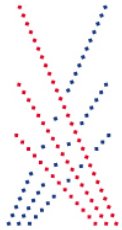

BRITISH ACADEMY
OF MANAGEMENT

BAM
CONFERENCE

3RD-5TH SEPTEMBER

ASTON UNIVERSITY BIRMINGHAM UNITED KINGDOM

This paper is from the BAM2019 Conference Proceedings

About BAM

The British Academy of Management (BAM) is the leading authority on the academic field of management in the UK, supporting and representing the community of scholars and engaging with international peers.

http://www.bam.ac.uk/

The Relationship between Board Structure, Innovation and Firm Efficiency: Empirical Evidence from the Chinese Listed Firms

Abstract

This study explores the relationship between board structure, innovation and firm efficiency amongst Chinese listed firms. Particularly, whether board structure moderates the relationship between innovation and firm efficiency. Drawing from a multi-theoretical approach, this empirical study is based on a panel data analysis of 9,768 firm-year observations (2007-2017). We are currently organising the data and aiming to have the results discussed in April 2019.

Keywords: Corporate governance; Innovation; Firm Efficiency; Chinese listed firms; Moderating effects

Track: Corporate Governance
Number of words: 3,638

1. Introduction

Innovation is a key driver of sustainable competitive advantage and economic growth (Zhou et al. 2017; Classeen et al., 2014). With the rise of emerging economies, there is a growing interest in how factors that are unique to emerging markets affect innovation development, in turn, affect firm efficiency (Lee et al., 2015; Chen et al., 2014; Di Vito et al., 2010). Meanwhile, one of the currently hot optics in management theories and practices is the issue of corporate governance (CG) as an important determinant of a firm efficiency (Musacchio et al., 2015). Although the ultimate goal of both innovation and CG is shareholder wealth maximisation, studies argue (e.g., Sarkees and Hulland, 2009) that few firms are able to simultaneously engages in a high degree of both innovation and the role of stewardship and accountability of corporate governance. This is because innovation requires less control and more resource to create value, on the other hand, CG tends to focus on protecting value by compliance with CG standards for shareholders. Tricker (2012) suggests that a corporate board is there to ensure that firms have adequate access to arrange of resources for investment (e.g., innovation) to maximise firm efficiency (Triobo et al., 2007). The board also has a role to play in monitoring that such resources are well-utilised (Barker and Chiu, 2018). The design of board structure should strike a balance between accountability and innovation, in order to enhance firm efficiency (Classen et al., 2014; Keasey and Wright, 1993). This paper attempts to shed some light on the links between board structure, innovation and firm efficiency.

Estrin (2002) argues that transition economies make a particularly good laboratory for understanding the evolution of corporate governance structure and for evaluating the impact of alternative governance mechanisms. Whilst researchers have broadened their use of governance data in their studies (Azeez, 2015; Bierwerth et al., 2015; Mangena et al., 2012; Coles et al., 2008), research into the effectiveness of corporate governance in transition economies remains limited (Shapiro et al., 2015; Dong and Gou, 2010). The objective of this paper is to expand the literature on the CG of transition economies by disentangling the effects of board structure and innovation on firm efficiency in China, the largest transition economy in the world.

China presents a unique context in which to examine the relationship between board structure, innovation and firm efficiency. It has strikingly different characteristics from those in Anglo-Saxon countries from which many studies are undertaken. For example, its CG structures are different in that government often appoints the key management and board members. Also, its economy is in the transition from planned economy to market economy, along with the fact that government controls resources, financing and materials distribution (Tang et al., 2008). These characteristics imply that findings from developed countries might not apply in China, thus providing an opportunity to make a significant contribution to the literature. Although studies on the effects of board structure on firm efficiency have started to develop in China (e.g. Zhou et al., 2017; Lazzarini, 2015; Lin et al., 2009), these are still limited and similar to literature across the world, have yet to consider how board structure moderate the effects of innovation on firm efficiency. Specifically, the study addresses the objective that whether firm-level board structure and innovation interact to influence firm efficiency in the Chinese listed firms.

