EFFECT OF CORPORATE GOVERNANCE ON THE FIRMS' STRUCTURAL CAPITAL

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Abstract

The study seeks to understand how the firm's ownership structure and the board of directors' composition influence the structural capital. The latter is apprehended by three main levers: TMT compensation, innovation, and firm's reputation. By mobilizing several panel linear regressions on 274 American firms, the results show that the firms which heavily invest in structural capital are more successful and chaired by the younger and heterogeneous TMT. No disciplinary effect of the board on structural capital has been found. The results support the cognitive theory assumptions. The classic perspective failed to explain the structural capital phenomena. In order to enhance their structural capital, firms must pay a close attention to their board cognitive contribution and not to its disciplinary role.

Keywords: Corporate Governance, Structural Capital, TMT Compensation, Innovation, Reputation

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1 - CONCEPTUAL FRAMEWORK AND HYPOTHESIS

1.1 - The Effect of Governance on the Intellectual Capital: The Contractual Approach View Point

1.1.1 - The Composition of the Board of Directors as the Main Determinant of the Structural Capital

Duality: According to the agency theory, the managers who hold of a dual position, have an unmeasured power which allows them to satisfy their self interests by increasing the cash part of their remuneration and decreasing the investment in R&D, which may damage the company's reputation. By contrast, the theory of normal succession assumes that the duality allows a better strategic decision and does not systematically lead to harmful activities (Vancil, 1987).

Size of the board of directors: The agency theory assumes that the boards of directors of small size exercise a more effective control. These boards are likely to enhance the firm's reputation and promote innovation by taking the appropriate decisions.

Presence of outsiders: A great majority of researchers advocate "the effectiveness of the outsiders" hypothesis which is supported by the agency theory and associated the presence of the outsiders with a triple advantage: the opening of prospects, the experience and the independence (Fama, 1980; Fama and Jensen, 1983). The presence of outsiders stimulates innovation (Baysinger, Kosnik & Turk, 1991; Tylecote and Visintin, 2008). In this respect, Kosnik (1990) argued that the outsiders are more likely than

the insiders to impose their choices in favor of the shareholders' interests by reducing the managers' resistance to changes and to the risky investments of "R&D".

The proponents of "the managerial hegemony" hypothesis, however, found that the managers dominate the board of directors (Lin and Hsing, 1997; Monks and Minow, 1995) and the outsiders tend to prefer the non risky projects in order to preserve their reputation. This behavior can be prejudicial to the stocks' value because "eliminating the most risky projects can in some cases lead to eliminating the most profitable ones".

Hypothesis 1: The level of the structural capital of a firm depends on the composition of its board of directors (Duality, size and percentage of outsiders).

1.1.2 - The Ownership Structure as the Main Determinant of the Structural Capital

Concentration of capital: According to the agency theory, the presence of the "Blockholders" reflects the effectiveness of the control of the board. Thus, the managers of firms which are individually controlled (including at least an investor who owns more than 5% of the capital) are less paid than their counterparts in managerial firms (controlled by managers and characterized by a thin and emaciated ownership) (Finkelstein & Hambrick, 1995; Shleifer and Vishny, 1997).

The effect of the concentration of capital on investments in "R&D" is subject to two conflicting perspectives. According to the agency theory, the presence of blockholders should be reflected through an increase in the "R&D" investment (Cook and Deakin, 1999; Crespi, 2004; Hill and Snell, 1988). But the dominating shareholders can agree with the managers to maximize their own interests by reducing the investments in "R&D"(Pound, 1988; Shleifer and Vishny, 1989).

Managerial ownership: According to the theory of entrenchment, the managers who possess bigger share capital can take advantage of their supremacy to conduct the remuneration and the investment policies in the direction of achieving their own goals by stressing the bonus and reducing the amount devoted to "R&D" and stock options. This is opposed by the theory of the interests' convergence (Salancik and Pfeffer, 1980). Harley & Roy (2002) suggested that there may be a substitution effect between the property and the remuneration of managers. Therefore, the company does not need to use the options to align the interests of managers (owners) with those of the shareholders.

Institutional ownership: The institutional investors have recently emerged to reduce the managerial supremacy (Gompers *et al*., 2003). The attitude of these institutional investors towards the risk is subject to two contradictory alternatives. According to the dominant "efficient control" hypothesis, the institutional investors who highly contribute to the capital urge the managerial coalition to act in the interest of shareholders and partners (Pound, 1988) by profiting from the "R&D" (Eng and Shackell, 2001) and the stock options (Harley and Roy, 2002). These comments are not valid if the institutional investors have business relationships with the managers (assumption of the strategic alignment).

According to the theory of the "myopia of the institutions", the institutional investors are considered as transitional shareholders who are looking for short-term profits (Bushee, 1998). Graves (1988) noted that the "R&D" expenses are small in the firms strongly held by institutional investors in order to limit the risk of the firm and keep the financial interests of the companies they represent (especially if these investors are creditors of the firm).

Outsiders' ownership: The more important their ownership in the company is, the more attentive the outsiders become in controlling the managers so that to regulate their remuneration and lead them to undertake risky and innovative activities (Filatotchev and Bishop, 2002).

