CHAPTER 7

EMPIRICAL FINDINGS ON THE IMPACT OF CORPORATE GOVERNANCE STRUCTURE – II

7.0 INTRODUCTION

Chapter 6 examined the impact of corporate governance variables and company characteristics on the level of intellectual capital (IC) disclosure. It explored the significant impact of various corporate governance variables, such as board composition and audit committee function, and company characteristics (for instance, firm size, listing age and profitability), on the level of IC disclosure. The analysis of IC disclosure was based on the aggregation of the three IC categories (i.e. human capital, structural capital and relational capital) and the three presentational formats (i.e. text, number and graph/picture). However, to better understand firms' disclosure policies on IC in the annual report, it is important to analyse the impact of corporate governance and company characteristics on (1) human, structural and relational capital disclosures, and (2) the format of IC disclosure.

The first aim of this chapter is to examine whether the significant relationships between IC disclosure and corporate governance structure and company characteristics identified in Chapter 6 are also supported at IC subcategory level.[1] The results and discussions, using multivariate analysis, are provided in Section 7.1. Secondly, the chapter aims to examine the relationships between corporate governance structure and company characteristics and the format of IC disclosure, using univariate analysis. These results are presented in Section 7.2. Section 7.3 concludes the chapter.

[1] As has been discussed in Chapter 6, the omission of market factors and audit committee characteristics apart from size and frequency of meeting is not problematic.

7.1 MULTIPLE REGRESSION ANALYSIS – IC SUBCATEGORY LEVEL

This section explores IC disclosure at the subcategory level based on the three measures, i.e. disclosure index (DI), word count (WC) and word count percentage (WC%) metrics.[2] By examining data at this level relationships, hitherto undetected, can be identified.

Multiple regression analysis was conducted based on the main regression model built up in Section 6.4 of Chapter 6, using SPSS 14.0. Hence, the model for multiple linear regression analysis is shown as follows:

$$ICD = \beta_0 + \beta_1 INED_i + \beta_2 RDUAL_i + \beta_3 SqSCON_i + \beta_4 SAC_i + \beta_5 MAC_i + \beta_6 ROA_i + \beta_7 LnAGE_i + \beta_8 AUD_i + \beta_9 LnSA_i + \varepsilon_i$$

Where,

ICD = Human capital (HIC), structural capital (SIC) or relational capital (RIC) disclosure index (DI), word count (WC), or word count percentage (WC%);

INED = Proportion of independent non-executive directors on board (proxy for board composition, %);

RDUAL = 1 if the roles of chairman and CEO are held by the same person; 0 if otherwise;

SqSCON = Cumulative shareholding by significant shareholders (i.e. individual or institutions holding 3% or more of total shares outstanding, with the exception of significant directors' shareholding) to total shares outstanding (%);

SAC = Audit committee size (total number of directors on audit committee) (a proxy for internal auditing function);

MAC = Frequency of audit committee meeting (total number of audit committee meetings held within the financial year) (a proxy for internal auditing function);

[2] It is expected that the hypotheses developed in Section 6.1 of Chapter 6 also apply to IC disclosure at its subcategory level.

ROA	=	Return on assets (a proxy for firm performance: profitability);
LnAGE	=	Length of listing on LSE (listing age);
AUD	=	Type of auditor (1 if the firm has a big-4 auditor; 0 if otherwise);
LnSA	=	Sales (a proxy for firm size);
β	=	parameters;
ε	=	error term; and
i	=	the *i*th observation

Note: *INED, SqSCON, SAC, MAC* and *RDUAL* are variables for corporate governance factors; *LnAGE, ROA, AUD* and *LnSA* are company characteristics.

The variables HICDI, SICDI and RICDI; HICWC, SICWC and RICWC; HICWC%, SICWC% and RICWC% are dependent variables.[3] Tests were conducted to ensure that the regression assumptions were met. Appendix 7-A provides normality test results for the dependent variables, which shows that HICDI, SICDI and RICDI are normally distributed, while HICWC, SICWC, RICWC, HICWC%, SICWC% and RICWC% are not. HICWC, SICWC, RICWC and SICWC% were transformed using logarithmic transformation, i.e. LnHICWC, LnSICWC, LnRICWC and LnSICWC%. Square root transformation was identified to be more effective for HICWC% and RICWC%, i.e. SqHICWC% and SqRICWC%. All transformed variables are normally distributed.

