in the army into high rank and low ranks, we found that a high-rank position is positively related to the R&D investment, while a low-rank position exhibits a negative correlation. Second, the influence of military experience on R&D investment is more pronounced in non-state-owned enterprises (SOEs) than in SOEs. This shows that the type of ownership of a firm can affect the relationship between managerial characteristics and corporate innovation investment, and this effect is even stronger if the manager held a high-rank military position. Third, being a founder also affects a company's innovation activities, and this founder identity reinforces the impact of military experience on R&D investment.

The study of Benmelech and Frydman (2015) is closely related to our study. However, they focus on American firms while we focus on Chinese firms. They find that firms with military CEO invest less in R&D. On contrary, we find firms with military CEO invest more in R&D. Our study helps to understand the role of military executives in emerging markets. Besides, different from Benmelech and Frydman (2015), we divide military executives into two groups: high ranking military officers and low-ranking soldiers, which deepened our understanding of the effect of military experience on R&D expenditure. In summary, our study promotes the empirical research on the background of firm executives and have important enlightenment to the firms and regulators.

5.2 Discussion

Based on the above results, this paper puts forward some discussion targeting emerging markets in general, as well as countries, companies and individuals. For emerging markets, this paper lends some support for companies to hire managers with a specific background and

embark on strategic development to catch up with others in terms of innovation. Since the beginning of the 21st century, emerging economies have become promising and active competitors in the global economy. As latecomers, enterprises in these economies can make the best of their second-mover advantages, but they still have to make break-throughs in cutting-edge technologies through independent innovation. As our paper suggests, managers with military experience can significantly promote the R&D investment of such enterprises, thereby enhancing the innovation performance of the company as well as the whole economy.

For the country, the Chinese government should pay more attention to veterans and former military personnel. These people are not a burden to society but an asset. The country should put more effort into “military-civilian integration” and stick to its people-oriented principle. It should ensure that military personnel receive enough social insurance coverage and that their legitimate demands are adequately met; soldiers who have retired from the army should be given enough formal support to plan for a new life, which may include helping them start a business. By recognizing the unique merits of military personnel, the country may move towards the optimal allocation of resources. Second, the government should loosen the constraints on enterprises to encourage them to innovate, create a lax environment for innovation, and continue the marketization reform.

For companies, it is necessary to improve innovative capability since this capability determines a firm's core competitiveness. Only by mastering new technologies can firms achieve long-term development, especially by employing talents with military experience. By hiring a military manager, a firm could cultivate an environment that is conducive to innovative activities and therefore maximize its output. The presence of a military manager can also prevent the company from making innovation decisions that are too conservative. Of course, for these desirable outcomes to appear, the company should work out a clear feedback channel in case the manager deviates from the optimal decision rules and harms the company's operations.

For individuals with military experience, when they become managers, they tend to have a greater impact on R&D expenditures and are more daring when facing risks and promoting innovative activities. However, when dealing with a risky project, they should have a balanced view of the pros and cons and assess how much the company could afford to lose; once the loss is realized, they should maintain a positive attitude.

5.3 Limitations and Future Research

There is an important on-going reform in the People's Liberation Army: the government has implemented several rounds of major disarmaments over recent years. The goal of such disarmament is to streamline the administrative procedure of the army, reshape the organizational structure and redistribute authority throughout the military system. During this reform, business organizations that were affiliated with the army were converted to fully independent enterprises. As a result, we expect to see a larger body of managers with military background enter the business world, and the type of military organizations they used to work with—whether for-profit or not—may have some effects on their decisions on corporate investment. Given the scope of this paper, however, we leave this topic to future research.