Hypothesis 2: The level of the structural capital of a firm depends on its ownership structure (presence of blockholders, institutional investors, managers and outsiders in the capital).

1.2 - The Effect of the Board of Directors on the Structural Capital: The Cognitive Approach View Point

According to the cognitive approach, the TMT tenure is considered as indicator of its competence (theory of human capital). Indeed, the relationship between the TMT and the shareholders is not hostile anymore but friendly. Their objectives are converging towards the continuous prosperity of the company: Such a goal requires the cooperation of all the actors to increase the comings and equally share them. In this context, the role of discipline of the board yielded to a role of developing and organizational learning.

According to the "stewardship theory" and the "circulation of power model", the insiders are able to exercise an effective control over the TMT. On the other hand and with reference to the "CEO succession theory", duality does not systematically damage the companies' performance. By contrast the common supervision can improve the quality of decision- making and reassure the investors. The board of great size seems to be favored by the stakeholder theory because they generate cognitive conflicts and alternative political coalitions which are able to defy the CEO. These conflicts may create a fruitful organizational learning.

The vehicles of entrenchment can be seen as vehicles of skills acquisition. Thus the role of governance is to help managers improve firm's performance by stimulating innovation and collective learning. The board of directors must have a strategic and external vision to adapt the firm to its environment. They also have to be involved in providing innovation strategies and go beyond the financial control to exercise a strategic control. Thus, the composition of directors' board and the ownership structure of the company (supposed to reflect the power of the board and the magnitude of the financial interests of directors), do not necessarily have a significant effect on innovation.

According to the cognitive perspective, reputation is based on the strategic considerations of innovation, organizational learning and relational capital. This contradicts the classical theory which bases reputation on financial and economic aspects. In fact, the board must play an active role in running the company whose effectiveness mustn't be conceived in terms of independence of the control (contractual approach) but in terms of cognitive contribution. In the absence of some levers of effectiveness of the board, significant levels of "R&D" and reputation can be enrolled. Thus, it does not seem necessary to follow the standards of governance (in the shareholder meaning) so that the company can enhance its intellectual capital.

Hypothesis 3: The structural capital of a firm is not necessarily related to the effectiveness of its board of directors (in the contractual meaning).

1.3 - Other Determinants of the Compensation

In addition to the governance mechanisms there are also other factors which affect the compensation structure: namely, the performance, the size and the human capital of the firm (Laing and Weir, 1999; Lin *et al*., 2011; Matthew, 2006).

According to the agency theory, compensation is the main spur of motivation which allows the aligning of the managers interests with the owners' (Ueng and Wells, 2000). One way of solving the agency problems would be to reward the managers according to the shareholders' income which is the basis of incentive compensation designed to limit the agency costs that are related to "moral hazard" and "adverse selection" problems (Jensen & Murphy, 1990; Jensen and Meckling, 1976). Therefore, and in accordance with the agency theory and the various studies that validate the traditional argument of "maximization of shareholder wealth", performance and compensation are expected to be positively and significantly correlated (Attaway, 2000; Kulik, 2001; O'Connor and Rafferty, 2010). However, the importance of such correlation depends on the considerable measures of the performance and compensation (Elayan *et al*., 2000).

Hypothesis 4: The compensation of managers is linked to the performance of companies.

Since 1967, Baumol has found a positive and strong relationship between remuneration and the firm's size. Thus he has got ahead with his "maximization of sales" hypothesis. As a matter of fact, the managers are usually eager to enlarge the size of the companies in order to diversify the resources under their

control, profit from strong remuneration and enhance their prestige. More recently, Morck, Schleifer and Vishny (1988), according to their hypothesis of "Management entrenchment" have proven that the managerial coalition can use its authority to benefit from excessive compensation (attributed to the growth of sales and not to shareholders wealth). The pioneering studies of the 1980s have shown that the compensation of managers is more strongly related to the size of firms rather than to their performance (Ciscel and Carrol, 1980; Coughlan and Schmidt, 1985; Drucker, 1984; Loomis, 1982; Murphy, 1985). In accordance with the assumptions of "maximization of sales" and "Management entrenchment", it is expected that the compensation of TMT is more important in the bigger firms.

Hypothesis 5: The compensation of managers is positively associated with the size of firms.

The fourth and last conceptual guide explaining remuneration is the theory of "human capital" which establishes a link between the level of TMT human capital and that of compensation. It is suggested that the age and tenure of the TMT positively affect remuneration since they reflect the proficiency and the power of the managers (Becker, 1964; Jeongchul, 2000; Mincer, 1970). Accordingly, the latter are inclined to boost their salaries and reduce the long term incentive pay (Finkelstein and Hambrick, 1996).
Hypothesis 6: The TMT age and tenure are positively associated with their remuneration (global and cash) and negatively related to stock options.

1.4 - Other Determinants of Innovation

In addition to governance, the human capital and remuneration should determine the "R&D" intensity. Indeed, the better paid managers are more likely to invest in the "R&D" (Cheng, 2001). This holds true for the "Stock options" because the managers whose compensation is focused on "stock options" deal attentively with the "R&D".

Hypothesis 7: The "R&D" intensity depends on the nature and the importance of compensation granted to the TMT.