This empirical study is based on panel data analysis of a data sample contains xxxx firm-year observations during the 20xx-20xx period. The results of this paper have several theoretical implications for designing and optimizing the board structure, which contribute to the theories of CG and innovation. First, this paper finds that xxxxx

Second, this paper provides empirical evidence that corporate board structure moderates the relationship between innovation and firm efficiency. xxxxxxxxxx

The rest of the study is organised as follows. In the next section, it discusses the institutional environment under which the study is conducted. In the third section, it discusses the theories and develops the hypotheses. The fourth section explains the research design, followed by the empirical results discussion. Finally, this paper presents a summary, limitations, and the main conclusions.

2. Chinese Institutional Environment

Since the 1990s, China has moved towards adopting a more liberalised economy and has significantly introduced new corporate governance (CG) system in line with the rest of the world. The reforms of the 1990s shifted ownership of firms from wholly owned by the government to private ownership via privatisation of state-owned enterprises (see Tong et al., 2013). However, despite the move towards privatisation, its CG system maintains the insider model, where the major shareholders, in particular, the government still has substantial control of firms. In terms of company law, China specifies three levels of control in the firm: shareholders' general meeting, the board of directors and supervisors, and management.

Board structure in China is unique, bringing elements of both the insider and outsider systems of CG. In this case, listed firms in China operates both a single-tier and a two-tier board system that consists of a board of directors and a supervisory board (Tong et al., 2013). The board of directors is structured as in the outsider system and is composed of both executives and non-executive directors. Chinese Companies Law requires that at least one-third of board members must be independent directors. The introduction of a supervisory board is consistent with the insider model, for example, as practiced in Germany. The supervisory board consists of shareholders' representatives and employees' representatives, and a third of members must be employees (Shapiro et al., 2015; Lin et al., 2009). However, unlike Germany, the supervisory board in China does not have power and acts through influence (Tricker, 2012). An interesting feature in China is that government has significant influence in the selection of board members and management in the firms. It is raising questions about board independence.

In terms of innovation, China recognises the critical importance of innovation in the 13th Five-Year Program (2016-2020) and has adopted policies to encourage innovative activities, including tax deduction, and governmental subsidies to innovation projects. However, innovation is a particular challenge because of the inadequate external institutions, and a highly bureaucratic and corrupt legal-political governance (Tang et al., 2008). This poses challenges for firms seeking to acquire and direct the resources necessary for innovation (Choi et al., 2011). For example, corrupt legal-political governance allows government officials to misuse their power, engage in self-beneficial trade and forgo high-risk projects (e.g., innovative activities) that benefit the firm. Also, the system might favour firms in which the government has control, providing these firms with resources and opportunities that might not available to other firms.

3. Theories and Hypotheses Development

Explaining the effects of CG and innovation on firm efficiency requires underpinning theory. In the literature, the majority studies are underpinned by the agency theory, which assumes that when ownership and control are separated, management might act in their own interests at the expense of shareholders (Jensen and Meckling, 1976). Effective CG structures (e.g., board structure, laws and regulations) therefore, required to monitor managers and improve firm efficiency (Barker and Chiu, 2018; Zhou et al., 2017; Mangena et al., 2012). Another theory has used to explain the implications for CG and innovation on firm outcomes is the stewardship theory (Donaldson and Davis, 1991). From a stewardship perspective, boards of directors are needed not just to monitor managers but to support the entrepreneurial actions of the managers, thereby improving firm efficiency. This theory emphasises the advisory role of board of directors and in this case, is similar to the resource dependence theory (Pfeffer and Salancik,1978), which posits that firms require resources to function. The resource dependence theory is used to explain how the external resources (e.g., networks, political connection, and

board of directors) of firms affect the success of innovative activities and firm efficiency (Barker and Chiu, 2018; Chen et al., 2014). This is particularly relevant in China, where networks, particularly those related to government and party officials can make a significant difference on how the firm acquires resources. For example, political connected firms, perhaps via their CEOs or directors are more likely to benefit from resources supported by the government (see Shapiro et al., 2015).

