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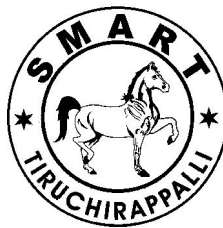
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CEO COMPENSATION AND FIRM INNOVATION; INTERACTION EFFECT OF OWNERSHIP STRUCTURE

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Abstract

The purpose of this paper was to understand the impact of CEO compensation (fixed and variable) on firm innovation (measured through, R&D investment, patents application, invention patent application, utility patents application, propensity to patent and conversion). The authors proposed that this relationship is affected by state-ownership. The authors described the moderating impact of ownership structures, on the earlier prescribed relationship, in a transitional economy in a holistic manner: Authors tested those above direct and moderating relationships in the context of China, by taking all A share companies, excluding financial companies, listed at Shanghai and Shenzhen Stock exchanges from 2007-2016. Authors used year and industry effect and panel data analysis to infer the results. The study revealed that CEO compensation was positively and significantly associated with firm innovation, except for R&D investment. In other words, if CEOs are paid adequately, they will focus on the optimal use of resources. State-ownership adversely but significantly moderated the patent application process. However, its moderating impact on the propensity to patent and conversion was positive and it indicated its value in

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expediting the innovation process. This study introduced necessary managerial implications, to consider the variables mentioned above, before/during/after the innovation process. CEO pay, ownership structures and innovations stages are interrelated and that the moderating impact of ownership structure presented many different horizons for managerial consideration, in a transitional economy like that of China.

Keywords: *CEO Compensation, Innovation, Ownership Concentration, State-ownership, R & D Investment*

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1.Introduction

Continuous innovation is key to survival for the firms, in a competitive business environment. Cultivating an innovative culture demands critical investments in the research and development projects, with a long-sighted futuristic opinion. CEO and board of directors, in association with the principal shareholders, can play a significant role in yielding efficient innovation output. The relationship between CEO, the board of directors, principal shareholders, and innovation is very complex and cannot be explained with the help of a single theory because a single theory lacks the broader scope, and often takes the support of different assumptions. The optimal contracting theory perspective of the agency theory predicts that independent surveillance by the principal shareholders can incorporate an efficient, goal-oriented, and motivated environment and it can help organizations to get a sustainable competitive advantage. Secondly, according to the resource-based view, organizations with valuable, rare, perfect, and non-substitutable resources will nourish a continually innovative and competitive environment.

Managers on the board, are strongly tied with their huge shareholding, and they are highly risk-averse. Investment in innovation projects

such as product development and design development, demands a long-term vision because the returns of the innovative projects can often exceed the managerial tenures. Effective compensation plans, accommodating the managerial risk-taking attitude, can inculcate an innovative environment. Hence implementation of the compensation plans is a strategic decision.

Data were obtained from the most trusted database, i.e. CSMAR (Chinese Stock Market and Accounting Research), of all non-financial companies listed at Shanghai and Shenzhen Stock exchanges and the study covered the years from 2007 to 2016. Results showed that CEO compensation was an accurate predictor of innovation but State-ownership showed mixed evidence. State-ownership positively moderated the relationship as far the intensity of the innovation process was concerned. On the other hand, State negatively influenced the CEO compensation and innovation relationship. Possible reasons might be the priority differences of state-owned enterprises because of their less focus on profit maximization.

2. Review of Literature

2.1 Firm Innovation

Globalization renders innovation more critical. Globalization gives rise to greater product

diversity, increased customer demands and thus gives rise to competition. The only way to survive in this dense competition is through innovation. Innovation refers to the production of an idea, practice, or object, that is perceived new and valuable, for the customer, organization, or unit of adoption.

2.2. Measurement of Firm Innovation

Patents facilitate innovation and eventual commercialization of the claimed invention by giving it a legal right. Purposes of patenting are manifold. *Firstly*, the creation of an innovative idea, that will ultimately incentivize the prospective idea holder (**Landes and Posner, 2009**). It implied selling the commercial personification of the invention, at skimmed prices or through licensing the idea (**Lemley, 2004**). *Secondly*, the patent exclusivity helps the patent holder to prevent others from duplicating the information (**Lemley, 2004**).