Age and tenure are not only perceived as indicators of the managers' experience but also as a proof of their narrow prospects. Thus their impact on innovation seems to be controversial (Barker and Mueller, 2002; Hayes and Abernathy, 1980; Porter, 1990; Reinmoeller, 2004; Schoenecker *et al*., 1995).

Hypothesis 8: The "R&D" intensity depends on the TMT demographic characteristics.

Finally and according to "Upper Echelons" theory, heterogeneity generates a cognitive conflict which enriches discussions and yields better decisions. It may, however, generate affective conflicts which mess up the working conditions.

Hypothesis 9: The TMT demographic heterogeneity is linked to "R&D" intensity.

2 - RESEARCH METHODOLOGY AND RESULTS

We will present in this section the models, the research variables, the methodological approach and the main results obtained.

In order to test the range of the hypotheses displayed, we need to clarify the determinants of the managers' compensation, "R&D" intensity and the firm's reputation. This is done by using a set of linear regressions for panel data (274 American firms from the Most Admired of the "Fortune" magazine and 8 years running from 1997 to 2004).

Our basic models are the following:

Remuneration of TMT = f ° (Governance, Performance, Sales, TMT Demographic Features, Control variables)
Innovation (R&D) = f° (Governance, Sales, Compensation of managers, TMT Heterogeneity & Demographic Features, Control variables)
Reputation = f° (Governance, Performance, Sales, TMT Heterogeneity & Demographic Features, Control variable).

The 1st table describes the variables used in the regressions.

Table 1. Description of the variables used in the regressions

	Variable Name	***Measure***
Dependent Variables		
Compensation	lnrem	Napierian Logarithm of the total remuneration paid to the TMT (The 1st five senior managers)
Innovation	lnrd	Napierian Logarithm of the amount of "R&D"
Reputation	score	Reputation Score published by the "Fortune" magazine
Independent Variables		
Governance		
Board Size		Number of directors in the board (insiders + outsiders)
Duality (Binary variable)		= 1 if the chairman of the board is the CEO and = 0 otherwise
Percentage of outsiders in the board		Number of outsiders / Board Size
Percentage of majority individual shareholders in the board		Number of majority individual shareholders / Board Size
Percentage of institutional shareholders in the board		Number of institutional shareholders / Board Size
Outsiders' ownership		Number of shares held by the outsiders / Total number of shares in circulation
Managerial ownership		Number of shares held by the managers and directors / Total number of shares in circulation
Majority ownership (Majority shareholders ownership exceeds 5%)		Number of shares held by the individual majority investors / Total number of shares in circulation
Institutional ownership		Number of shares held by the institutional investors / Total number of shares in circulation
Performance	roa	Return on Assets [(Income Before Extraordinary Items / Total Assets) * 100].
	npm	Net Profit Margin (Income Before Extraordinary Items / Revenues) * 100
	mtob	Market to Book (Unitary Price – Monthly – Close /Ordinary Equity divided by Common Shares Outstanding)
Compensation	salr	The proportion of salary (granted to TMT) compared to their total remuneration
	bonusr	The proportion of the bonus (granted to TMT) compared to their total remuneration
	cashr	The proportion of the cash (granted to TMT) compared to their total remuneration
	bsoptr	The proportion of options (granted to the TMT) compared to their total remuneration
Demographic characteristics	age	Average TMT Age
	tenpst	Average TMT Tenure in current position
	tenfirm	Average TMT Tenure in the firm
Demographic Heterogeneity	hettp	Heterogeneity of tenure in the team (tenure max - tenure min)
Control Variables		
Firm Size	lnemp	Napierian Logarithm of Number of employees
Growth of firm Size	sevemp	Sign of evolution in the number of employees (Binary variable : takes the value 1 if the growth of employees compared to the previous year is positive and 0 otherwise)
Revenues	lnrev	Napierian Logarithm of sales
Revenues Growth	erev	It is a binary variable. It takes the value 1 if the growth of sales compared to the previous year is positive and 0 otherwise
Debt	debt	The value of the debt reported to the value of total assets
Activity Sector	isect1	It takes the value 1 if the firm belongs to the sector "Basic materials" and 0 otherwise
	isect2	It takes the value 1 if the firm belongs to the sector "Basic materials" and 0 otherwise
	isect3	It takes the value 1 if the firm belongs to the sector "Consumer Goods" and 0 otherwise
	isect5	It takes the value 1 if the firm belongs to the sector "Healthcare" and 0 otherwise
	isect6	It takes the value 1 if the firm belongs to the sector "Industrial Goods" and 0 otherwise
	isect8	It takes the value 1 if the firm belongs to the sector "Technology" and 0 otherwise

Note: The Technology sector (8) is omitted in the different regressions in order to eliminate the problem of Collinearity. The interpretation will be conducted relatively to this sector. The financial sector (4) is eliminated

because it is subject to specific regulations and the services' sector (7) containing a single firm in our sample is reclassified and assigned to the sector 2 of the conglomerates.

To perform our regressions, we applied a specific procedure for the panel regression[6]. We will present the adopted estimations after detecting and solving the problems. For the sake of clarity, we separate the interpretation of the regressions in three different paragraphs considering the three levers of the structural capital.