3.1 Board of Directors

Board size has been studied as a major aspect of board composition. Past research has empirically shown that the size of boards influences firm efficiency (Adeabah et al., 2018; Kusuma and Ayumardani, 2016; Azeez, 2015; Guest, 2009). Larger boards often bring directors with diverse professional backgrounds (e.g., community leaders, politicians, business executives). Such diversity of experience serves as "a pool of expertise and advice that executives can capitalise on" (Ruigrok et al., 2006, p. 1205). Accordingly, larger boards can positively contribute to firm strategy and efficiency by providing valuable and relevant external information. Given the highly complex and uncertain nature of strategic decision-making process, such additional board capabilities not only improve quality of strategic decisions but also contribute to improved firm efficiency.

In developing countries, for example, China, where the economy is at a growing stage (Zhang et al., 2014). Considering that innovation involves seeking new opportunities and advantages, which leaves no doubt that external resources are essential for firms wanting to promote innovation. Moreover, given the circumstance embedded in Chinese firms which are in a stage of transforming from state-owned to private sector organisations, and the challenges arising from the business environment in which they operate. It is likely that Chinese listed firms face a high demand for the resources needed to carry out the innovative activities, in turn, influence the long-term growth of firm value. One effective way to assist them to better access these critical resources is to increase their number of board members. Similarly, larger boards enable the focal firms to better process complex and uncertain market information including the viability and legitimacy of emerging innovations (Abebe et al., 2018). In such a scenario, having a larger corporate board enhances the firm's ability not only to cope with the uncertainty of innovative activities but also better firm efficiency (Chen et al., 2016). Therefore, board size is chosen as a moderator in this paper.

Hypothesis 1: Board size positively moderates the relationship between innovation and firm efficiency.

3.2 Independent Directors

Independent directors refer to the members that do not have (or previously had) any material association with the firm. The ratio of independent directors on the board has been extensively studied as a prominent variable in board composition research (Balsmeier et al., 2014; 2017; Tong et al. 2008). A great deal of empirical work has explored the relationship between independent director ratio and firm efficiency (e.g., Rehman et al., 2015; Kusuma and Ayumardani, 2016; Kor and Sundaramurthy, 2009;). Drawing from the resource dependence theory, researchers argue that independent directors improve firm efficiency by: (1) serving as medium of communication between the firm and its external environment; (2) their provision of expertise and advice to the executive team; (3) playing a critical role in obtaining institutional legitimacy and, (4) securing the collaboration and commitment of other institutions and partners on whom the firm depends on for its operation (Abebe et al., 2018; Balsmeier et al., 2014; Pfeffer and Salancik, 1978). Findings from existing studies (see Rehman et al., 2015; Coles et al., 2008; Gupta and Fields, 2009;) find that boards dominated by

independent directors offer higher firm efficiency as well as ensuring the executive directors are accountable to shareholders' value (Kusuma and Ayumardani, 2016).

So, does the proportion of independent directors affect firm's innovation? This question has attracted some scholarly attention (see Chen and Hsu, 2009; Le et a., 2006). Some studies suggest that board independence influences firm innovation primarily by their involvement in setting the strategic direction of the firm including strategies that define the firm's diversification scope (Robeson and O'Connor, 2013; Le et al., 2006). As Roberson and O'Connor (2013, p.609) put it, "the board influences innovation through its direction of strategic planning and funding". Specifically, past research has shown a positive relationship between the proportion of independent directors and innovation (Hoskisson et al., 2002; Balsmeier et al., 2014; 2017).

Boards with high proportion of independent directors are more likely to terminate the managers in case of poor organisational outcome and this threat provides an incentive to the managers to work hard (Fama, 1980). Increased monitoring from independent boards may alleviate agency problems, for example, shirking or tunnelling of corporate resources. Managers should also take actions that are and appear to be closer to the interests of shareholders (Jensen an Meckling, 1976). When under increased scrutiny and demands for results of the R&D investment, managers will also focus on quantifiable results, for example, a greater number of patents. They will adduce an increase in patent counts to satisfy demands for firm efficiency (Balsmeier et al., 2017). Therefore,

Hypothesis 2: Independent director ratio positively moderates the relationship between innovation and firm efficiency.