Nine separate regression models were run based on three measures of IC disclosure in three categories. The models were tested using the method of entering all variables into the regression equation. Table 7.1 presents a summary of the multiple regression results for each of the three IC subcategories in three measures.[4] The results based on the aggregated IC disclosure are also included.

It can be observed from panel A of Table 7.1 that, with the exception of role duality

[3] See Section 5.1 of Chapter 5 and Appendix 5-A for computations of these variables.
[4] The univariate analyses results for human, structural and relational capital disclosure are shown in Appendices 7-B, 7-C and 7-D.

Table 7.1 Multiple Regression Results: Corporate Governance Factors, Company Characteristics and Human, Structural and Relational Capital Disclosure in Three Measures

		A – Disclosure Index				B – Disclosure Word Count				C – Disclosure Word Count Percentage			
		ICDI	HICDI	SICDI	RICDI	LnICWC	LnHICWC	LnSICWC	LnRICWC	ICWC%	SqHICWC%	LnSICWC%	SqRICWC%
(Constant)	VIF	4.92***	6.743***	3.758***	1.587	24.702***	27.266***	15.534***	13.034***	4.724***	10.676***	-10.093***	5.109***
Audit committee size (SAC)	1.387	2.739***	2.855***	1.365	2.459**	4.197***	5.053***	2.824***	3.396***	1.400	1.472	0.753	1.309
Frequency of audit committee meeting (MAC)	1.389	2.033**	0.087	1.90*	1.965*	2.739***	2.288**	2.355**	2.22**	0.788	-0.312	0.976	0.835
Board composition (INED)	1.104	2.443**	-0.059	2.684***	2.036**	3.461***	1.541	3.264***	2.76***	1.998**	-1.221	2.14**	1.684*
Share concentration (SqSCON)	1.247	-2.393**	-0.764	-2.722***	-1.554	-2.736***	-1.403	-1.745*	-3.316***	-1.781*	0.457	-0.863	-2.983***
Role duality (RDUAL)	1.114	-0.838	-0.272	-0.700	-0.813	-1.707*	-2.212**	-0.931	-1.158	-0.499	-0.606	0.220	-0.294
Profitability (ROA)	1.108	2.149**	0.115	1.297	2.181**	0.930	0.301	0.753	1.359	1.032	-0.062	0.808	1.442
Listing age (LnAGE)	1.183	-2.288**	-2.306**	-0.208	-2.237**	-1.535	-2.103**	-0.101	-2.029**	-2.602**	-2.616**	-0.458	-2.706***
Auditor type (AUD)	1.127	0.903	0.348	1.617	0.367	1.502	1.309	0.866	1.061	1.103	0.313	0.509	0.869
Firm size (Sales: LnSA)	1.952	5.069***	4.74***	2.392**	4.118***	4.118***	4.849***	2.27**	3.561***	-0.747	-0.911	-1.681*	0.995
R		0.808	0.682	0.708	0.750	0.838	0.831	0.734	0.799	0.441	0.368	0.313	0.560
R Square		0.652	0.465	0.501	0.562	0.703	0.690	0.538	0.638	0.194	0.135	0.098	0.313
Adj. R Square		0.617	0.411	0.452	0.519	0.673	0.659	0.492	0.601	0.114	0.049	0.008	0.245
Std. Error		0.051	0.053	0.068	0.084	0.416	0.338	0.548	0.635	0.068	0.044	0.405	0.069
F		18.749	8.684	10.059	12.848	23.615	22.290	11.668	17.599	2.413	1.564	1.089	4.563
Sig.		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.138	0.379	0.000

The figures for each variable are the t-statistics under each regression model.

*** $p<0.01$, ** $p<0.05$, * $p<0.10$ (2-tailed)

and auditor type, all corporate governance factors and company characteristics were significant in explaining one or more disclosure index models in the direction expected. Only one variable was significant under all four disclosure index models, namely firm size, confirming the significant size effect on IC disclosure practice in annual reports.