References

- [1] Aghion,P., Reenen,J.V. and Zingales, L.,2013, “Innovation and institutional ownership”, *American Economic Review*, 103(1), pp. 277 - 304.
- [2] Aldwin, C. M., Levenson, M. R.and Spiro, A., 1994, “Vulnerability and resilience to combat exposure: Can stress have lifelong effects”, *Psychology and Aging*, 9(1), pp. 34 - 44.
- [3] Baer, M., 2012, “Putting creativity to work: the implementation of creative ideas in organizations”, *Academy of Management Journal*, 55(5), pp. 1102 - 1119.
- [4] Balsmeier, B., Fleming, L. and Manso, G., 2017, “Independent boards and innovation”, *Journal of Financial Economics*, 123(3), pp.536 - 557.
- [5] Benmelech, E. and Frydman, C., 2015, “Military CEOs”, *Journal of Financial Economics*, 117(1), pp.43 - 59.
- [6] Bereskin, F. L.and Hsu, P.-H., 2014, “Bringing in changes: The effect of new CEOs on innovation”, Working paper. *University of Delaware and University of Hong Kong*.
- [7] Bernile, G., Bhagwat, V. and Rau, P. R., 2017, “What doesn’t kill you will only make you more risk-loving: Early-life disasters and CEO behavior”, *Journal of Finance*, 72(1), pp. 167 - 206.
- [8] Bernstein, S., 2015, “Does going public affect innovation”, *Journal of Finance*, 70(4), pp. 1365 - 1403.
- [9] Bhattacharya, S. and Ritter, J. R., 1980, “Innovation and communication: signaling with partial disclosure”, *Journal of Financial and Quantitative Analysis*, 15(4), pp. 853 - 854.
- [10] Broom, L. and Smith, J. H., 1963, “Bridging occupations”, *The British Journal of Sociology*, 14(4), pp. 321 - 334.
- [11] Chapman, G. and Hewitt-Dundas, N., 2018, “The effect of public support on senior manager attitudes to innovation”, *Technology Innovation*, 69(1), pp. 28 - 39.
- [12] Chava, S., Oettl, A., Subramanian, A. and Subramaniac, K. V., 2013, “Banking deregulation and innovation”, *Journal of Financial Economics*, 109(3), pp. 759 - 774.
- [13] Chen, C.J., Lin, B.W., Lin, Y.H. and Hsiao, Y.C., 2016, “Ownership structure, independent board members and innovation performance: A contingency perspective”, *Journal of Business Research*, 69(9), pp. 3371 - 3379.

- [14] Chen, Y., Podolski, E. J. and Veeraraghavan, M., 2015, "Does managerial ability facilitate corporate innovative success", *Journal of Empirical Finance*, 34, pp. 313 - 326.
- [15] Cho, C., Halford, J. T., Hsu, S. and Ng, L., 2016, "Do managers matter for corporate innovation?", *Journal of Corporate Finance*, 36(2), pp. 206 - 229.
- [16] Cho, S. Y. and Kim, S. K., 2017, "Horizon problem and firm innovation: The influence of CEO career horizon, exploitation and exploration on breakthrough innovations", *Research Policy*, 46(10), pp. 1801 - 1809.
- [17] Coles, J. L., Daniel, N. D. and Naveen, L., 2006, "Managerial incentives and risk taking", *Journal of Financial Economics*, 19(2), pp. 431 - 468.
- [18] Cornaggia, J., Mao, Y., Tian, X. and Wolfe, B., 2015, "Does banking competition affect innovation", *Journal Financial Economics*, 115(2), pp. 189 - 209.
- [19] Custódio, C., Ferreira, M. A. and Matos, P., 2017, "Do general managerial skills spur innovation", *Management Science*, 65(2), pp. 459-476.
- [20] Diamant, N. J., 2010, *Embattled Glory: Veterans, Military Families, and the Politics of Patriotism in China, 1949 - 2007*, Lanham: Rowman & Littlefield Publishers.
- [21] Dittmar, A. and Duchin, R., 2016, "Looking in the review mirror: The effect of managers' professional experience on corporate financial policy", *Review of Financial Studies*, 29(3), pp. 565 - 602.
- [22] Dokko, G., Wilk, S. L. and Rothbard, N. P., 2009, "Unpacking prior experience: How career history affects job performance", *Organization Science*, 20(1), pp. 51 - 68.
- [23] Elder, G. H., 1986, "Military times and turning points in men's lives", *Developmental Psychology*, 22 (2), pp. 233 - 245.
- [24] Ferris, S. P., Javakhadze, D. and Rajkovic, T., 2017, "CEO social capital, risk-taking and corporate policies", *Journal of Corporate Finance*, 47(12), pp. 46 - 71.
- [25] Fith, E. M., and Nguyen, T., 2020, "The value of CEOs' supply chain experience: Evidence from mergers and acquisitions", *Journal of Corporate Finance*, 60 (2), pp. 101525.
- [26] Garcí'a-Granero, A., Llopis, O., Fernández-Mesa, A. and Alegre, J., 2015, "Unraveling the link between managerial risk- taking and innovation: The mediating role of a risk-taking climate", *Journal of Business Research*, 68(5), pp. 1094 - 1104.
- [27] Gervais, S. and Odean, T., 2001, "Learning to be overconfident", *Review of Financial Studies*, 14(1), pp. 1 - 27.
- [28] Gimbel, C. and Booth, A., 1994, "Why does military combat experience adversely affect