2.1 - Remuneration of managers: 1st lever of the internal structural capital

To refine the analyses, we considered four items that reflect remuneration and obtained, therefore, four main models whose endogenous variables are: the total remuneration (lnrem) and the relative measures of remuneration (salr, bonusr and bsoptr). Then and in order to enrich the analysis, we introduced for each principal model (corresponding to the four items of remuneration) three performance indicators that reveal the market value (MTOB) and the firms profitability (ROA and NPM). At the end, we have 12 regressions to test [4 items of remuneration * 3 performance indicators]. The estimation of these models allows us to assess the contingency of the results.

The following table illustrates the results of the principal models where the dependent variable is the natural logarithm of remuneration and the independent variables reflect the main determinants of the managers' compensation (board of directors characteristics, performance variables, indicators of human capital (age and tenure in the post and in the firm), revenues and control variables (the size of the firm and the level of debt)[7].

Table 2. Determinants of Compensation

Model / ***Independent Variables***	***Model 1***	***Model 2***	***Model 3***
Size Board	0.01	0.01	0.01
Duality	0.03	0.03	0.04
Outsiders' Percentage	0.07	0.06	0.02
Majority shareholders Percentage	-0.12	-0.12	-0.12
Institutional Percentage	-0.37***	-0.38***	-0.32***
Managerial Ownership	-0.38**	-0.38**	-0.29**
Outsiders' Ownership	-0.15***	-0.15***	-0.17***
Institutional Ownership	0.03	0.02	-0.03
ROA	0.01***		
Revenues	0.28***	0.27***	0.29***
Age	-0.01	-0.01	0.01
Tenure in position	-0.01**	-0.02***	-0.01***
Tenure in firm	0.01***	0.01**	0.01**
Firm Size	0.03**	0.04***	0.04**
Debt	-0.01	-0.01	-0.01
isect1	-0.64***	-0.65***	-0.63***

[6] We have applied the following approach:

- Perform the test of VIF to detect a potential problem of collinearity
- analyze the type of relationship (linear, quadratic or cubic) between the dependent variable and each independent variable
- Estimate the model by individual fixed effects (test of Fisher)
- Estimate the model by individual random effects (Lagrange Multiplication Test of Breusch & Pagan)
- Specify the model (fixed or random effects) by using the Hausman Test
- Conduct the "post – estimation tests " to reveal the potential problems of heteroskedasticity and auto correlation of errors
- and finally correct the detected problems by performing the Least Squares Quasi Generalized

[7] The results of models relating to various components of the compensation are indicated in the appendices

isect2	-0.48***	-0.47***	-0.46***
isect3	-0.19***	-0.18***	-0.19***
isect5	-0.61***	-0.62***	-0.60***
isect6	-0.47***	-0.47***	-0.46***
NPM		0.01***	
MTOB			0.01***
Constant	8.35***	8.52***	8.10***
N	2190	2190	2190

Notes:
1. All models have for endogenous variable the total remuneration of TMT but the performance indicators are different (we introduce among the independent variables respectively in the three models: roa, npm and mtob)
2. Significance levels: †p < .10; *p < .05; **p < .01; ***p < .001.
P-values greater than .05 but less than .10 are considered marginally significant. P-values greater than .10 are considered insignificant.
A first review of the estimations shows the sturdiness of results that are similar in all the models.

Effect of Governance: The institutional investors' rate, the managerial ownership and ownership of the outsiders have a limited effect on the TMT remuneration. The managers and the outsiders who possess a considerable share in the capital tend to maximize the firm's value as it is the basis of their revenues. This is done by controlling more effectively the managerial decisions and the policy of compensation (ß = -0,38 in model 1 & 2 and -0,29 in model 3, $p < 0,01$ in all). In addition, a board that is dominated by the outsiders is not rigorous systematically if these outsiders have small parts in the capital.

However, a more detailed analysis in terms of the different components of the pay will refine our interpretations and reveals that only the managerial ownership and the institutional investors' rate in the board have a significant effect on remuneration (see Appendix). Concerning the other mechanisms of control, the results are not conclusive. The results also show that a strong managerial ownership and a relevant presence of institutional investors in the board are associated with higher levels of salaries and bonuses and low levels of stock options. These results contradict the agency theory which asserts the effectiveness of the governance mechanisms in reducing short term incentive compensation and enhancing that of long term. In fact, the stock options which engage the managers for long periods of time are not highly preferred. These managers are known for their appreciation of the short term.

Effect of Firm Size: The effect of the revenues and the firm size on compensation is positive and significant (ß = 0,28 in model 1; 0,27 in model 2 and 0,29 in model 3, $p < 0,001$ in both). This supports the argument of the managerial theory which stipulates that the managers are usually tempted to expand the firm in order to obtain exorbitant amounts of compensation (Amihud and Lev, 1981; Hill and Snell, 1989). In addition, the firms of big sizes are more difficult to manage and therefore require high qualifications and great effort. These qualifications and this effort should be the subject of greater rewards (H_5 validated).

