

# The Relationship between Corporate Governance and Intellectual Capital: Empirical Study of Taiwanese Electronics Manufactures

Chun-Yao Tseng\*      Chun-Yi Lin\*\*

## Abstract

Since finance scandals emerge in an endless stream, corporate governance simultaneously has become a core issue to prevent miscellaneous falsities and improve the effectiveness of management in recent years. Intellectual capital is the dominating resource to corporate success in the contemporary knowledge-based economy. However, little is known about what occurs in the 'black box' between corporate governance and intellectual capital. This study employs agency theory, resource dependence theory and other theories to investigate the relationship between corporate governance and intellectual capital. After reviewing the relevant literature, this study identifies human capital, organizational capital, innovation capital and relationship capital as four constructs of intellectual capital. Corporate governance involves large part such as behavior of board of directors, so it is measured using seven characteristics of board in this study. Time-series cross-section panel data from 255 Taiwanese electronic manufacturers during 2001-2005 are employed for the fixed effect analysis in the model. The empirical finding demonstrates there is a significant relationship between corporate governance and intellectual capital.

**Keywords:** Corporate Governance, Intellectual Capital, Board of Directors

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\* Department of Business Administration, Tunghai University.No.181, Taichung Harbor Road, Section 3, Taichung 40704, Taiwan. Tel.: +886-4-235-90121 x 35109; fax: ++886-4-23594107 Email: cytseng@thu.edu.tw(Corresponding author)

\*\* Department of Business Administration, Tunghai University.No.181, Taichung Harbor Road, Section 3, Taichung 40704, Taiwan. Tel.: +886-4-235-90121 x 35104; fax: +886-4-23594107 Email: g944153@thu.edu.tw

*Chun-Yao Tseng* (corresponding author) is a professor at the department of Business Administration, Tunghai University, Taiwan. He holds a PhD in Business Administration from the Taipei University, Taiwan. His research is in the area of intellectual capital, corporate governance and technology management. His papers have been published in a variety of journals including *Management Decision*, *Research-Technology Management*, *R&D Management*, *Technological Forecasting & Social Change*, *International Journal of Technology Management*, *Service industrial journal*, *Applied Economics*, *Applied Economics Letters*, *International Journal of Intelligent Enterprise*, *International Journal of Automotive Technology and Management*, *International Journal of Services Technology and Management*.

## 1. INTRODUCTION

Since finance scandals emerge in an endless stream, corporate governance simultaneously has become a core issue to prevent miscellaneous falsities and improve the effectiveness of management in recent years. Intellectual capital is a dominating resource in the contemporary knowledge-based economy, and far more important than land, capital or labor. Intellectual capital thus has become a key to corporate success, especially in the knowledge-based industries (Quinn et al., 1996), and employing intellectual capital as strategic tool is more critical for creating economy profit (Kavida, V., & Sivakoumar, N., 2009). Corporate governance can improve performance and ensure the interests of stakeholders. That is, corporate governance could ensure the maximization of the shareholder's equity, protect stakeholder, and encourage the firms using resources efficiently (Wu, 2004, Aguilera, 2005). It infers that corporate governance would influence the disposition and the use of resources. However, little is known about what occurs in the 'black box' between corporate governance and intellectual capital. That is, whether does corporate governance really have influence intellectual capital? Thus, the main objective of this study is to demonstrate the relationship between corporate governance and intellectual capital. Corporate governance involves large part such as behavior of board of directors, so it is measured using seven characteristics of board in this study. The basic information of the directors is representing the characteristic of board of

directors, and they will influence the disposition of intellectual capital. The prior research confirmed that the board effectiveness is significantly related financial performance (Payne, G. T., G. S. Benson, Finegold, D., 2009), and in this study, it is used the characteristics and traits of the board to present corporate governances. Further, this study investigates the relationship between characteristics of board directors and intellectual capital.

The subject of this study is electronics companies in Taiwan for three major reasons. First, according to “Global Competitiveness Report 2006-2007” published by WEF (World Economic Forum), Taiwan is ranked fifth overall worldwide of growth competitiveness, third of technology of growth competitiveness, and is the world’s second biggest producer of information and communications hardware in 2005. Secondly, Taiwanese government extremely focuses on developing the information and electronic industry. Finally, the Taiwanese business environment has undergone significantly adjustments creating considerable uncertainty. Many Taiwanese companies thus are under growing pressure to develop appropriate practices for meeting the challenges of this uncertain business environment. Consequently, this study discusses the relationship between corporate governance and intellectual capital based on Taiwanese electronic manufacturers.