3.3 Supervisory Board

In China, the 2013 Company Law requires limited-liability companies to have a two-tier system, consisting of a board of directors and a supervisory board (Shapiro et al., 2015; Shan and McIver, 2011; Lin et al., 2009). The board of directors is responsible for the immediate governance of the firm, while the supervisory board is supposed to monitor the board of directors and to protect the rights and interests of the firm and the stakeholders (Tricker, 2012). In practice, the supervisory directors in Chinese listed firms often have low status and limited power because the supervisory board can only suggest sanctions on the board of directors and senior management or file lawsuits against them. However, they lack the legal authorisation to decide and carry out such sanctions. Compared to Germany where the supervisory boards are the first-tier boards (Tricker, 2012; Balsmeier et al., 2014), the supervisory boards in China are considered as second-tier boards with limited capacity (Lin et al., 2009). Therefore, supervisory boards in China are likely to be less effective in monitoring the board of directors and the management. Results in Ning et al., (2014) imply that larger supervisory boards may be inefficient in monitoring the board's ability to balance the power of insiders, because both the board of directors and supervisors might be affiliated with the controlling shareholders (Wei, 2007). However, existing empirical studies suggested that a large supervisory board can attract potential external resources and offer stakeholder representation. For example, Shapiro et al., (2015) investigated Chinese small and non-state-controlled firms, the results showed that R&D investment is increased with more independent directors and supervisors on the two boards. Based on the above argument, it is proposed the following:

Hypothesis 3: Supervisory board size positively moderates the relationship between innovation and firm efficiency.

3.4 CEO Duality

CEO duality refers to a board of directors' structure where the firm's CEO also holds the chairman of the board position. CEO duality is considered as an important measure of board independence. Past research in this area has drawn from agency and stewardship theory arguments to propose opposing explanation of CEO duality in firm efficiency. According to the agency theory argument, CEO duality is most likely to facilitate CEO entrenchment behaviour and weaken the board's overall monitoring responsibilities (Krause et al., 2014; Yu and Ashton, 2015). Splitting the roles between CEO and chairman in a firm should be positively related to long-term decision-making and in turn, improves firm efficiency. In line with the agency perspective, empirical studies provide evidence of the significant and negative effects of CEO duality on firm efficiency (Van Damme et al., 2016; Setayesh et al., 2016; He et al., 2015; Ujunwa, 2012). Stewardship theory argument, on the other hand, suggests that CEO duality enhances managerial discretion, proactive response to external market changes and facilitate accountability of decision making (Peng, 2004).

Whilst the current CG literature extensively explored the relationship between CEO duality and firm efficiency (see Van Damme et al., 2016; Krause et al., 2014), research on the relationship between CEO duality and firm innovation is at the nascent state (Lu and Wang, 2015; He et al., 2015; Zona, 2014). For example, Hung and Mondejar (2005) found a positive relationship between CEO duality and innovation in Hong Kong firms. Similarly, Zona (2014) found that CEO duality improves firm innovative activities more significantly in the early stages of the CEO tenure.

In this paper, it is proposed that CEO duality enhances the relationship between innovation and firm efficiency. First, Jensen and Meckling (1976) argued that firms in young age present a classic case of union rather than separation of ownership and control. Given the fact that the Chinese stock exchanges are in growing state (the average firm age of in this paper is about 9 year). Also, listed firms have emerged as a result of their transformation from state-owned enterprises (SOEs) and moved to an entirely new competitive environment. Listed firms in Chinese therefore, could be considered as young firms. The boundaries between control and ownership are thus somewhat blurred. Executives, in this case, tend not to consider themselves as agents but rather as company owners. Second, stewardship perspective seems to be more applicable to a firm which operates under weak control systems, in other words, trust is the basis of collective and collaborative work (He et al., 2015; Peng, 2004). Given the underdeveloped nature of Chinese market institutions, trust is more likely to exert a significant force among actors in a business relationship (*Guanxi*) than in economies where market institutions are better established (Yu and Ashton, 2015). Third, in terms of culture, collectivism is prevalent in China (Hofstede, 2011). The success of one's firm may thus be considered more important than individual achievements. Moreover, people are influenced by Confucian philosophy consider intrinsic rather than extrinsic values to be of greater significance. Therefore, one individual may be more willing to invest in innovation to enhance his/her reputation with the expectation of obtaining long-term profitable opportunities to the firm. It is, therefore, proposed the following,