Shareholders foresee investment in the research and development field as a leading way towards innovation because it is critical for the growth of an enterprise. **Tsao and Lin and Chen (2015)** stated that intensive investments in the research and development sector could yield an innovative environment, if backed up by flexible CEO compensation framework. It is well established in the literature that higher research and development expenditures can reap greater innovation for the organizations (**Ruiqi, et al. 2017; Schulte, 2015; Wang and Kafourous, 2009**). R&D expenditures are revenue expenditures, with return suppressed over the long term. Managers, being short-sighted, sometimes hesitate to invest in the rich R&D projects and instead they preferred to invest in the speedily paying off projects.

2.3. Underlying theories

Agency theory postulates that agents work for the benefits of their principals and that they

do not prefer their interests to the interests of their principals. Separation of ownership and management raises the agency conflicts where directors, being an agent to the shareholders, prefer their personal benefits in contrast to the organizational benefits. This agency problem can be minimized through an appropriate compensation plan. Agency problems can also be reduced by competently examining the activities of the agents through a proper ownership structure.

Agency theory also postulates that managers usually hesitate to invest in the innovation because the payback period of these projects exceeds the tenure of managers and that the managers overlook these investments and thus compromise the organizational benefits for their shortsighted personal benefits. This possible agency problem can be solved with a compensation plan duly dedicated to the performance, that can align the interest of both the parties through promoting the motivation of managers towards long-term radical R&D decisions, that consequently foster innovation. The optimal contracting theory perspective of the agency theory explains that a performance-based compensation plan can mitigate the agency problems. The optimal contracting theory describes that an independent board can enter into more performance-based compensation contract that can reduce the agency problems (**Balsmeier, Fleming, and Manso, 2017; Sarhan, et al. 2018**).

Resource-based view postulates that heterogeneous resources are positively associated with organizational performance. However, this theory argues that resources should possess several attributes for being competitive. Firstly, the remedy should be *valuable* that it should be able to improve the effectiveness and efficiency of the organization. Secondly, it should be *unique* and should be

available to one organization. Thirdly, it should *not be imitable* by the competitors in the ordinary circumstances and lastly, it should be *non-substitutional*. This theory thus guides organizations to innovate because it is the most appropriate route to gain valuable, unique, perfect, and non-substitutional resources, that eventually enable organizations, to get a competitive advantage.

2.4. CEO Compensation and Firm Innovation

Extant literature had discussed the association between CEO compensation and firm innovation. Studies by **Bolton, et al. (2015)**; **Sheikh (2018)**; **Smirnova and Zavertiaeva (2017)** concluded that the former has a positive impact on the latter. Although overall results remained positive, this positive relationship is a function of the industry and compensation types and pay for performance. Exploration of this study is of unique significance to the managers and investors because, at *first*, the risk-averse attitude of managers, tied with their massive investments in the shares of the company, can be overcome with the performance incentive plans (**Fama, 1980**). *Second*, innovation investment is prone to be high-risk in contrast to the investment in the physical assets (**Bhagat and Welch, 1995**). The cash inflows can stretch over long-term, exceeding the managerial tenure. *Third*, innovative financing can compromise the short-term earnings because this cannot be capitalized.

Therefore, compensation plans should adequately be tied with the firm performance rather than accounting performance. The literature evidence is less conclusive in the context of compensation plans with those of the firm performance, except for stock options. **Vo and Nguyen, (2014)** found a direct association between performance-related incentives and

research and development investment. **Mazouz and Zhao (2018)** also indicated that the ratio of long-term equity-based incentives and total (fixed and variable) compensation were significantly linked with high investment innovation projects. On the contrary, **Holthausen, et al. (1995)** found a negative association between compensation and number of patents.

2.5. Ownership Structure as Moderator between CEO Compensation and Firm Innovation

Agency problems can be controlled through supervisory checks on the CEO decisions. CEOs take decisions with the collaboration of directors. Majority of shareholders usually work as directors to their companies, and they can significantly influence the strategic corporate decisions. Friendly boards, characterized by CEO-directors social connectedness, are positively associated with patents and citations (**Kang, et al., 2018**; **Ruiqi et al., 2017**). Boards significantly help the CEO in evaluating and incorporating the innovation projects (**Faleye, et al, 2014**).