Listing age ($p<0.05$), audit committee size and firm size ($p<0.01$) are significantly related to HICDI. Three corporate governance variables are significantly related to SICDI, i.e. share concentration and board composition ($p<0.01$), and frequency of audit committee meeting ($p<0.10$), together with firm size ($p<0.05$). Six of the nine variables examined are significantly related to RICDI, which include three corporate governance variables (i.e. audit committee size and frequency of meeting, and board composition) and three company characteristics (i.e. listing age, profitability, and firm size). The significant association between profitability and ICDI is largely due to its significant association with RICDI. This suggests that financially healthy firms are more willing to disclose relational capital items to signal good management and performance. Listing age is negatively related to ICDI, which is supported by both HICDI and RICDI, but not SICDI. The insignificant association between listing age and SICDI could be partly due to the lack of established management and accounting routines for more complex structural capital disclosure.

The variations in the significance of variables in each disclosure index model suggest that the impact of corporate governance factors on the variety of human, structural and relational capital disclosure varies. The significant results of board composition, share concentration, and audit committee size and frequency of meeting under one or more of the disclosure index models, provide confirmation on the important role audit committees, board independence and share ownership structure play in influencing the

level of IC disclosure in its various forms. It also suggests that the effectiveness of audit committees in overseeing IC disclosure practice is not only affected by their size but also their level of activity. Detailed partial correlation analysis[5] of the 61 IC items[6] (see Appendix 7-F) reveals that:

1) *firms with larger audit committees* have significantly more disclosure of human capital items (e.g. number of employees, employee diversity, relations, motivation and capabilities), and relational capital items (e.g. customer involvement, public relations, distribution channels, business agreements, research collaborations, and marketing issues). Despite the insignificant relationship between audit committee size and the structural capital disclosure index, firms with larger audit committees provide greater disclosure of intellectual property information;

2) *firms with audit committees that meet more frequently* disclose significantly more relational capital items (e.g. customers, customer acquisitions, distribution channels, business and research collaboration, business agreements, and marketing issues) and marginally more of intellectual property information;

3) *firms with greater presence of independent non-executive directors on the board* provide significantly greater disclosure of structural capital items (e.g. corporate culture, innovation, knowledge-based infrastructure, and quality management and improvement), and relational capital items (e.g. customer retention, involvement, education and training, relationship with suppliers, and research collaborations);

4) *firms with more concentrated share ownership structure* provide significantly less disclosure of business processes and organisational flexibility/adaptability;

5) *firms with greater profitability* provide significantly more disclosure of relational

[5] Correlation analysis was also conducted. Significant size effects were identified for many IC items. It was then considered more appropriate to perform partial correlation analysis, controlling for size effect (sales as a proxy).
[6] A list of numbered 61 IC items included in the designed research instrument is shown in Appendix 7-E.

capital items such as market presence, customer involvement, public relations, diffusion and networking, and market leadership; and

6) *younger listed firms* provide significantly more disclosure of human capital items (e.g. employee diversity, competence, attitudes/behaviours, and productivity), and relational capital items of customer acquisition and retention.

From panel B of Table 7.1, it can be seen that the disclosure word count models revealed broadly similar, but more significant, results than those under disclosure index models, producing higher adjusted R^2s. It can also be observed that firm size and the two audit committee variables (i.e. size and frequency of meeting), are significant under all four models, confirming the role these committees play in influencing the level of IC disclosure in its various forms. In addition, relational capital disclosures are significantly associated with board composition, share concentration ($p<0.01$) and listing age ($p<0.05$); structural capital disclosures are significantly associated with board composition ($p<0.01$) and marginally with share concentration ($p<0.10$); while human capital disclosures are associated with role duality and listing age ($p<0.05$), all in the direction expected. Profitability and type of auditor fail to show any significance under all disclosure word count models.