Hypothesis 4: CEO duality positively moderates the relationship between innovation and firm efficiency.

4. Data and Sample Selection

Data are collected in a time span of 11-year (2007-2017) to provide a better understanding of how board structure moderates the relationship between the innovation and firm efficiency. The timespan of the data was chosen to capture innovation data of firms since 2007 when the new Chinese Accounting Standard (CAS) commenced in 2006, given that listed firms were

encouraged to report direct R&D investment from 2007 in the annual report. The sample of firms was drawn from the Shenzhen Stock Exchange (SSE) and Shanghai Stock Exchange (SHSE).

Year-end financial data and board data are collected from two sources: *CSMAR (China Stock Market & Accounting Research)* database and *Bloomberg*. These two databases complement each other for the missing data. As at 31st December 2017, 3,656 firms were listed on both Stock Exchanges. After removing firms without R&D investment data, it yielded a total of 12,423 out of 23,318 annual reports. 54 annual reports published by financial firms were eliminated as they have different regulatory regimes compared to non-financial firms. Further, 1,590 reports were eliminated of firms from low technology industry (e.g., wholesale & retails, beverage, food, education, and real estate industries) (Guan, 2009). 1,011 reports were dropped from matching procedure between *CSMAR* and *Bloomberg*. The entire screening process results in 9,768 firm-year observations of panel data.

SFA method

A stochastic production frontier was developed by Aigner et al. (1977), Battese and Corra (1977), Jondrow et al. (1982), and Battese and Coelli (1988). They estimated production efficiency by introducing a two-stage error term. The first error term is a statistical noise that accounts for measurement error. The second error term is a disturbance that captures inefficiency. Battese and Coelli (1992) also assume a traditional random error (V_{it}) and a nonnegative error term (U_{it}) representing the technical efficiency. As mentioned above, V_{it} is assumed to be $iid\ N(0, \sigma_v^2)$ and captures statistical noise, measurement error, and other random effects, such as economic situation, natural disasters, and political instability, that are beyond company's control. The nonnegative error term (U_{it}) captures the inefficiency and is assumed to be *iid* as truncations at zero of the $N(0, \sigma_u^2)$. Also, V_{it} is independent from the U_{it}. So, the model is formed as follow:

$$Y_{it} = X_{it}\beta + (V_{it} - U_{it})$$

where Y_{it} is output (the logged) of the i_{th} firm in the t_{th} time period; X_{it} is a *K x 1* vector of inputs (the logged) of the i_{th} firm in the t_{th} time period; β is a *K x 1* vector of unknown parameters; V_{it} and U_{it} are assumed to have normal and half-normal distribution, respectively. Thus, the stochastic production frontier can be specified as follows:

$$\ln(Y_i) = \beta 0 + \beta 1 \ln(X_{i1}) + \beta 2 \ln(X_{i2}) + \beta 3 \ln(X_{i3}) + (V_i - U_i)$$

where Y_i is the output (total sales); X_{i1}, X_{i2} and X_{i3} are the inputs representing total assets, total employee costs (salary expense), and common equity. β0, β1, β2, and β3 are all coefficients. V_i and U_i are assumed to have normal and half-normal distribution, respectively.