2.6. State-Ownership

In the emerging economies, the State plays a significant role in shaping the route of enterprises. From the last quarter of the Twentieth Century, China had begun to reform from a centrally controlled economy to the private enterprises. It is evident that growth in the number of privately-owned enterprises had remained significant since 1992 when the first privately-owned enterprise was listed in the Chinese Stock Exchange (**Ding, Zhang, & Zhang, 2007**) but in 2015, among Fortune Global 500, China had 72 state-owned enterprises, that represented two-thirds of the total number. Many SOE's in the emerging economies are flourishing at a rapid pace, thus challenging the

conventional, efficiency-based economic view, that government intervention delays the decision making (Musacchio & Lazzarini, 2013; Stan, Peng, & Bruton, 2014).

2.7.State-Ownership and CEO compensation

Ownership structures do play a very dominant role in designing the compensation structure of the top executives of an enterprise. **Liang, Renneboog and Sun (2016)** discussed the managerial role of the State to influence the executive compensation in China. A study by **Lam, McGuinness, and Vieito (2013)** found negative association between state-ownership and CEO compensation, for companies with a higher proportion of state-ownership. It is stated that the interests of shareholders is minimal in case of state-ownership in contrast to the private shareholders.

2.8. State-Ownership and Firm Innovation

It is also well acknowledged in the literature that State-owned organizations are more inclined towards risk-taking, because of their crucial role in policy making and defining rules and regulations (**Mahmood & Rufin, 2005**). Several studies have explored the direct effect of state-ownership on innovation, arguing that State-ownership gives superior access to the licensing, administrative privileges, and raw materials that is generally restricted to the regular market channels (**Choi, Lee, & Williams, 2011; Ruiqi et al., 2017; Yi, Hong, chung Hsu, & Wang, 2017**).

3. Statement of the Problem

A well-adjusted, performance-based compensation plan can inculcate an adaptive innovation culture in an organization. It is also known in the literature that the relationship between CEO compensation, innovation and

State-ownership is a function of several factors such as industry type (**Mazouz & Zhao, 2018**), kind of ownership structure (**AlHares, Ntim, & King, 2018**), and executive compensation plan (**Lam et al., 2013**). State-ownership is a key moderating variable in a transitional economy, wherein the State holds a significant proportion of shares and ownership, that enable companies to have competitive access to the less commonly available resources. The State may mitigate the innovation process on account of its bureaucratic limitations. **Carney, Estrin, Liang and Shapiro (2018)** explored the role of State-ownership from a cross-country perspective. **Liu, Qu, and Haman (2018)** examined the mitigating impact of State ownership on product market competition and firm performance relationship. **Gaio and Pinto (2018)** studied the impact of State-ownership on financial reporting and earning management.

Although, the above relationships are informatively rich, the findings are inconclusive. Majority of studies had addressed the direct impact of one or two variables on another variable **Kroll and Kou (2019)** and lacked a combined infrastructure where the presence of all variables should have been analyzed together. Several theories inform us that all the variables mentioned work simultaneously, in a complex organizational context and that the direct relationships cannot adequately explain this complex phenomenon.

Therefore, a study was needed to bridge this knowledge gap, that should discuss the moderating impact of ownership structures on the CEO compensation and different stages (R&D investment, patent application), types (invention patent application, utility patent application), and agility (propensity to patent and conversion) of the innovation process.

4. Need of the Study

Innovation remains an essential hallmark of organizational success. Innovative cultures increase the probability of organizational progress, using patents. The innovation process is a complicated process and it demands radical decisions as to the investment and continuous monitoring. CEO compensation, innovation and ownership structures are found interlinked in the existing literature. However, these studies discussed the relationship directly without taking all variables as a unit. However, a research initiative, that should address the moderating impact of ownership structures on the CEO compensation and innovation relationship in the transitional, but fastest growing economy of China, is lacking.