Effect of Performance: The results show that profitability and the market value have a positive effect on the TMT compensation, which confirms the argument for maximizing the performance advocated by the proponents of the agency theory (ß = 0,01 in all models, $p < 0,001$: H_4 validated).

In this respect, it is possible to raise the following questions: What is the most important factor in the TMT compensation? Is it the performance of the firm or its size? To answer these questions, we must compare the sales and performance elasticity of remuneration[8]. The following table shows the superiority of the sales elasticity compared to the performance elasticity in the three models. Therefore, the assumption of the managerial theory ("maximization of sales") is more consistent than that of the agency theory ("maximization of the performance").

[8] Since our exogenous variables do not have the same form (the variable lnrev is in natural logarithm while ROA (NPM or MTOB) is a ratio), then we must use the elasticity. The regression coefficient of lnrev corresponds to the sales elasticity of remuneration. So we must determine the performance elasticity of remuneration. To do this, we generate a new variable "elas" which is equal to the multiplication of ROA by its regression coefficient and then have to calculate the mean of this new variable.

Table 3. Sales and Performance Elasticity of Compensation

Model	***Model 1***	***Model 2***	***Model 3***
Revenues (lnrev)	0,28	0,27	0,29
ROA	0,04 = (0,008 * 4,8318)		
NPM		0,03 = (0,007 * 4,9627)	
MTOB			0,03 = (0,006 * 5,2844)

Note: In the 1st model: 0,008 is the regression coefficient of "ROA" and 4,8318 is the average value of "ROA" in the sample.

In order to identify the effect of the various performance measures on the different components of remuneration, we have brought together, in the same table, the regression coefficients we need[9]. We compared the regression coefficients of the independent variables (performance measures) in the sub-models which have as dependent variables the amount of salaries, bonus and stock options granted to the TMT.

Table 4. Effect of the Performance on the Various Compensation Components

Dependent Variables / ***Independent Variables***	***Salary***	***Bonus***	***Stock-Options***
ROA	-0,002***	0,003***	-0,002***
NPM	-0,001***	0,002***	-0,001***
MTOB	-0,001***	0,001	0,001**

Note: Significance levels: †p < .10; *p < .05; **p < .01; ***p < .001. P-values greater than .05 but less than .10 are considered marginally significant. P-values greater than .10 are considered insignificant.

According to the comparative analysis between the rows and columns of the table, we can say that the amount of salaries is not positively related to performance while the level of the bonus and options closely and respectively depends on the profitability and market evaluation. These findings support the definition of bonus and stock-options and thus confirm our expectations.

Effect of Human Capital: As expected, the older managers are more inclined to maximize the "cash" part of their compensation and limit their stock options (see Appendix). This result supports the assumption of both the managerial and the agency theory. Salary is usually linked to the size and not to the firm performance. It is the less risky component of compensation for the managers (H_6 validated).

Control Variables: The level of debt has no significant effect on the amounts of TMT compensation. The high-tech firms seem to rely on the "stock options" component when paying their TMT (more than the firms belonging to other sectors).

2.2 - R&D Investments: 2nd lever of the Internal Structural Capital

In order to study the effect of board of directors on innovation, we should clarify the main determinants of "R&D" using the panel linear regressions. We suggest to re-estimate the basic model (model 1) by varying the measures of remuneration. The main results related to the four regressions are reported in the following table.

[9] Extracts of the results for the various models relating to the various components of remuneration

Table 5. Determinants of R&D

Model	***Model 1***	***Model 2***	***Model 3***	***Model 4***
Board Size	0,004	0,004	0,004	0,004
Duality	-0,023	-0,023	-0,021	-0,021
Outsiders' Percentage	0,128	0,115	0,097	0,115
Majority shareholders Percentage	-0,361**	-0,349**	-0,320**	-0,338**
Institutional Percentage	-0,054	-0,053	-0,052	-0,055
Managerial Ownership	0,070	0,080	0,102	0,094
Outsiders' Ownership	-0,032	-0,033	-0,028	-0,033
Institutional Ownership	0,018	0,014	0,010	0,013
Revenues	0,329***	0,333***	0,326***	0,332***
Total Remuneration	0,021**			
Age	-0,006**	-0,006**	-0,006**	-0,006**
Tenure in position	0,008**	0,007*	0,006	0,007*
Tenure in firm	0,007***	0,006***	0,005***	0,006***
Tenure Heterogeneity (in position)	0,003**	0,003**	0,003**	0,003**
Firm Size	0,255***	0,257***	0,260***	0,257***
Debt	-0,006**	-0,006**	-0,006**	-0,006**
isect 1	-1,675***	-1,685***	-1,677***	-1,678***
isect 2	-1,081***	-1,085***	-1,080***	-1,075***
isect 3	-0,681***	-0,693***	-0,703***	-0,691***
isect 5	-0,585***	-0,580***	-0,553***	-0,566***
isect 6	-0,706***	-0,711***	-0,704***	-0,702***
Salary		-0,017		
Bonus			-0,029	
Cash				-0,023
Constant	10,040***	10,234***	10,355***	10,243***
N	2192	2192	2192	2192

Notes:

1. Significance levels: †p < .10; *p < .05; **p < .01; ***p < .001. P-values greater than .05 but less than .10 are considered marginally significant. P-values greater than .10 are considered insignificant.
2. For all models, the dependent variable is the natural logarithm of R&D. Among the independent variables, the first model integrates the total compensation but the other models integrate respectively the salary, the bonus and the stock options.
3. The use of "bsopt" instead of "cashr "does not change the estimation, only the regression coefficient of "bsoptr" becomes the opposite of the "cashr" (since bsopt = 1 - cashr).
4. We have reported 3 decimal places for statistics because the ß values are very weak.