DEA method

DEA was developed by Charnes et al (1978) to form an efficiency frontier by maximizing (minimizing) the weighted output/input ratio of each decision-making unit (DMU). The ratio is less than or equal to unity for any other DMU in the data set. It measures the relative distance from the piecewise linear frontier to the DMU under evaluation. This distance falls between the values of 0 and 1. It indicates the level of input should be proportionally reduced to attain efficiency. Charnes et al. (1978) introduced the following model to measure technical efficiency:

$$TE = \min_{\theta,\tau} \theta$$
$$Y\tau \geq y_k$$
$$s.t\ X\tau \leq \theta x_k$$
$$\tau \geq 0$$

We follow the model above to measure efficiency score and rank the order of our sample companies based on the scores.

To estimate DEA efficiency score, we follow the input and output variables in measuring SFA. We use total assets, total employee cost (salary expense) and common equity as input variables, and total sales as output variable.

References:

Abebe, M. and Myint, P.P.A., 2018. Board characteristics and the likelihood of business model innovation adoption: Evidence from the smart home industry. *International Journal of Innovation Management*, p.1850006.

Adeabah, D., Gyeke-Dako, A. and Andoh, C., 2018. Board gender diversity, corporate governance and bank efficiency in Ghana: a two-stage data envelope analysis (DEA) approach. *Corporate Governance: The International Journal of Business in Society*.

Aigner, D., Lovell, C.K. and Schmidt, P., 1977. Formulation and estimation of stochastic frontier production function models. *Journal of econometrics*, *6*(1), pp.21-37.

Azeez, A., 2015. Corporate Governance and Firm Performance: Evidence from Sri Lanka. *Journal of Finance,* 3 (1), 180-189.

Balsmeier, B., Buchwald, A. and Stiebale, J., 2014. Outside directors on the board and innovative firm performance. *Research Policy,* 43 (10), 1800-1815.

Balsmeier, B., Fleming, L. and Manso, G., 2017. Independent boards and innovation. *Journal of Financial Economics,* 123 (3), 536-557.

Barker, R. and Chiu, I.H.Y., 2014. Protecting minority shareholders in blockholder-controlled companies: evaluating the UK's enhanced listing regime in comparison with investor protection regimes in New York and Hong Kong. *Capital Markets Law Journal*, *10*(1), pp.98-132.

Battese, G.E. and Coelli, T.J., 1988. Prediction of firm-level technical efficiencies with a generalized frontier production function and panel data. *Journal of econometrics*, *38*(3), pp.387-399.

Battese, G.E. and Corra, G.S., 1977. Estimation of a production frontier model: with application to the pastoral zone of Eastern Australia. *Australian journal of agricultural economics*, *21*(3), pp.169-179.

Bierwerth, M., Schwens, C., Isidor, R. and Kabst, R., 2015. Corporate entrepreneurship and performance: A meta-analysis. *Small Business Economics*, 1-24.

Charnes, A., Cooper, W.W. and Rhodes, E., 1978. Measuring the efficiency of decision-making units. *European journal of operational research*, *2*(6), pp.429-444.

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.

Chen, H., and Hsu, W., 2009. Family ownership, board independence, and R&D investment. *Family Business Review,* 22 (4), 347-362.

Chen, V.Z., Li, J., Shapiro, D.M. and Zhang, X., 2014. Ownership structure and innovation: An emerging market perspective. *Asia Pacific Journal of Management,* 31 (1), 1-24.

Choi, S.B., Lee, S.H. and Williams, C., 2011. Ownership and firm innovation in a transition economy: Evidence from China. *Research Policy,* 40 (3), 441-452.

Classen, N., Carree, M., Van Gils, A. and Peters, B., 2014. Innovation in family and non-family SMEs: an exploratory analysis. *Small Business Economics,* 42 (3), 595-609.

Coles, J.L., Daniel, N.D. and Naveen, L., 2008. Boards: Does one size fit all? *Journal of Financial Economics,* 87 (2), 329-356.

Donaldson, L., and Davis, J.H., 1991. Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management,* 16 (1), 49-64.

Dong, J., and Gou, Y., 2010. Corporate governance structure, managerial discretion, and the R&D investment in China. *International Review of Economics & Finance,* 19 (2), 180-188.

Di Vito, J., Laurin, C. and Bozec, Y., 2010. R&D activity in Canada: Does corporate ownership structure matter? *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, *27*(2), pp.107-121.