5. Objectives of the Study

Following objectives were formulated to be tested in this paper.

- (i) To understand the impact of CEO compensation on firm innovation.
- (ii) To understand the moderating impact of State-ownership on CEO compensation and firm innovation relationship.

6. Hypotheses of the Study

H1: CEO compensation has an impact on innovation

H2: State-ownership has a moderating impact on CEO compensation and innovation

H1a: CEO compensation has an impact on research and development expenditures.

H1b: CEO compensation has an impact on the patent application.

H1c: CEO compensation has an impact on invention patent application.

H1d: CEO compensation has an impact on the utility patent application

H1e: CEO compensation has an effect on the propensity to patent.

H1f: CEO compensation has an impact on conversion.

H2a: State-ownership has a moderating impact on CEO compensation and research and development expenditures relationship.

H2b: State-ownership has a moderating impact on CEO compensation and patent application relationship.

H2c: State-ownership has a moderating impact on CEO compensation and invention patent application relationship.

H2d: State-ownership has a moderating impact on CEO compensation and utility patent application relationship.

H2e: State-ownership has a moderating impact on CEO compensation and propensity to the patent relationship.

H2f: State-ownership has a moderating impact on CEO compensation and conversion relationship.

Econometric Models

Based on the research question, objectives and hypotheses, different models were used in this study, for estimation purpose.

$$Innovation_{i,t} = \alpha_0 + \alpha_1 CEO\ Compensation_{i,t} + \alpha_j \sum Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Innovation_{i,t} = \alpha_0 + \alpha_1 CEO\ Comp_{i,t} + \alpha_2 StateOwned\ Firms_{i,t} + \alpha_3 CEO\ Comp_{i,t} * StateOwned\ Firms_{i,t} + \alpha_j \sum Controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

7. Research Methodology

7.1 Research framework

This study examines the impact of CEO compensation, on different proxies of firm innovation, by taking the moderating effect of State-ownership.

7.2 Sample Selection

China has adopted a dual-track economy which is a transition mechanism, that liberalizes the traditional, central monitored system, but retains the government control. Thus, China provides the best place to understand the market behaviour from the multidimensional standpoint. A reform strategy, that allows local governments to set their interests to support and protect their firms (Boisot & Meyer, 2008) and the induction of industry-specific incentives and regulations for innovation, makes this country an ideal context for this kind of research.

7.3 Sources of Data

All companies, listed at Shanghai and Shenzhen stock exchange, were taken as the sample. The reason to choose only “A share companies” was due to the fact that they represented a comparatively more matured behaviour of the local economy.

7.4 Period of the Study

Data about A share companies, from 2007 to 2016, were collected from the Chinese Stock Market and Accounting Research (CSMAR) database. Financial firms were excluded from the list because of their unique financial structure and prioritized features.

7.5 Tools Used in the study

Data were collected from secondary sources and analyzed through descriptive statistics in order to identify specific patterns

and explanations of facts prevailing in the data. The study was conducted to find the impact of CEO compensation on different measurements of innovation. In this scenario, correlation analysis was a useful tool, to measure the strength of inter-relationships between any two variables.

To find the answer to our first objective, econometric equation (1), was regressed to get the model, with year and industry effect for six types of the innovation proxies because our dependent variable was measured through six different methods. This multiple analysis was performed to check the reliability of our results. Results are presented in **Table-1**, and the discussion of the results is presented below.

8. Analysis of Data

Results of **Table-1** indicate the tendency towards utility patent to be greater as compared to the invention patent. In other words, companies usually focus on the upgradation of its existing processes rather than inventing new processes. In **Table-2**, the Pearson's correlation matrix reveals the presence of multicollinearity between independent variables. Value of the correlation matrix reveals that no value in the matrix was more than 0.80, which indicated the absence of multicollinearity between the independent variables. As the first hypothesis was divided into six sub hypotheses, the results from **Table-3** (from Model 1 to Model 6) indicated that there was positive and significant impact of CEO compensation on all measurements of innovation, except for research and development expenditures. Hence reject all hypotheses from H1b to H1f, except H1a, at one percent level of significance, with P values of 0.0001, 0.002, 0.008, 0.001 and 0.0003 respectively. A possible reason for not rejecting