Overall, with the exception of role duality, relational and structural capital disclosures are significantly associated with all corporate governance factors (i.e. SAC, MAC, INED, and SqSCON) in the direction expected. However, the impact of corporate governance on human capital disclosure operates somewhat differently. Only role duality, and audit committee size and frequency of meeting are significantly related to LnHICWC. The significant negative association between role duality and LnHICWC is also evidenced in the results from the sensitivity tests by including other variables (see Appendix 7-I). Prior studies have been unable to find any relationship between role

duality and voluntary disclosure, but it is observed that where there is a dominant personality, less human capital disclosure can be expected. Detailed independent sample t-tests and Mann-Whitney U tests on the disclosure word count of the 22 human capital items and role duality (not included) reveal that firms with the role duality attribute provide significantly less disclosure of human capital items (e.g. entrepreneurial spirit, employee motivation, training, equality, relations, attitudes/behaviours, commitment, competences, and other capabilities). Detailed partial correlation analysis (controlling for size effect) was also conducted to examine the association between the explanatory variables and disclosure word count of the 61 IC items (see Appendix 7-G). The results reveal that:

1) *firms with greater presence of independent non-executive directors on the board* provide significantly more disclosure of structural capital items (e.g. management philosophy, corporate culture, innovation, financial dealings, knowledge-based infrastructure, and quality management and improvement), and relational capital items (e.g. market presence, relationships with suppliers and other stakeholders, business agreements, and marketing issues);[7]

2) *firms with larger audit committees* have significantly more disclosure of human capital items (e.g. number of employees, employee age, diversity, relations, work-related competence, motivation, training, and flexibility), structural capital items (e.g. corporate culture, innovation, financial dealings, and networking), and relational capital items (e.g. market presence, company image/reputation, public relations, brands, relationships with suppliers and other stakeholders, distribution channels, business and research collaborations, business agreements, and marketing issues);

3) *firms with audit committees that meet more frequently* disclose significantly more

[7] The results also show that firms with a greater presence of independent non-executive directors provide greater disclosure of human capital items of e.g. employee relations, work-related competence and employee capabilities, but not diversity or equality.

human capital items (e.g. employee education, work-related knowledge, commitment, and motivation), structural capital items (e.g. management philosophy, organisational learning, financial dealings, infrastructure and distribution network), and relational capital items (e.g. customers, market presence, distribution channels, and relationship with stakeholders);

4) *firms with more concentrated share ownership structure* provide significantly less disclosure of relational capital items (e.g. customers, market presence, customer relationships, distribution channels, business collaboration and relationship with stakeholders);[8]

5) *firms with greater profitability* provide significantly more disclosure of structural capital items (e.g. quality management and improvement and accreditations), and relational capital items (i.e. customer training and education, public relations and business agreements). With the exception of employee training, hardly any human capital item showed any significant association;

6) *younger listed firms* provide significantly more disclosure of human capital items (i.e. employee diversity, skills/know-how, and vocational qualifications), and relational capital items (i.e. customer acquisition and retention, and favourite contracts). However, older-listed firms provide marginally more disclosure of the human capital item of employee motivation, the structural capital item of management philosophy, and relational capital items of brands and relationships with suppliers. This may be because of their well-established management and accounting routines and track records, and partially explains why listing age is not significantly associated with the overall volume of IC disclosure.

[8] The results also show that firms with more concentrated share ownership structures provide significantly less disclosure of human capital items (i.e. skills/know-how, employee work-related knowledge and development, and entrepreneurial spirit). Hardly any structural capital item shows significant association with share concentration, apart from organisational flexibility.

Panel C of Table 7.1 reveals that the disclosure word count percentage models produce weaker results than the disclosure index and word count models. The adjusted R^2s of the SqHICWC% and LnSICWC% models are very low, less than 5%, with the *F* statistic significance value greater than 0.05, suggesting failure to reject the null hypothesis that coefficients of the independent variables all equal to 0 (at $p<0.05$). Hence, it was unable to demonstrate that variation in HICWC% and SICWC% can be explained by corporate governance variables and company characteristics, despite the significant results identified for listing age and board composition under SqHICWC% and LnSICWC% respectively. The explanatory power of the SqRICWC% model is stronger (adjusted R^2 of 24.5%). It can be observed that audit committee control mechanisms generally fail to show a significant impact on the focus devoted to IC disclosure in annual reports at both overall and subcategory levels. With the exception of board composition, share concentration and listing age, all other variables are insignificant under all word count percentage models. Detailed correlation analysis[9] of the 21 items comprising relational capital (see Appendix 7-H) reveals that:

1) *firms with greater presence of independent non-executive directors on the board* put significantly greater focus on the disclosure of marketing, and relationships with suppliers and stakeholders issues in their annual reports;

2) *firms with concentrated share ownership* are less focused on the disclosure of customers, market presence, customer relationships, company awards, distribution channels, business collaboration, and the relationship with stakeholders;

3) *younger listed firms* are significantly more focused on the disclosure of customers, favourite contracts, and customer relationships and acquisition. However, the focus on disclosure of brands and marketing are positively related to listing age, which may

[9] As the focus measure of IC disclosure is not size dependent (see Chapter 6), full correlation analysis was applied without controlling for size effect.

suggest that longer-listed firms are more likely to have established brands and marketing channels, given their longer history in the market and greater market knowledge and experience than younger listed firms.

Interestingly, firm size shows weak negative association with LnSICWC%, suggesting that smaller firms may be devoting greater focus to structural capital information in their annual reports than larger firms. Detailed correlation analysis of the 18 structural capital items (not included) reveals that the negative association was mainly due to the significantly greater focus devoted to research and development and technology in the annual reports by smaller firms.

In addition to the multiple regression model examined above, sensitivity tests were conducted by including variables of directors' shareholding, board directors with cross-directorships, leverage, non-executive chairman, chairman with cross-directorships, assets-in-place (SqAIP), and industry sectors. The results of the various multiple regression models are shown in Appendix 7-I.

The results suggest that directors' shareholding is significantly associated with the volume of IC disclosure (LnICWC), mainly due to its significant negative relationship with structural capital disclosure.[10] In addition, directors' shareholding is positively associated with the focus on human capital disclosure in annual reports (SqHICWC%), and negatively associated with the variety of relational capital disclosure (RICDI), despite its insignificant associations with the overall focus and variety of IC disclosure (ICWC% and ICDI). One of the possible explanations for firms with higher directors' shareholdings allocating greater focus on human capital disclosure is that, based on signalling theory, firms with many director shareholdings are more inclined to disclose information to explain why that is so and to provide assurance to the stakeholders that

[10] Partial correlation results (see Appendix 7-G) reveal that firms with greater directors' shareholdings provide significantly less disclosure of structural capital items of intellectual property, processes, management philosophy, organizational learning, research & development, innovation, financial dealings, and knowledge-based infrastructure.

such shareholdings do not affect management effectiveness.[11]

The significant positive association between the proportion of board directors with cross-directorships and LnICWC is mainly due to its significant positive relationship with structural and relational capital disclosures.[12] Leverage is weakly related with ICDI, supported by its positive association with relational capital disclosure. Despite the insignificant overall relationship between leverage and LnICWC, higher leveraged firms are found to provide greater disclosure on human capital items of employee work-related knowledge and motivation (see Appendix 7-G).

Non-executive chairman shows weak negative association with ICDI, which is mainly due to its negative association with human capital disclosure, contrary to the expectation. One of the possible explanations is that firms with an executive chairman may provide more disclosure about his/her competence and experiences that highlights the benefit of having such a chairman on the board, compensating for the expected additional disclosure brought by a non-executive chairman.[13] Despite the insignificant results for chairman with cross-directorships and assets-in-place[14] at overall level, analysis at subcategory level reveals that the two variables are positively associated with the variety of relational and structural capital disclosure respectively.