Estrin, S., 2002. Competition and corporate governance in transition. *Journal of Economic Perspectives*, *16*(1), pp.101-124.

Fama, E.F., 1980. Agency Problems and the Theory of the Firm. *Journal of Political Economy,* 88 (2), 288-307.

Guan, J.C., Richard, C., Tang, E.P. and Lau, A.K., 2009. Innovation strategy and performance during economic transition: Evidences in Beijing, China. *Research Policy,* 38 (5), 802-812.

Guest, P.M., 2009. The impact of board size on firm performance: evidence from the UK. *The European Journal of Finance,* 15 (4), 385-404.

Gupta, M., and Fields, L.P., 2009. Board independence and corporate governance: evidence from director resignations. *Journal of Business Finance & Accounting,* 36 (1-2), 161-184.

He, Y., Chiu, Y.H. and Zhang, B., 2015. The impact of corporate governance on state-owned and non-state-owned firms efficiency in China. *The North American Journal of Economics and Finance*, *33*, pp.252-277.

Hofstede, G., 2011. Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture,* 2 (1), 8.

Hoskisson, R.E., Hitt, M.A., Johnson, R.A. and Grossman, W., 2002. Conflicting voices: The effects of institutional ownership heterogeneity and internal governance on corporate innovation strategies. *Academy of Management Journal,* 45 (4), 697-716.

Hung, H. and Mondejar, R., 2005. Corporate directors and entrepreneurial innovation: an empirical study. *The journal of entrepreneurship*, *14*(2), pp.117-129.

Krause, R., Semadeni, M. and Cannella Jr, A.A., 2014. CEO duality: A review and research agenda. *Journal of Management,* 40 (1), 256-286.

Jensen, M.C., and Meckling, W.H., 1976. Theory of firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics,* 3 (4), 305-360.

Jondrow, J., Lovell, C.K., Materov, I.S. and Schmidt, P., 1982. On the estimation of technical inefficiency in the stochastic frontier production function model. *Journal of econometrics*, *19*(2-3), pp.233-238.

Keasey, K., and Wright, M., 1993. Issues in corporate accountability and governance: An editorial. *Accounting and Business Research,* 23 (sup1), 291-303.

Kor, Y.Y., and Sundaramurthy, C., 2009. Experience-based human capital and social capital of outside directors. *Journal of Management,* 35 (4), 981-1006.

Kusuma, H. and Ayumardani, A., 2016. The corporate governance efficiency and Islamic bank performance: an Indonesian evidence. *Polish Journal of Management Studies*, *13*(1), pp.111-120.

Lazzarini, S.G., 2015. Strategizing by the government: Can industrial policy create firm-level competitive advantage? *Strategic Management Journal*, *36*(1), pp.97-112.

Lu, J., and Wang, W., 2015. Board independence and corporate investments. *Review of Financial Economics,* 24 (1), 52-64.

Le, S.A., Walters, B. and Kroll, M., 2006. The moderating effects of external monitors on the relationship between R&D spending and firm performance. *Journal of Business Research,* 59 (2), 278-287.

Lee, N., Sameen, H. and Cowling, M., 2015. Access to finance for innovative SMEs since the financial crisis. *Research policy*, *44*(2), pp.370-380.

Lin, C., Ma, Y. and Su, D., 2009. Corporate governance and firm efficiency: evidence from China's publicly listed firms. *Managerial and Decision Economics*, *30*(3), pp.193-209.

Mangena, M., Tauringana, V. and Chamisa, E., 2012. Corporate boards, ownership structure and firm performance in an environment of severe political and economic crisis. *British Journal of Management,* 23 (S1), S23-S41.

Musacchio, A., Lazzarini, S.G. and Aguilera, R.V., 2015. New varieties of state capitalism: Strategic and governance implications. *Academy of Management Perspectives*, *29*(1), pp.115-131.

Ning, L., Prevezer, M. and Wang, Y., 2014. Top Management Turnover and Corporate Governance in China: Effects on Innovation Performance, 53.