***Effect of Governance*:** For all the models, the variables of governance (except the percentage of the majority individual shareholders) do not have a significant effect on the amount of "R&D". Accordingly, the directors' board does not seem to play the disciplinary role as assigned by the agency theory. In fact, it is not necessary for the firm to have a powerful board to be able to improve its process of innovation. In other words, the control mechanisms (reflecting the board power) do not have neither a positive nor a significant effect on the motivation of managers towards the risky investments. A tight control could be exerted by the external mechanisms (the financial market, the public power, the goods and services market and the labor market). The mixed results and the non-significance of board variables support the cognitive approach of governance.

***Effect of TMT Compensation*:** Generally speaking, the effect of remuneration on innovation is positive (ß = 0,021; p < 0,01). The firms which grant the higher compensation to their managers tend to invest heavily in "R&D". Nevertheless, our results highlighted the expected positive effect of stock-options (H_7 confirmed).

***Effect of TMT Demographic Attributes*:** The results indicate that older managers are the least likely to innovate because they are risk-averse (ß = -0,006, p < 0,01 in all). The investments in "R&D" may

adversely affect the firm profitability and thus their compensation. In addition, these managers are not motivated to invest in "R&D" because they have a limited employment horizon and the yields of such investments are to be achieved in the long run. This result supports the presumptions of the "Upper Echelons" and the agency theories and therefore confirms H_8. The effect of TMT tenure on innovation is generally positive and significant for all the models (ß = 0,007 in model 1; 0,005 in model 3 and 0,006 in models 2 & 4, $p < 0,001$ in all). The older managers are more experienced and therefore more likely to run the innovation process **(**Hayes & Abernathy, 1980).

***Effect of TMT Demographic Heterogeneity*:** The effect of heterogeneity is, in all cases, significant and favorable (ß = 0,003; $p < 0,01$ in all). The heterogeneity of the TMT tenure implies a diversity of experiences and perceptions. It strengthens the intellectual conflict necessary for any innovation. The TMT discontinuity improves the quality of decisions. This result is highly supported by Hambrick and Mason (1984) work and validates H_9.

***Control Variables*:** Large firms are usually endowed with many ways to promote and enhance the innovation activities. The negative effect expected from debt is verified. The "activity sector" seems to influence the amount devoted to the investment in "R&D". Seemingly, the firms which do not belong to the technology sector invest less in "R&D". With reference to the nature of its activity, this sector evidently ranks high in terms of innovation.

2.3 - The Firm's Reputation: Main Lever of the External Structural Capital (Relational Capital)

To identify the effect of directors' board on the relational capital, we applied, similarly, a set of multiple linear regressions for panel data which explains the determinants of firm's reputation. In fact, the latter is hardly measured as it is qualitative and abstract. In this work, it has been apprehended, by the scores published by the "Fortune" American Magazine. The exogenous variables reflect:

- The governance variables
- Performance
- Innovation
- The TMT compensation
- The sales growth
- The TMT demographic features
- And other control variables: size, debt and the activity sector of firms.

We will estimate the basic model by varying the components of compensation (the overall remuneration and the component cash) and the performance measures (ROA, NPM and MTOB). In sum, six regressions are employed. The results are summarized in the 6th table.

Table 6. Determinants of Reputation

Model	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Board Size	0,036***	0,034***	0,035***	0,037***	0,035***	0,036***
Duality	0,034	0,032	0,041	0,032	0,030	0,039
Outsiders' Percentage	-0,605***	-0,622***	-0,571***	-0,604***	-0,618***	-0,573***
Majority shareholders Percentage	0,177	0,186	0,216	0,180	0,195	0,205
Institutional Percentage	0,210	0,231	0,157	0,213	0,237*	0,162
Managerial Ownership	-0,624***	-0,576**	-0,716***	-0,602***	-0,554**	-0,698***
Outsiders' Ownership	0,038	0,033	0,001	0,035	0,032	-0,007
Institutional Ownership	-0,809***	-0,793***	-0,742***	0,817***	-0,804***	-0,750***
ROA	0,010***			0,011***		
Innovation	0,038***	0,035***	0,045***	0,037***	0,034***	0,046***
Total Compensation	0,033*	0,028	0,037**			
Sales growth	0,038	0,036	0,046**	0,041*	0,039*	0,049**