- marital relations”, *Journal of Marriage and the Family*, 56(3), pp. 691 - 703.
- [29] Griffiths, W. and Webster, E., 2010, “What governs firm-level R&D: Internal or external factors”, *Technology Innovation*, 30, pp.471 - 481.
- [30] Hambrick, D. C. and Mason, P. A., 1984, “Upper echelons: The organization as a reflection of its top manager”, *Academy of Management Review*, 9(2), pp. 193 - 206.
- [31] Han, S., Nanda, V. K. and Silveri, S. D., 2016, “CEO power and firm performance under pressure”, *Financial Management*, 45(2), pp. 369 - 400.
- [32] Haneda, S. and Ito, K., 2018, “Organizational and human resource management and innovation: Which management practices are linked to product and/or process innovation”, *Research Policy*, 47(1), pp. 194 - 208.
- [33] Hellmann, T. and Thiele, V., 2011, “Incentives and innovation: A multitasking approach”, *American Economic Journal: Microeconomics*, 3(1), pp. 78 - 128.
- [34] Hirshleifer, D., Low, A. and Teoh, S. H., 2012, “Are overconfident CEOs better innovators”, *Journal of Finance*, 67(4), pp. 1457 - 1498.
- [35] Holmstrom, B., 1989, “Agency costs and innovation”, *Journal of Economic Behavior and Organization*, 12(3), pp. 305 - 327.
- [36] Hou, Q., Hu, M. and Yuan, Y., 2017, “Corporate innovation and political connections in Chinese listed firms”, *Pacific-Basin Finance Journal*, 46(12), pp. 158 - 176.
- [37] Jiao, H., Yang, D., Gao, M., Xie, P. and Wu, Y., 2016, “Entrepreneurial ability and technological innovation: Evidence from publicly listed companies in an emerging economy”, *Technological Forecasting and Social Change*, 112(12), pp. 164 - 170.
- [38] John, K., Litov, L. and Yeung, B., 2008, “Corporate governance and risk-taking”, *Journal of Finance*, 63(4), pp. 1679 - 1728.
- [39] Kendler, K. S., Myers, J. and Prescott, C. A., 2002, “The etiology of phobias: an evaluation of the stress-diathesis model”, *Archives of General Psychiatry*, 59(3), pp. 242 - 248.
- [40] Killgore, W. D., Cotting, D. I., Thomas, J. L., Cox, A. L., McGurk, D., Vo, A. H., Castro, C. A. and Hoge, C. W., 2008, “Post- combat invincibility: Violent combat experiences are associated with increased risk-taking propensity following deployment”, *Journal of psychiatric research*, 42(13), pp. 1112 - 1121.
- [41] Kim, E. H. and Lu, Y., 2011, “CEO ownership, external governance and risk-taking”, *Journal of Financial Economics*, 102(2), pp. 272 - 292.