Peng, M.W., 2004. Outside directors and firm performance during institutional transitions. *Strategic Management Journal,* 25 (5), 453-471.

Pfeffer, J.S., and Salancik, G., 1978. GR (1978). The external control of organizations: a resource dependence perspective. *New York.*

Rehman, R.U., Zhang, J., Ali, R. and Qadeer, A., 2015. Does growing economy and better governance impede banking efficiency? A DEA analysis. *Journal of Applied Business Research*, *31*(6), pp.1225-1236.

Robeson, D. and O'Connor, G.C., 2013. Boards of directors, innovation, and performance: An exploration at multiple levels. *Journal of Product Innovation Management*, *30*(4), pp.608-625.

Ruigrok, W., Peck, S.I. and Keller, H., 2006. Board characteristics and involvement in strategic decision making: Evidence from Swiss companies. *Journal of Management Studies,* 43 (5), 1201-1226.

Sarkees, M. and Hulland, J., 2009. Innovation and efficiency: It is possible to have it all. *Business horizons*, *52*(1), pp.45-55.

Setayesh, M.H., Rezaie, G. and Kazemnezhad, M., 2016. Corporate governance, investment in research and development and company performance: A data envelopment analysis approach based on data from a developing country. *International Journal of Economics and Financial Issues*, *6*(3), pp.1114-1122.

Shan, Y.G., and McIver, R.P., 2011. Corporate governance mechanisms and financial performance in China: Panel data evidence on listed non-financial companies. *Asia Pacific Business Review,* 17 (3), 301-324.

Shapiro, D., Tang, Y., Wang, M. and Zhang, W., 2015. The Effects of Corporate Governance and Ownership on the Innovation Performance of Chinese SMEs. *Journal of Chinese Economic and Business Studies,* 1 (4), 311-335.

Tang, J., Tang, Z., Marino, L.D., Zhang, Y. and Li, Q., 2008. Exploring an inverted U-shape relationship between entrepreneurial orientation and performance in Chinese ventures. *Entrepreneurship Theory and Practice,* 32 (1), 219-239.

Tong, S., Junarsin, E. and Davidson III, N.W., 2013. A comparison of Chinese state-owned enterprise firm's boards and private firm's boards. *In: Proceedings of 23rd International Business Research Conference,* pp. 18-20.

Tribo, J.A., Berrone, P. and Surroca, J., 2007. Do the type and number of blockholders influence R&D investments? New evidence from Spain. *Corporate Governance: An International Review,* 15 (5), 828-842.

Tricker, B., 2012. *Corporate Governance: Principles, Policies and Practices.* 2nd ed. Oxford: Oxford University Press.

Ujunwa, A., 2012. Board characteristics and the financial performance of Nigerian quoted firms. Corporate Governance: The international journal of business in society, 12(5), pp.656-674.

Van Damme, P., Wijesiri, M. and Meoli, M., 2016. Governance and efficiency of microfinance institutions: empirical evidence from Sri Lanka. *South Asia Economic Journal*, *17*(2), pp.236-247.

Wei, G., 2007. Ownership structure, corporate governance and company performance in China. *Asia Pacific Business Review,* 13 (4), 519-545.

Yu, M., and Ashton, J.K., 2015. Board leadership structure for Chinese public listed companies. *China Economic Review,* 34, 236-248.

Zhang, Q., Chen, L. and Feng, T., 2014. Mediation or Moderation? The Role of R&D Investment in the Relationship between Corporate Governance and Firm Performance: Empirical Evidence from the Chinese IT Industry. *Corporate Governance: An International Review,* 22 (6), 501-517.

Zhou, K.Z., Gao, G.Y. and Zhao, H., 2017. State ownership and firm innovation in China: An integrated view of institutional and efficiency logics. *Administrative Science Quarterly*, *62*(2), pp.375-404.

Zona, F., 2014. Board leadership structure and diversity over CEO time in office: A test of the evolutionary perspective on Italian firms. *European Management Journal,* 32 (4), 672-681.