Revenues	0,134***	0,140***	0,118***	0,140***	0,145***	0,125***
Age	-0,003	-0,003	-0,005	0,004	-0,003	-0,005
Tenure in position	0,011**	0,011**	0,01*	0,01**	0,01**	0,009*
Tenure in firm	0,012***	0,012***	0,011***	0,012***	0,012***	0,011***
Growth in number of employees	-0,081***	-0,08***	-0,08***	0,081***	-0,08***	-0,081***
Debt	-0,001	-0,001	-0,002*	-0,001	-0,001	-0,002*
isect 1	-0,082	-0,111	-0,153	-0,089	-0,115	-0,163
isect 2	0,016	0,009	-0,009	0,012	0,009	-0,017
isect 3	-0,057	-0,098	-0,052	-0,061	-0,103	-0,059
isect 5	-0,110	-0,134*	-0,144***	-0,109	-0,129*	-0,147**
isect 6	0,094	0,084	0,085	0,095	0,088	0,081
NPM		0,01***			0,011***	
MTOB			0,001			0,001
Cash				-0,103**	-0,104**	-0,085*
Constant	2,303***	2,277	2,642***	2,708***	2,639***	3,045***
N	2190	2190	2190	2190	2190	2190

Notes:

1. Significance levels: †p < .10; *p < .05; **p < .01; ***p < .001. P-values greater than .05 but less than .10 are considered marginally significant. P-values greater than .10 are considered insignificant.
2. The first three models considering the overall compensation while the three latest models incorporate the party cash of remuneration as exogenous variable.
   Model 1 is the model which has for endogenous variable reputation score and integrates among its exogenous variables the variable "R0A" as a measure of performance and total compensation ("lnrem") as a measure of the managers' compensation.
   Model 4: is the model which has for endogenous variable reputation score and integrates among its exogenous variables the variable "ROA" as a measure of performance and the component cash ("cashr") as a measure of the managers' compensation.
   Model 2 & 3 are similar to the model 1 but they integrate respectively Npm & MTOB.
   Model 5 & 6 are similar to the model 4 but they integrate respectively Npm & MTOB.

***Effect of Governance*:** The variables of governance do not have unanimous positive significant effect on the firms' reputation[10]. This result can be interpreted in two ways.

On the one hand, the firms that enjoy the best reputations are not necessarily those which conform to the instructions of the good governance within the shareholder approach. In other words, the market does not quote favorably a firm because it has a rigorous board that is able to thwart the arbitrary actions of managers. Thus, the direct effect of governance on firm's reputation has not been observed in our sample. On the other hand, the most anxious boards to comply with the standards of good governance do not seem to intervene effectively in the management in order to steer them towards the right choices. Accordingly, we can say that the boards of our sample did not exercise an indirect effect on the reputation by influencing the strategic decisions of firms.

It seems that boards do not play the disciplinary role advocated by the contractual approach of governance to restore the firms' reputation. This confirms the negative effects of the percentage of outsiders and the managerial and institutional ownership. In addition, larger boards sound to have a favorable impact on reputation as they enrich the decisions and strengthen the cognitive conflict. The cognitive contribution of the board is more important than its contribution in the control and supervision. Furthermore, the market believes that the board of directors is not the police officer in the company but it must rather play the role of an adviser to the management. The directors and managers should maintain cooperative relations to help one another while running firms.

[10] Some variables are non-significant (duality, the outsiders' ownership, the presence of the majority investors: individual or institutional) for all models and other variables have adverse effect on the reputation (the presence of outside directors in the board, the managerial and institutional ownership).

***Effect of Firm's Performance*:** The effect of performance (for the two facets of performance: profitability and market value) is always positive (ß = 0,01 in models 1, 2, 4 & 5, p < 0,001 in all). The financial data are very important in the assessment of firms despite the powerful assumptions of theories that emphasize the relevance of the social and societal data and intangible goods.

Effect of R&D intensity: The effect of "R&D" is significant and positive in all the models (p < 0,001 in all). It is obvious that the analysts favor the firms which devote big amounts to "R&D".

***Effect of sales growth*:** The firms which have the higher sales are usually well perceived by the market (ß = 0,049, p < 0,01). This seems also obvious as the sales growth reflects the important efforts made by firms to satisfy their consumers (quality of products, originality of services, economic, social and societal responsibilities).

Effect of TMT Demographic Attributes: The negative effect of the managers' age has been checked in all the models but it is not statistically significant. Possibly, the market perceives age as a vector of entrenchment, resistance to change and aversion to risk. The market believes that the firms directed by older managers are unable to confront the challenges imposed by the current changes of the environment. In addition, the effect of tenure (in the post and in the firm) is positive and significant in all the models (for example ß = 0,011, p < 0,001 in model 6). This result shows that the market perceives tenure as an indicator of experience and professionalism.

***Effect of TMT Compensation*:** The results indicate that the market does not appreciate the firms which depend on the "cash" component to compensate their managers (ß = -0,085, p < 0,05). By contrast, the market considers the stock options as an effective means to strengthen the commitment of these managers.

Control Variables: First, the results prove that the firms which increase the number of their employees have a deteriorated reputation since they seem to go beyond the interval of the optimal size and will help in amplifying their salary charges (ß = - 0,08, p < 0,001 in all models). Then, the most indebted firms are the firms which have the most moderate level of reputation (ß = - 0,002, p < 0,05 in models 3 & 6). These firms are suffering from financial difficulties. Finally, the non-significant signs of the latest binary variables predict that the firms' reputation is not explained by their activity sector.