H1a may be that in the presence of a compatible compensation plan, CEOs are more concerned about output rather than input and their behaviour tends to be more efficient. As discussed earlier, research and development expenditures are inputs for the innovation process, and that the success of this investment would be evident through a patent application. The study results are in support of the optimal contracting theory perspective of agency theory because CEO compensation will lessen the agency conflicts and it will streamline the progress of the firm, keeping the interests of the shareholders. The results are in accordance with the results of **Francis, et.al., (2011)**, who measured the impact of CEO compensation on firm innovation in S&P 400, 500 and 600 firms. To find out the moderating impact of state-ownership on CEO compensation and firm innovation relationship was regressed and econometric model (2) results with the SOE as an interaction term, are given in **Table-4** (Model 7 to Model 12). Reason for possible rejection of H2a may be the formal bureaucratic culture of the State which may hinder the initiation of innovation process, as described by **Guan, et al (2009); Jefferson, et al (2003); Xu and Zhang, (2008)**. H2c at 5 percent level of significance, with the P value 0.05, was accepted because the results indicated that State-ownership recorded a significant negative moderating impact on the relationship between CEO compensation and the invention patent application. The possible reason for this negative impact may be attributed to the priority differences of the State-owned enterprises (**Choi et al., 2011**). The State may prioritize invention patent more as compared to utility patent (See Model 9 and Model 10). However, the acceptance of H2c hypothesis indicated that the bureaucratic and more formal structure of State

owned enterprises may slow down the policy making, thus negatively moderate the over-all innovation process. This may be a possible reason for a negative moderating role of State in case of utility patent application. H2e and H2f hypotheses, at 5 percent level of significance, with P values of 0.02 and 0.03 respectively, were accepted (See Model 11, and Model 12) and it indicated that once the process of innovation was started, the unique monitoring role of State encourages enterprises to expedite the innovation process to succeed (**Li & Xia, 2008; Mahmood & Rufin, 2005**). The propensity to patent should be annexed with the invention patent only because the interaction results had rejected the H2d hypothesis (See Model 10).

9. Findings of the Study

Regarding the moderating impact of State-ownership on the CEO compensation and innovation relationship, it was found that State-ownership negatively and significantly moderated the relationship between CEO compensation and innovation. The State remained more inclined to the invention patents whereas the focus of investors remained on modifying the existing process. The study discussed the CEO compensation and innovation relationship, across different stages (initiation, types, and results) of the innovation process in contrast to the earlier studies, which measured innovation process as a holistic phenomenon **Sheikh, (2018); Smirnova and Zavertiaeva (2017)**.

10. Conclusion

The study examined the moderating impact of state-ownership on the CEO compensation and firm innovation relationship in the context of a developing economy. Data were obtained from 2007 to 2016, through CSMAR database, about all A share companies listed on Shenzhen

Stock Exchange and Shanghai Stock Exchange. The study discussed CEO compensation and innovation relationship across different stages (initiation, types, and results) of the innovation process in contrast to the earlier studies, which measured innovation process as a holistic phenomenon **Sheikh, (2018); Smirnova and Zavertiaeva (2017).**

Statistical examination of the data indicated a complex moderating behavior of State-ownership on CEO compensation and firm innovation relationship. State exercised a negative moderating impact on the initiation of innovation process. This negative impact was significant for invention patents but insignificant for utility patents. However, once the innovation process was started, then the monitoring role of State helped enterprises to achieve successful innovation output.

11. Suggestions

Developing economies, in contrast to the developed economies, are characterized by complex ownership structures such as State-ownership. Therefore, the moderating impact of ownership structures could be explained across all stages of the innovation process. These varied results can help shareholders, investors and management, to develop a more informed understanding of the innovation process. These research findings can provide help to the management, current and prospective shareholders to understand the behaviour of ownership structures on the innovation process. Differences of the results, concerning utility and invention patent, can help all stakeholders to rank their priorities.