## **2. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESIS**

### **2.1 Corporate Governance**

According to OECD (1999), corporate governance refers to manage the firm, managers, directors and stakeholders, and the firm also can achieve the operation goal through this mechanism. OECD (2004) made more clear definition that corporate governance is guides of management, and it should be promoted. There are many theories to illustrate corporate governance. Agency Theory argued that shareholder possesses the right, but unable to have an influence to firm's operation policy. However, managers own the power of operation, but they do not hold the right of the firm and need not to bear the consequence and responsibility of the business decision, thus there is agency problems that separated the power of firm and managers and cause the firm fail to achieve the goal of maximizing shareholder's profit (Berle & Means, 1932). In 1970s, Stakeholder Theory addressed multinational corporations not only are responsible for its shareholders, but have social responsibility. The firms pursue the profits of the shareholders and serving the whole society. Resource Dependence Theory argued that the organization relies on the recourses of other organizations, and reduces the reliance of resource, does not rely on one's resources (Pfeffer & Salancik, 1978). In the view of corporate governance, Resource Dependence Theory asserted that the board directors can provide managers environmental information that it is helpful to transfer

resources into effective actions in order to enhance firm's performance (Cai, 2002, Fama & Jensen, 1983).

## **2.2 Intellectual Capital**

Intellectual capital(IC) is the behavior of using intellect and thought knowledge can create difference advantages in firms (Galbraith, 1969). Recently, intellectual capital is defined as a kind of knowledge, experience, professional skill; it is the source of value creating. This study advocates that intelligence capital is a kind of resources inside the firms, can create value. Resource-based Theory argued that the value-creating capability of an organization comes not from the dynamics of the industry of that organization, but from organizational processes, leading to idiosyncratic endowments of proprietary resources. While this study explores the firms' intellectual capital, it regard resources as the centre of firms' decision, and the management emphasis on how to confirm, obtain, strengthen and accumulate the core or unique resources according Resource-based Theory (Chen ,2004). By the contract, Financial Perspective of intellectual capital focuses on calculating and comparing financial data (Chen, 2002). For strategic management, intellectual capital is measured by utilizing publicly available information (Kavida & Sivakoumar, 2009), and this measurement is conveniences.

This study wants to know the different kind of intellectual capital would be influenced by corporate governance, so this study must categorize intellectual capital. Tseng & Goo (2005) found intellectual capital models comprise four interrelated categories: (1)Human Capital (HC) refers to personal ability,

knowledge, experience of all firms' employees (Bontis, 1996). It belongs to employees and not owned by the firms, thus, it must associate with the reward system. (2) Relationship Capital (RC) is dependent on understanding and obtaining customer satisfaction, relationship, and it emphasizes that there are long-term good relationship with customers. (3) Organizational Capital (OC) to the company, and is the actual environment established by the firm to manage and generate its knowledge effectively. Organizational Capital can concrete human capital and transfer it to be a supporting framework. Hubert (1996) thought that Organizational Capital includes the system, structure, operation process and organization culture. (4) Innovation Capital (InC) is the ability of creative and innovation, it emphasized on improving and creating ability to develop new product. In the knowledge-driven economy, the competitive advantages are determined by innovation (Chen, 2004).