- [42] Lai, L., Gong, Y. and Ma, Y., 2016, "Managers' military experience, financing preference and operating performance", *Management World (in Chinese)*, 32(8), pp. 126 - 136.
- [43] Li, J. and Tang, Y., 2004, "CEO hubris and firm risk taking in China: The moderating role of managerial discretion", *Academy of Management Journal*, 53(1), pp. 45 - 68.
- [44] Li, M., Lu, Y. and Phillips, G., 2018, "CEOs and the product market: When are powerful CEOs beneficial", *Journal of Financial and Quantitative Analysis*, Forthcoming.
- [45] Lin, C., Lin, P., Song, F. M. and Li, C., 2011, "Managerial incentives, CEO characteristics and corporate innovation in China's private sector", *Journal of Comparative Economics*, 39(2), pp. 176 - 190.
- [46] Lu, J. and Wang, W., 2018, "Managerial conservatism, board independence and corporate innovation", *Journal of Corporate Finance*, 48(2), pp. 1 - 16.
- [47] Luo, J., Xiang, Y. and Zhu, R., 2017, "Military top executives and corporate philanthropy: Evidence from China", *Asia Pacific Journal of Management*, 34(3), pp. 725 - 755.
- [48] Maloney, L., 2003, *R&D and development*, World Bank Policy Research Working Paper.
- [49] Main, M., Kaplan, N. and Cassidy, J., 1985, "Security in infancy, childhood, and adulthood: A move to the level of representation", *Monographs of the Society for Research in Child Development*, 50, pp. 66 - 104.
- [50] Malmendier, U. and Tate, G., 2008, "Who makes acquisitions? CEO overconfidence and the market's reaction", *Journal of Financial Economics*, 89(1), pp. 20 - 43.
- [51] Malmendier, U., Tate, G. and Yan, J., 2011, "Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies", *Journal of Finance*, 66(5), pp. 1687 - 1733.
- [52] Marquis, C. and Tilcsik, A., 2013, "Imprinting: Toward a multilevel theory", *Academy of Management Annals*, 1(7), pp. 195 - 245.
- [53] Nelson, R. R. and Winter, S. G., 1982, *An Evolutionary Theory of Economic Change*, Cambridge: Harvard University Press.
- [54] Pham, L. T. M., Vo, L. V., Le, H. T. T. and Le, D. V., 2015, "Asset liquidity and firm innovation", *International Review of Financial Analysis*, 58(3), pp. 225 - 234.
- [55] Piotroski, J. D. and Wong, T. J., 2012, "Institutions and information environment of Chinese listed firms. In: Capitalizing China", *University of Chicago Press*, pp. 201 - 242.
- [56] Piperopoulos, P., Wu, J. and Wang, C., 2018, "Outward FDI, location choices and innovation performance of emerging market enterprises", *Research Policy*, 47(1), pp. 232

- 240.