12. Limitation of the Study

Due to the lack of available data, the study examined only a single country and the financial

structure of China is far different from other developing countries. Hence a cross-country analysis could add more to the generalizability of the findings.

13. Scope for Further Research

CEO power in place of CEO compensation, can provide a better understanding of the phenomenon and hence a seven-dimensional CEO power index, as proposed by Sheikh (2018), can be used for further research.

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Table-1: Descriptive Statistics for Sample Variables relating to CEO Compensation and Firm Innovation

Variable	Mean	Std. Dev.	Min	Max
CEO Compensation	12.9435	0.8112	10.5966	14.9867
Propensity to Patent	0.0033	0.0078	0.0001	0.0584
R&D Investment	0.0048	0.0178	0.0000	0.1271
Firm Performance	0.0373	0.0567	-0.2126	0.1897
Invention Patent Applications	1.6818	1.2751	0.0000	5.5835
Utility Patent Applications	1.9449	1.3245	0.0000	5.7621
Patent Applications	2.3940	1.3805	0.0000	6.3699
Conversion Rate	0.0023	0.0055	0.0000	0.0397
Ownership Concentration3	49.0315	15.8494	15.5886	86.1604
Ownership Concentration5	53.1318	15.9365	18.1888	88.5133
Ownership Concentration10	57.6504	16.0106	21.0875	90.2792
State-owned Enterprises	0.4469	0.4972	0.0000	1.0000
Firm Size	21.7258	1.2485	19.0215	25.4937
Independent Director Ratio	0.3702	0.0522	0.3000	0.5714
Leverage	0.4411	0.2150	0.0460	0.9027
Age of Firm	8.8057	6.4084	6.0000	26.0000

Source: Data obtained from the (CSMAR) database and computed using SPSS

Table-2: Pearson Correlation Matrix for Sample Variables relating to CEO Compensation and Firm Innovation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. R&D Investment	1															
2. Patent Applications	0.01	1														
3. Invention Patent Applications	0.04	0.73	1													
4. Utility Patent Applications	-0.04	0.66	0.60	1												
5. Conversion Rate	0.00	0.73	0.58	0.68	1											
6. Propensity to Patent	0.00	0.75	0.66	0.67	0.76	1										
7. CEO Compensation	-0.02	0.27	0.28	0.19	0.23	0.26	1									
8. Ownership Concentration 3	-0.07	0.10	0.05	0.12	0.10	0.09	0.10	1								
9. Ownership Concentration 5	-0.05	0.09	0.03	0.11	0.09	0.07	0.10	0.78	1							
10. Ownership Concentration 10	-0.04	0.08	0.03	0.10	0.08	0.07	0.10	0.61	0.77	1						
11. SOE/Non SOE	-0.03	0.12	0.16	0.08	0.12	0.14	0.04	0.02	-0.05	-0.11	1					
12. Firm Size	-0.08	0.39	0.38	0.36	0.41	0.43	0.32	0.17	0.12	0.09	0.41	1				
13. Independent Director Ratio	0.05	0.03	0.04	0.02	0.04	0.04	-0.02	0.07	0.06	0.05	-0.04	0.03	1			
14. Firm Performance	-0.01	0.12	0.09	0.07	0.09	0.08	0.27	0.16	0.20	0.24	-0.17	-0.04	-0.03	1		
15. Leverage	-0.09	0.13	0.13	0.17	0.15	0.16	0.02	-0.06	-0.12	-0.18	0.38	0.55	-0.02	-0.42	1	
16. Firm Age	-0.06	0.12	0.13	0.09	0.12	0.15	0.09	-0.23	-0.32	-0.39	0.56	0.45	-0.05	-0.23	0.46	1

Source: Data obtained from the (CSMAR) database and computed using SPSS

Table-3: Regression Results without Interaction Effect for Sample Variables relating to CEO Compensation and Firm Innovation