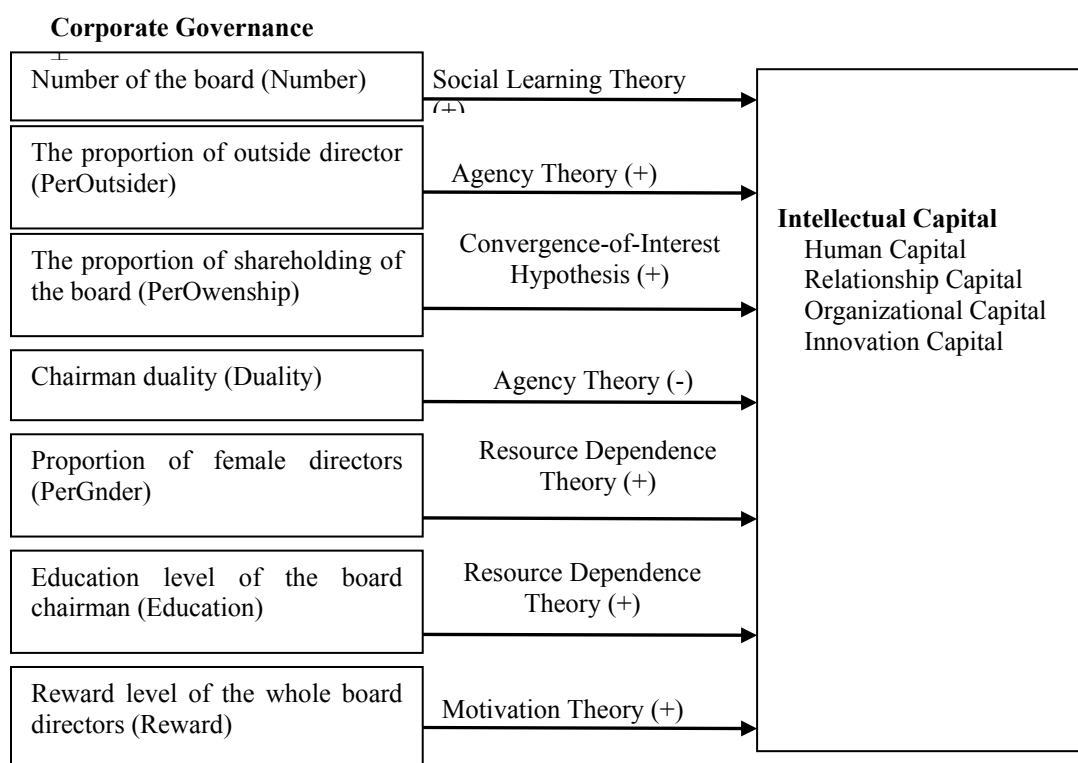
### **2.3 Relationship between Corporate Governance and Intellectual Capital**

Knowledge and innovative activity is the key of success or failure, and it comes from intellectual capital and intangible assets. Thus, firms should focus on the accumulation and acquirement of intellectual capital, which is charge by the board directors. The relevant articles of corporate governance and intellectual capital are as follows. Keenan & Aggestam (2001) discussed the creation of intellectual capital in the light of trust responsibility, personnel, structure. They also developed a structure to link corporate governance and intellectual capital, and they also explained the benefits after linking. The

conclusion is that the corporate governance and intellectual capital all emphasized with the value creation and focused on stakeholders' interests and multidirectional value creation from multiple directions, and distinguishes the management environment through managing the intellectual capital.

Gupta et al. (2003) attempted to construct a suitable corporate governance method to making policy and creating value. They finally found five conclusions as follows. (1) Corporate governance could link to the financial performance. (2) Corporate governance provides the direction of the financial evaluation. (3) It offers management a proper insert (4) Governance process model has a trade-off relationship that is unavoidable. Williams (2001) found the board directors and intellectual capital, and the result reported the company with at least one woman director or with at least one non-white director would have higher intellectual capital than the company with non woman or non-white director.

This study argues that corporate governance would influence intellectual capital. However, corporate governance involves large part such as behavior of managers and directors, firms' performance, structure of firms. Therefore, this study focuses on the characteristics of board for simplistic and accuracy. Corporate governance is measured using seven characteristics of board in this study, including total number of the board, the proportion of shareholding of the board, the proportion of outside director, chairman duality, education level of the board chairman and reward level of the whole board directors. The model we addressed is reported in Fig. 1.



**Fig. 1 The Research Model**

### **(1) Relationship between Number of Board and Intellectual Capital**

The board directors can offer information to managers and then managers can transfer the information to competitive advantage and actions (Cai, 2002). Therefore, directors need to emphasize on accumulating personal knowledge to make the right decisions. According to social learning theory, people can learn knowledge and skill by observing others (Jones, 2004), and the more people is the better learning effect. Therefore, the following hypotheses are proposed.

Hypothesis1a: There is positive relationship between the number of the board directors and human capital.



Hypothesis1b: There is positive relationship between the number of the board directors and relationship capital.

Hypothesis1c: There is positive relationship between the number of the board directors and organizational capital.

Hypothesis1d: There is positive relationship between the number of the board directors and innovation capital.

## **(2) Relationship between Outside Directors and Intellectual Capital**

The directors can be divided into outside and inside director. Inside directors participate in daily business operation, but outside directors do not and they are employed to be non-operating directors. Agency theory declared that the goal of managers and shareholders might be conflict, so there should be more outside directors to have better supervise and control function (Berle & Means, 1932). Many studies support that outside directors can promote the performance of managing (Zhao, 2004, Aguilera, 2005). Accordingly, this study predicts the following:

Hypothesis2a: There is positive relationship between the proportion of outside director and human capital.