- [57] Rajapathirana, R. P. J. and Hui, Y., 2018, "Relationship between innovation capability, innovation type, and firm performance", *Journal of Innovation & Knowledge*, 3(1), pp. 44 - 55.
- [58] Rong, Z., Wu, X. and Boeing, P., 2017, "The effect of institutional ownership on firm innovation: Evidence from Chinese listed firms", *Research Policy*, 46(9), pp. 1533 - 1551.
- [59] Ruiz-Jime'nez, J. M. and Fuentes-Fuentes, M.D.M., 2016, "Management capabilities, innovation, and gender diversity in the top management team: An empirical analysis in technology-based SMEs", *BRQ Business Research Quarterly*, 19(2), pp. 107 - 121.
- [60] Sahaym, A., Howard, M. D., Basu, S. and Boeker, W., 2016, "The parent's legacy: Firm founders and technological choice", *Journal of Business Research*, 69(8), pp. 2624 - 2633.
- [61] Sariol, A. M. and Abebe, M. A., 2017, "The influence of CEO power on explorative and exploitative organizational innovation", *Journal of Business Research*, 73(4), pp. 38 - 45.
- [62] Semuel, H., Siagian, H. and Octavia, S., 2017, "The effect of leadership and innovation on differentiation strategy and company performance", *Procedia-Social and Behavioral Sciences*, 237(2), pp. 1152 - 1159.
- [63] Sheikh, S., 2018, "The impact of market competition on the relation between CEO power and firm innovation", *Journal of Multinational Financial Management*, 44, pp. 36-50.
- [64] Shichor, Y., 1996, "Demobilization: The dialectics of PLA troop reduction". *The China Quarterly*, 146, pp. 336-359.
- [65] Simsek, Z., Fox, B. C. and Heavey, C., 2015, "'What's past is prologue' A framework, review, and future directions for organizational research on imprinting", *Journal of Management*, 41(1), pp. 288-317.
- [66] Spiro, A., Schnurr, P. P. and Aldwin, C. M., 1994, "Combat-related posttraumatic stress disorder symptoms in older men", *Psychology and Aging*, 9(1), pp. 17 - 26.
- [67] Sunder, J., Sunder, S. V. and Zhang, J., 2017, "Pilot CEOs and corporate innovation", *Journal of Financial Economics*, 123(1), pp. 209-224.
- [68] Tang, Y., Li, J. and Liu, Y., 2016, "Does founder CEO status affect firm risk taking", *Journal of Leadership & Organizational Studies*, 23(3), pp. 322-334.
- [69] Sakakia, H. and Jory, S. R., 2019, "Institutional investors' ownership stability and firms' innovation", *Journal of Business Research*, 103(10), pp. 10-22.
- [70] Torchia, M., Calabrò, A., Gabaldon, P., and Kanadli, S. B., 2018, "Women directors

- contribution to organizational innovation: A behavioral approach”, *Scandinavian Journal of Management*, 34(2), pp. 215-224.
- [71] Tsai, L. C., Zhang, R., and Zhao, C., 2019, “Political connections, network centrality and firm innovation”, *Finance Research Letters*, 28, pp. 180-184.
- [72] Waegenare, A. D., Sansing, R. C. and Wielhouwer, J. L., 2012, “Multinational taxation and R&D investments”, *The Accounting Review*, 87(4), pp. 1197-1217.
- [73] Wansink, B., Payne, C. R., and Van Ittersum, K., 2008, “Profiling the heroic leader: Empirical lessons from combat-decorated veterans of World War II”, *The Leadership Quarterly*, 19(5), pp. 547-555.
- [74] Wong, S. M., Opper, S., and Hu, R., 2004, “Shareholding structure, depoliticization and firm performance”, *Economics of Transition*, 12(1), pp. 29-66.
- [75] Yu, F., 2013, “Government R & D Subsidies, Political Relations and Technological SMEs Innovation Transformation”, *iBusiness*, 5(3), pp. 104 - 109.
- [76] Yuan, R., and Wen, W., 2018, “Managerial foreign experience and corporate innovation”, *Journal of Corporate Finance*, 48, pp. 752-770.
- [77] Zhang, C., 2015, “Military service and life chances in contemporary China”, *Chinese Sociological Review*, 47(3), pp. 230-254.
- [78] Zhang, H., Ou, A. Y., Tsui, A. S., and Wang, H., 2017, “CEO humility, narcissism and firm innovation: A paradox perspective on CEO traits”, *The Leadership Quarterly*, 28(5), pp. 585-604.

About the Authors

Xiangxiang Lang is working as an assistant professor at the School of Business Administration of Dalian University of Technology. She received her Ph.D. from the School of Management at Xiamen University. Her current research interests include corporate finance, banking finance, household finance, etc.

E-mail address: langxiangxiang@dlut.edu.cn

Dandan You received her master degree from the School of Business at Dalian University of Technology. Her current research interests include corporate finance, household finance, etc.

E-mail addresses: 1289221308@qq.com

Dr. Li Cui, PhD, is an Associate Professor in School of Business, Dalian University of Technology. Her research interests include eco-innovation, sustainable operations and green supply chain management.

E-mail addresses: cuili@dlut.edu.cn

Zhe Peng is a PhD student at Wilfrid Laurier University. Her current research interests include asset pricing and corporate governance.

E-mail address: j.z.peng@foxmail.com