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	R&D Investment	Patent applications	Invention patent applications	Utility Patent applications	Propensity to patent	Conversionrate
CEO Compensation	0.0002	0.1078***	0.1373***	0.0645***	0.0007***	0.0004***
	-0.9	-4.91	-6.13	-2.65	-5.67	-5.25
Firm Performance	-0.0163***	2.9044***	2.0582***	2.2881***	0.0070***	0.0046***
	(-4.42)	-8.4	-5.85	-6.73	-3.61	-3.39
Firm size	0.0002	0.4998***	0.4935***	0.4649***	0.0030***	0.0020***
	-0.271	-27.23	-26.46	-23.65	-29.57	-28.62
Independent director ratio	0.0144***	0.5078**	0.4812*	0.4025	0.0023	0.0019*
	-4.69	-1.89	-1.76	-1.38	-1.56	-1.84
Leverage	-0.0057***	-0.0711	-0.0668	0.2212**	-0.0012**	-0.0008**
	(-5.55)	(-0.72)	(-0.68)	-2.07	(-2.17)	(-2.22)
Firm age	0.0000***	-0.0025	-0.0046	-0.0087***	0	0
	(-2.42)	(-0.79)	(-1.44)	(-2.52)	(-0.5)	(-1.49)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0071	-11.4614***	-11.7733***	-10.3586***	-0.0736***	-0.0493***
	(-1.58)	(-22.22)	(-23.17)	(-11.79)	(-25.3)	(-24.17)
R²	0.1174	0.2866	0.2569	0.3186	0.3066	0.3025
Adj- R²	0.11	0.279	0.2479	0.3091	0.2992	0.2951
F-Statistic	15.97***	37.59***	28.54***	33.28***	41.38***	40.58***

Note: *** if p < 0.01, ** if p < 0.05, * if p < 0.1, † if p < 0.1.

Source: Data obtained from the (CSMAR) database and computed using SPSS

Table-4: Regression Results with Interaction Affect for Sample Variables relating to CEO Compensation and Firm Innovation

	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	R&D Investment	Patent applications	Invention patent applications	Utility Patent applications	Propensity to patent	Conversionrate
CEO Compensation	0.0003	0.1182***	0.1686***	0.0829***	0.0004***	0.0003***
	-1.11	-4.37	-6.07	-2.76	-3.17	-2.94
CEO Comp*SOE	-0.0002	-0.0223	-0.0786**	-0.0387	0.0005**	0.0003**
	(-0.61)	(-0.56)	(-1.94)	(-0.88)	-2.3	-2.17
SOE/Non SOE	0.0034	0.3068	1.1449**	0.5415	-0.0065**	-0.0044**
	-0.6	-0.59	-2.16	-0.94	(-2.26)	(-2.18)
Firm Performance	-0.0161***	2.8783***	2.1404***	2.5546***	0.0069***	0.0044***
	(-4.36)	-8.29	-6.06	-6.62	-3.55	-3.26
Firm size	0.0001	0.4972***	0.4857***	0.4632***	0.0029***	0.0020***
	-1.03	-26.63	-25.64	-23.06	-28.58	-27.91
Independent director ratio	0.0149***	0.5009*	0.4824*	0.3779	0.0013	0.0012
	-4.82	-1.85	-1.75	-1.28	-0.91	-1.12
Leverage	-0.0057***	-0.0837	-0.0942	0.2038**	-0.0011**	-0.0008**
	(-5.55)	(-0.85)	(-0.94)	-1.9	(-2.04)	(-2.06)
Firm age	0.0000**	-0.0033	-0.0097***	-0.0110***	0	0
	(-2.2)	(-0.94)	(-2.73)	-0.006	(-0.68)	(-1.36)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0087*	-11.5424***	-12.0585***	-10.5392***	-0.0691***	-0.0466***
	(-1.66)	(-20.19)	(-21.25)	(-11.45)	(-21.52)	(-20.73)
R²	0.1165	0.2842	0.2552	0.3176	0.305	0.3021
Adj- R²	0.1089	0.2763	0.2459	0.3078	0.2973	0.2944
F-Statistic	15.38***	35.19***	27.40***	32.09***	39.78***	39.24***
Note: *** if p < 0.01, ** if p < 0.05, * if p < 0.1, † if p < 0.1.						
SOE mean State-owned Enterprises						

Source: Data obtained from the (CSMAR) database and computed using SPSS