Hypothesis2b: There is positive relationship between the proportion of outside director and relationship capital.

Hypothesis2c: There is positive relationship between the proportion of outside director and organizational capital.

Hypothesis2d: There is positive relationship between the proportion of outside director and innovation capital.

### **(3) Relationship between Shareholding of Board and Intellectual Capital**

Based on the convergence-of-interest hypothesis (Jensen & Meckling, 1976), the shareholders have more motivation to supervise and improve business operation while the more centralization of shareholding. Finkelstein (1992) also thought that directors have stock rights could increase business performance and have positive influence to employees' ability. Williams (2000) argued that the director with real power would expand their concern of other stakeholder and use their vote to improve business policy, and Williams' research (2000) also supported that.

Hypothesis3a: There is positive relationship between the proportion of shareholding and human capital.

Hypothesis3b: There is positive relationship between the proportion of shareholding and relationship capital.

Hypothesis3c: There is positive relationship between the proportion of shareholding and organizational capital.

Hypothesis3d: There is positive relationship between the proportion of shareholding and innovation capital.

### **(4) Relationship between Chairman Duality and Intellectual Capital**

The big shareholder often participates in management to increase the control power of the firms (King & Chen, 2005). When the chairman of the board holds the chief executive officer of the firms, it generates the chairman duality (Williams, 2000). At the chairman duality situation, it can reduce the information asymmetry problem among the shareholder and manager, but it

also reduces the business performance. Agency theory argued that the chairman duality situation would reduce the efficiency of the control (Martins, 2003) and prevent the concern of other stakeholders. Besides, Brickley (1997), Vafeas & Theodorou(1998) found that the chairman duality situation caused low value of intellectual capital.

Hypothesis4a: There is negative relationship between the chairman duality and human capital.

Hypothesis4b: There is negative relationship between the chairman duality and relationship capital.

Hypothesis4c: There is negative relationship between the chairman duality and organizational capital.

Hypothesis4d: There is negative relationship between the chairman duality and innovation capital.

### **(5) Relationship between Female Directors and Intellectual Capital**

Resource dependence theory thought the board directors could offer information to managers, and while the variety of the director's background enhances the suggestion of the policy and management (Fama & Jensen, 1983). In the view of gender, the variety means the balance of the proportions of male and female. The female directors can create the management elasticity (Katzenbach & Associate, 1995), and the board with balance can improve firms' performance (Williams & O'Reilly, 1997). Kesner (1988) discovered the more the female directors, the better the firms' performance. Williams (2001)

and Van der Zahn (2004) also supported the female director help to improve firms' intellectual capital performance.

Hypothesis5a: There is positive relationship between the proportion of female directors and human capital.

Hypothesis5b: There is positive relationship between the proportion of female directors and relationship capital.

Hypothesis5c: There is positive relationship between the proportion of female directors and organizational capital.

Hypothesis5d: There is positive relationship between the proportion of female directors and innovation capital.

## **(6) Relationship between Education of Board Chairman and Intellectual Capital**

Based on resource dependence theory (Cai, 2002) the board directors could offer information to managers to forming competitive ability, and the firms with more important information and knowledge can existence in the competitive environment. These information and knowledge are related to directors' education level. Generally speaking, the higher directors' education level, the more professional knowledge could be possessed. The directors with higher education level would emphasize on intellectual capital.

Hypothesis6a: There is positive relationship between the directors' education level and human capital.

Hypothesis6b: There is positive relationship between the directors' education level and relationship capital.

Hypothesis6c: There is positive relationship between the directors' education level and organizational capital.

Hypothesis6d: There is positive relationship between the directors' education level and innovation capital.

### **(7) Relationship between Reward of Board and Intellectual Capital**

Firms would encourage its board to accomplish the corporate goal by rewarding. Thus, firms should combination the benefit of the direction and the reward system to increasing the motivation of supervising business operation.

On the basis of these arguments, this study predicts the following:

Hypothesis7a: There is positive relationship between the directors' reward level and human capital.

Hypothesis7b: There is positive relationship between the directors' reward level and relationship capital.

Hypothesis7c: There is positive relationship between the directors' reward level and organizational capital.

Hypothesis7d: There is positive relationship between the directors' reward level and innovation capital.