CONCLUSION

The objective of this work is to apprehend the effect of the firms' ownership structure and the directors' board characteristics on the structural capital.

To do this, we have studied three levers of the structural capital (compensation, innovation and reputation) in order to identify their key determinants. So, we have conceptually mobilized the two main governance approaches (contractual and cognitive) and empirically tested a set of multiple linear regressions for panel data.

In addition to the governance variables, other exogenous factors were considered: the performance, the size of firms and the indicators of human capital. In order to enrich the interpretations, we have subdivided the compensation and we have varied the measures of the performance. The results appear to be reliable because they do not depend on the proposed measures. They indicate that the companies that invest so much in structural capital have higher returns and they are chaired by the youngest and most heterogeneous TMT whose compensation is focused on the stock-options. Then, the control variables related to the size of firms, the debt, the activity sector and the year of research also influence the structural capital.

Nevertheless, the more surprising result is the remarkable absence of the disciplinary effect of governance mechanisms on the firms' structural capital. This result supports the presumptions of the cognitive theory of governance and refutes the arguments of the financial theory (H_3 verified). The "R&D" intensity and the firms' reputation do not depend on the rigor of the control of board. The modern approaches of governance seem to be more suitable in explaining the managerial behavior. The classical theory (financial and stakeholder theory) failed to explain the importance of the structural capital because its arguments contradict the requirements and characteristics of the firms which have a tendency to innovate.

Finally, the results highlight the foresight and the relevance of the market assessments: it is a long-term vision of the cognitive approach based on the challenges of innovation and organizational learning and not on the control and discipline of the managers advocated by the contractual theory.

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APPENDIX

Determinants of the Different Components of the TMT Compensation

Model	1 Salary ROA	2 Bonus ROA	3 Options ROA	4 Salary NPM	5 Bonus NPM	6 Options NPM	7 Salary MTOB	8 Bonus MTOB	9 Options MTOB
Size Board	0,001	0,005***	-0,005**	0,001	0,005***	-0,005**	0,001	0,005***	-0,005**
Duality	-0,004	0,012	-0,001	0,004	0,013*	0,001	-0,004	0,017**	0,001
Outsiders' Percentage	-0,009	-0,035	0,086*	0,007	-0,043	0,089*	-0,006	-0,051	0,073
Majority Shareholders Percentage	0,096**	0,056	-0,066	0,095**	0,058	-0,067	0,084*	0,042	-0,056
Institutional Shareholders Percentage	0,099***	0,058*	-0,155***	0,1***	0,059*	-0,152***	0,075**	0,06	-0,138***
Managerial Ownership	0,182***	0,072*	-0,336***	0,178***	0,077*	-0,340***	0,199***	0,103***	-0,328***
Outsiders' Ownership	0,016	-0,007	-0,013	0,017*	-0,005	-0,013	0,018	-0,009	-0,015
Institutional Ownership	-0,019	-0,01	0,076	0,015	-0,019	0,077	-0,002	-0,028	0,086*
Performance	-0,002***	0,003***	-0,002***	0,001***	0,002***	-0,001***	-0,001***	0,001	0,001**
Revenues	-0,037***	0,013***	0,019***	0,037***	0,012**	0,02***	-0,039***	0,012**	0,021***
Age	0,003***	0,003***	-0,007***	0,003***	0,002**	-0,007***	0,003***	0,003***	-0,007***
Tenure in Position	0,003	-0,002***	-0,002	0,003***	-0,002**	-0,002	0,003***	-0,002**	-0,003*
Tenure in Firm	-0,001	-0,001	-0,001	0,001	-0,001	-0,001	-0,001	-0,001	-0,001
Firm Size	0,003	-0,023**	0,028***	0,003	-0,023***	0,027***	0,003	-0,024***	0,03***
Debt	0,001	0,001	-0,001	0,001	0,001	-0,001	0,002*	0,001	-0,001
isect 1	0,099***	0,068***	-0,118***	0,1***	0,067***	-0,158***	0,096***	0,075***	-0,165***
isect 2	0,096***	0,093***	-0,198***	0,097***	0,093***	-0,2***	0,09***	0,091***	-0,197***
isect 3	0,043***	0,02	-0,044*	0,042***	0,021	-0,045*	0,04***	0,034**	-0,057**
isect 5	0,115***	0,085***	-0,243***	0,118***	0,082***	-0,241***	0,114***	0,091***	-0,241***
isect 6	0,086***	0,088***	-0,177**	0,087***	0,089***	-0,178***	0,082***	0,094***	-0,180***
Constant	0,779***	-0,089	0,333**	0,755***	-0,057	0,314**	0,814***	-0,053	0,255*
N	2190	2190	2190	2190	2190	2190	2190	2190	2190

Notes:

1. Significance levels: †p < .10; *p < .05; **p < .01; ***p < .001
2. Model 1: dependent variable: Salary ("salr") & performance indicator (independent variable): ROA
   Model 2: dependent variable: Bonus ("bonusr") & performance indicator (independent variable): ROA
   Model 3: dependent variable: Stock Options ("bsoptr") & performance indicator (independent variable): ROA
   Model 4: dependent variable: Salary ("salr") & performance indicator (independent variable): NPM
   The same thing for the other models.