## **3. METHODOLOGY**

The subject of this study is listed Taiwanese electronic manufacturers. The rationale for sample selection was follows. First, this study found 304 firms that be listed into the electronics industry by Taiwan Economic Journal (TEJ)

in 2005. Second, because the annual reports between 2001 and 2005 are necessary to report accurately, this study deleted 12 firms which were full-cash delivery stock and go public under two years. Third, this study also deleted 14 firms that unable to obtain material. Finally, the 255 electronics manufactures were selected to meet the above criteria.

Empirical model in this study is showed as follow:

$$HC_{i,t} = \beta_0 + \beta_1 Number_{i,t} + \beta_2 PerOutside_{i,t} + \beta_3 PerOwenership_{i,t} + \beta_4 Duality_{i,t} + \beta_5 PerGender_{i,t} + \beta_6 Education_{i,t} + \beta_7 Reward_{i,t} + \varepsilon_{i,t}$$

$$RC_{i,t} = \beta_0 + \beta_1 Number_{i,t} + \beta_2 PerOutside_{i,t} + \beta_3 PerOwenership_{i,t} + \beta_4 Duality_{i,t} + \beta_5 PerGender_{i,t} + \beta_6 Education_{i,t} + \beta_7 Reward_{i,t} + \varepsilon_{i,t}$$

$$OC_{i,t} = \beta_0 + \beta_1 Number_{i,t} + \beta_2 PerOutside_{i,t} + \beta_3 PerOwenership_{i,t} + \beta_4 Duality_{i,t} + \beta_5 PerGender_{i,t} + \beta_6 Education_{i,t} + \beta_7 Reward_{i,t} + \varepsilon_{i,t}$$

$$InC_{i,t} = \beta_0 + \beta_1 Number_{i,t} + \beta_2 PerOutside_{i,t} + \beta_3 PerOwenership_{i,t} + \beta_4 Duality_{i,t} + \beta_5 PerGender_{i,t} + \beta_6 Education_{i,t} + \beta_7 Reward_{i,t} + \varepsilon_{i,t}$$

Where HC, RC, OC and InC are four constructs of intellectual capital and are refers to human capital, relationship capital, organizational capital and innovation capital. This study measures the human capital by total number of employees, the relationship capital by advertising expenses, organizational capital by total assets turnover which equals net sales revenue divided by total assets, and the innovation capital by the expenses of R&D. There are seven characteristics of board in the empirical model. Number refers to the total number of people on the board of directors. PerOutside represents the

proportion of outside directors on the board of directors. PerOwenership refers to the proportion of shareholding on the board of directors. Duality refers to a director holding the chairman of the board and the chief executive officer position. PerGender represents the proportion of female directors of the board. Education represents the education level of the chairman of the board. Reward refers to the total reward that the whole board directions acquired. The estimating method of each indicator about corporate governances in this study is presented in Tab. 1.

Tab. 1 *Indicators of Corporate Governances*

Indicators	Method of Estimating
Number	= Number of Outside Directors + Number of Inside Directors
PerOutside	= Number of Outside Directors / Total Number of Total Number of Board
PerOwenership	= Shareholdings Directors Owned / Total Shareholdings Company Published
Duality	= 1 or 2, where 1 is chairman of the board holds the chief executive officer of the company, and 2 presents the man of chairman and chief executive officer of company are different.
PerGender	= Number of Female Directors / Total Number of Board
Education	= 1, 2, 3, or 4, where 1 is high school and below, 2 is junior college, 3 is university, and 4 is graduate school and above.
Reward	= Total Amount of Rewards Directors Rewarded

The two most frequently adopted for panel data estimation methods are the fixed effect and random effect models. Using a fixed effect solves the problem of unobservable variables in conventional OLS regression estimates, and thus enables efficient estimation of the regression parameters (Greene, 2003). Restated, the error term( $\epsilon_{i,t}$ ) can be classified into two terms, firm specific effects( $\mu_{i,t}$ ), and white noise additive random error terms( $v_{i,t}$ ). Time-series cross-section panel data from 255 Taiwanese electronic manufacturers between 2001-2005 are employed for the fixed effect analysis in the model.

## 4. EMPIRICAL RESULTS

In this section, this study would display the results and explanations of statistical analysis. The summary of the data we collected was reported in Tab.1. In addition, this study tested if empirical model fits for fixed effect model. In this study, the results of the F-test demonstrate the accuracy of applying a fixed effect model to the proposed data. Restated, inter-individual differences between firms should be considered in the panel estimate.

Tab. 2 *Descriptive Data for Variables*

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	1275	-	-	2001	2005
<b>1. Corporate Governance</b>					
Number	1275	6.579608	1.833465	3	15
PerOutside	1275	0.105953	0.144857	0	0.5
PerOwenship	1275	0.216194	0.119759	0.0277	0.9533
Duality	1259	1.400318	0.490157	1	2
PerGender	1260	0.095773	0.125188	0	0.75
Education	1262	3.058637	0.940608	1	4
Reward	1272	10098.55	22541.82	0	257410
<b>2. Intellectual Capital</b>					
Human Capital	1275	1156.197	2625.557	26	31421
Relationship Capital	1275	39943.43	289664.7	0	8144354
Organizational Capital	1275	13.233	437.3644	0.03	15618
Innovation Capital	1275	419227	1175101	0	1.34E+07

### 4.1 Results of Relationship between Corporate Governance and Human Capital

Human capital is the manpower came from the employees with know-how and knowledge and experience. This study used the total number of employees to represent human capital. The result showed that there is a significant



relationship between corporate governance human capitals (see Tab. 2), the R-Square of this model is 95.82%. PerOutside and Reward are significant positive ( $p < 0.05$ ) related to the human capital. Taiwanese electronics manufactures would raise their human capital with increasing their outside directors of the board. This result corresponded with Berle & Mean (1932) thought the outside board director could enhance the supervision and control level to improve the business performance and to provide more concerns of their firms. It also supported Williams (2002) and Zhao' s (2004) founding which argued the more outside board director is helpful for the firms. Hence, when the employees accumulate the know-how, knowledge and experience more, the firms can create more value from human capital. Furthermore, the reward level of the whole board directors also is significant positive related to the human capital. That is, the result supported motivation theory the more reward the firms provided the more efficacy of supervising. However, the result that the proportion of shareholding of the board is significant negative (See Tab. 2) to human capital is different from the hypothesis 3a. It is also against the discovery from Finkelstein (1996) and Williams (2000). Although the result is not corresponded with convergence-of-interest hypothesis (Jensen & Meckling, 1976) advocated the board with higher proportion of shareholding could increase the performance of the firm, it is corresponded with entrenchment hypothesis (Fama & Jensen, 1983) that declared directors who own the decision right and power would prefer the decision protect their interests and status. Thus, hypothesis 3a is rejected. The result of Number,

Duality, PerGender, Education and Reward are not significant ( $p>0.05$ ) related to human capital, so this study can not advocate their relationship with human capital (See Tab. 2).

Tab. 3 *Statistical Result of Corporate Governance and Human Capital*

Variable	Coef.	Std. Err.	t Value
Number	6.519706	28.1387	0.23
PerOutside	461.7582	203.5	2.27**
PerOwnership	-1914.76	406.4	-4.71***
Duality	-63.3254	78.7133	-0.8
PerGender	520.8522	358.8	1.45
Education	58.74	63.0182	0.93
Reward	0.010608	0.00169	6.29***
Constant term	954.9094	439.9	2.17**

Note: 1. The average R-Square of this model is 95.82%.

2. The dependent variable is human capital represented by the total number of employees.
3. \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.

## 4.2 Results of Relationship between Corporate Governance and Relationship Capital

Relationship capital is mainly about customer satisfaction and maintaining long-term relationship with customer. Most indicators of relationship capital are subjective, and can not fairly measure, such as the satisfaction and loyalty of customer. To avoid unfair measurement, this study employs advertising expense to valuing relationship capital. Tab. 3 showed that corporate governance partly related to relationship capitals. This study found both Number and Pergender were significant positive ( $p<0.05$ ) to relationship capital from Tab. 3. In other words, the more people of the board or the more female directors of the board the firm creates higher value of relationship capital. This founding is corresponded to the argument that the directors could

learn more from other directors to making better decision, and the more directors the better(Jones, 2004). Fama & Jensen(1983) and Williams & O' Reilly(1997) supported that PerGender has a significant positive impact on intellectual capital, because female directors of the board could enhance the creativity and flexibility of organizations. Kesner(1988), Williams(2001) and Van der Zahn(2004) also agreed this view. The result of PerOutside, PerOwenership, Duality, Education and Reward are not significant ( $p>0.05$ ), and this study can not determine their relationship with human capital (See Tab. 3).

Tab. 4 *Statistical Result of Corporate Governance and Relationship Capital*

Variable	Coef.	Std. Err.	t Value
Number	22107.21	12166.9	1.82**
PerOutside	24472.49	87994.6	0.28
PerOwenership	-157075	175707	-0.89
Duality	-8264.82	34034.8	-0.24
PerGender	367851.4	155122	2.37**
Education	-23769.4	27248.4	-0.87
Reward	0.428206	0.7296	0.59
Constant term	45348.22	190206	0.24

Note: 1. The average R-Square of this model is 35.86%.

2. The dependent variable is relationship capital represented by advertising expenses.

3. \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.

### 4.3 Results of Relationship between Corporate Governance and Organization Capital

Organizational capital organizes and combines all resource of the firms to work efficiently. This study used total assets turnover to represent organizational capital. Tab. 4 revealed that Number, PerGender and Reward are significant positive related to organizational capital ( $p<0.05$ ), and the R-Square

of the model is 90.67%. Jones (2004) declared the more members of the board could increase the efficiency of management. According to Fama & Jensen (1983), Williams & O'Reilly(1997), the variety and balance of the board stimulates creativity and flexibility of firms and it is helpful for firms' performance. Besides, other studies supported that the female directors would enhance the functionality of the board (Williams2001, Van der Zahn, 2004). Coincided with motivation theory, the reward level of the whole board can stimulate the directors to do their job efficiently. The relationship between PerOwenership and organizational capital coincided with the result of human capital and relationship capital is significant negative (See Tab. 2-4). It is different form the hypothesis about the proportion of shareholding of the board. But, Fama & Jensen (1983) thought the directors holding lots of shares would protect their interests by voting or choosing inappropriate decision. Hypothesis 3c is rejected. This study can not understand the relationship between organization capital and other variables, such as PerOutside, Duality and Education (See Tab. 4).

Tab. 5 *Statistical Result of Corporate Governance and Organizational Capital*

Variable	Coef.	Std. Err.	t Value
<b>Number</b>	0.021204	0.0105	2.01**
<b>PerOutside</b>	-0.07119	0.076	-0.94
<b>PerOwenership</b>	-0.36649	0.1487	-2.46***
<b>Duality</b>	0.016001	0.0295	0.54
<b>PerGender</b>	0.270317	0.1335	2.02**
<b>Education</b>	0.014134	0.0236	0.6
<b>Reward</b>	1.84E-06	6.32E-07	2.92***
<b>Constant term</b>	1.424257	0.1513	9.41***

Note:1.The average R-Square of this model is 90.67%.

2. The dependent variable is relationship capital represented by total assets turnover.
3. \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.

#### **4.4 Results of Relationship between Corporate Governance and Innovation Capital**

Innovation capital creates differential advantages, and it is important for firms to enhance performance. This study employed the expenses of R&D to represent innovation capital. Tab. 5 displayed there was partly related between corporate governance and innovation capital, and the R-Square of the model is 89.60%. PerOutside and Education positively to affect innovation capital of firms (P-Value < 0.05). This study understands the more outside directors and the higher education of chairman are helpful for innovation capital. Williams (2000) also supported this finding, and he declared outside directors emphasize long term view of improving investment. Moreover, based on resources dependence theory directors could provide experience and important information to make right decision, the chairman with higher education provide more critical information and professional knowledge. Thus, Hypothesis 7d is accepted and is very different from other intellectual capital. In Tab. 5, the proportion of shareholding of the board is different from what this study expected in advance. It also is not corresponded to the argument of Fama & Jensen (1983), but corresponded to the thought of Jensen & Meckling (1976) that claimed directors holding more shares would be harmful for making correct decisions. This study can not understand the relationship between Number, Duality, PerGender and Reward and innovation capital (see Tab. 5).

Tab. 6 *Statistical Result of Corporate Governance and Innovation Capital*

Variable	Coef.	Std. Err.	t Value
Number	-23528.7	19859.4	-1.18
PerOutside	388504.1	143630	2.70**
PerOwnership	-1174440	286799	-4.09***
Duality	17935.13	55553.4	0.32
PerGender	285046.3	253199	1.13
Education	131976.4	44476.3	2.97**
Reward	-1.73878	1.1909	-1.46
Constant term	352320.9	310464	1.13

Note: 1. The average R-Square of this model is 89.60%.

2. The dependent variable is relationship capital represented by expenses of researching and developing.

3. \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.

## 5. CONCLUSIONS AND DISCUSSES

This study found out and proved the related theory could support the relationship between corporate governance and intellectual capital based on the empirical results. The results demonstrate that outside directors, shareholding owned by the board, reward level are significantly related to human capital based on agency theory that argued outside director could raise the power of supervision (Berle & Means, 1932, Zhao, 2004), entrenchment hypothesis that encourage directors with power or shares to protect themselves (Fama & Jensen, 1983), and motivation theory that argued more reward would induce directors to do the right thing (Xu, 1982). Based on social learning theory that argued directors learn from other to increasing their ability (Cai, 20002, Jones, 2004), and based on resource dependence theory that declared the variety and balance of the board could enhance the efficiency of it (Fama & Jensen, 1983),

and total number of board and female directors are significant positive to relationship capital. This study understand that there are a significant relationship between the corporate governance system which refers to outside directors, shareholding owned by the board and education level of directors and innovation capital.

This study discusses the issue about the relationship between corporate governance and intellectual capital which was less discussed before, and provides further researcher for reference. Although this study offers a significant result of the relationship between corporate governance and intellectual capital, there still are some limitations. In order to acquire collectable, feasible and simplistic data, this study only could use public data to measure corporate governance and intellectual capital, they may not reflect real situations. On the other hand, this study only observed five-year data and are long enough to reflect the difference changes of firm. Moreover, as regards the variables of corporate governance issue, this study only employed the composition and characteristic of the board of directors. Future research would benefit from other variables, such as behavior about employees or managers and so on. Therefore in-depth research is required to offer a better understanding of the idiosyncrasies of the relationship between corporate governance and intellectual capital.

Regardless of those limitations, this study provides several interesting results about corporate governance and intellectual capital. The result displayed that outside directors and reward was positive related to human

capital, and the shareholding of board was negative related to human capital. The total people of board and female directors were positive related to relationship capital. The total people of board, female directors and reward were positive related to origination capital, and the shareholding of board was negative related to origination capital. The outside directors and education the board chairman accepted were positive related to innovation capital, and the chairman duality situation and the shareholding of board were negative related to innovation. Summarizing the discussion of the relationship between corporate governance and intellectual capital based on 255 Taiwanese electronics firms, this study could understand that corporate governance influences firms how to dispose intellectual capital. Thus, firms should adequately employ their corporate governance system to accumulate and use intellectual capital to create value effectively. Firms must understand the relationship between their corporate governance and intellectual capital, and then they could reach the goal of high performance. Firms also could combine the manpower, efficiently operate to face market challenges through corporate governance. Intellectual capital is important to create firms' value. Therefore, firms need to set up a good corporate governance system to dispose intellectual capital that firms accumulated.



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# 公司治理與智慧資本關係之研究 — 以資訊電子業為例

曾俊堯\* 林俊儀\*\*

## 摘要

近年來，亞洲金融風暴與美國知名企業爆發財務醜聞，暴露出企業管理的諸多問題，同時有鑑於公司治理係為企業重要策略與生存發展之核心關鍵，使得公司治理漸漸興起與受到重視。同時，在知識經濟的基礎下，智慧資本成為公司重要資源。然而，對於公司治理與智慧資本之間的“黑箱”地帶，卻無太多的瞭解，因此本研究透過對代理理論、資源依賴理論和其他理論，探討公司治理與智慧資本之間的關係。本研究主要探討董事會組成結構與董事會成員特質之公司治理議題，而智慧資本則分為人力資本、組織資本、關係資本與創新資本四項，同時以2001年至2005年的臺灣255家資訊電子產業上市公司作為研究對象，並建立兼具時間數列與橫段面之追蹤資料(Panel Data)，並利用固定模式程式來進行實證。在實證過程中，本研究為能深入瞭解公司治理對不同類型的智慧資本的影響，將智慧資本分成四項—人力資本、關係資本、組織資本與創新資本來探討。研究結果發現，發現公司治理與智慧資本之間確實存在有關聯。

**關鍵詞：**公司治理、智慧資本、董事會

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\*東海大學企業管理學系教授，40704 台中市西屯區台中港路三段 181 號  
電話: 0-4-235-90121 轉 35109; 傳真: 04-23594107, Email: cytseng@thu.edu.tw (聯絡人)

\*\*東海大學 企業管學系 研究生，40704 台中市西屯區台中港路三段 181 號  
電話: 0-4-235-90121 轉 35109; 傳真: 04-23594107, Email: g944153@thu.edu.tw