Biotechnology & pharmaceutical, IT, and banks & insurance firms provide significantly more disclosure of structural capital information than do business services providers, with firms in the former two sectors and the food production & beverage

[11] Partial correlation results (see Appendix 7-F) reveal that firms with greater directors' shareholdings provide significantly less disclosure of relational capital items of brands, business agreements, research collaboration, and marketing issues.
[12] Partial correlation results (see Appendix 7-G) reveal that firms with higher proportions of board directors holding cross-directorships provide significantly more disclosure of structural capital items (e.g. intellectual property, management philosophy, research and development, innovation, and knowledge-based infrastructure), and relational capital items (i.e. brands, distribution channels, and marketing issues).Greater disclosure of employee work-related competence is also identified.
[13] The results of detailed independent sample t-tests and Mann-Whitney U tests (not included) reveal that firms with an executive chairman provide significantly more disclosure of employee diversity, capabilities and involvement with the community.
[14] Detailed analysis (see Appendix 7-F) reveals that firms with greater assets-in-place provide significantly more disclosure of structural capital items of corporate culture, research and development, technology, quality management and improvement, and accreditations. Despite the insignificant associations between assets-in-place and the variety of human and relational capital disclosure, the partial correlation results reveal significant negative associations with human capital items (i.e. employee education, vocational qualifications, and involvement with the community), and the relational capital item of business agreement.

sector putting greater focus on structural capital disclosure in the annual report. Telecommunication services firms are less focused on human capital disclosure in the annual report than business services providers. Given the inconsistent results of the three measures, it was concluded that there was no systematic difference in the overall level of IC disclosure between the seven selected sectors.

After the analysis of IC disclosure based on its subcategories, the next section examines the effect of corporate governance factors and company characteristics on the format of IC disclosure, using univariate analysis. The analysis also provides some understanding of firms' IC disclosure policies and implications for future development.

7.2 DETERMINANTS OF FORMAT OF IC DISCLOSURE

This section examines the association between IC disclosure index by its presentational format, i.e. text (ICDI_T), number (ICDI_N) and graph/picture (ICDI_GP),[15] and the variables examined in Section 7.1. Such associations are examined using univariate analysis only. The descriptive statistics for IC disclosure by its format are provided in Section 5.2 of Chapter 5 and will not be repeated here. Table 7.2 presents the correlations and partial correlations (controlling for size) between IC disclosure in three presentational formats and corporate governance factors and company characteristics.[16] It can be seen from the table that the results for the variables are different for IC disclosure in each of the three formats.

Based on panel A of Table 7.2, IC disclosure in text and numerical forms are both significantly correlated with all six corporate governance variables included (i.e. board composition, share concentration, directors' shareholding, board directors with cross-directorships, audit committee size and frequency of meeting, $p<0.01$), and three of the

[15] The computations of ICDI_T, ICDI_N and ICDI_GP are based on IC disclosure by each of the three formats divided by 61 items.
[16] For two-category nominal independent variables, their associations with IC disclosure in three formats were examined based on both parametric and non-parametric tests. The results are shown in Appendix 7-J.

five company characteristics included (i.e. profitability, leverage, and firm size). Listing age is marginally related to IC disclosure in numerical form.

The impact of these variables on IC disclosure in graph/picture form operates somewhat differently. Three of the six corporate governance variables are significant, i.e. share concentration (p<0.01) and audit committee size and frequency of meeting (p<0.05). Two corporate governance variables, i.e. directors' shareholding and board directors with cross-directorships show weak associations (p<0.10). Leverage and firm size are significant (p<0.01). Board composition, listing age, profitability and assets-in-place are not significant.

Table 7.2 Correlation and Partial Correlation Matrices: IC Disclosure by Format and Corporate Governance Structure and Company Characteristics

	A – Correlation			B – Partial Correlation		
Variables	ICDI_T	ICDI_N	ICDI_GP	ICDI_T	ICDI_N	ICDI_GP
Board composition (INED)	0.374***	0.368***	-0.017	0.327***	0.321***	-0.105
Share concentration (SqSCON)	-0.354***	-0.435***	-0.264***	-0.121	-0.237**	-0.133
Directors' shareholding (LnDISH)	-0.517***	-0.545***	-0.189*	-0.176*	-0.213**	0.054
Board directors with cross-directorships (XDIR)	0.390***	0.411***	0.166*	0.15	0.175*	0.006
Audit committee size (SAC)	0.531***	0.513***	0.222**	0.312***	0.277***	0.047
Frequency of audit committee meeting (MAC)	0.462***	0.517***	0.208**	0.178*	0.257**	0.018
Listing age (LnAGE)	0.111	0.181*	0.112	-0.125	-0.031	0.004
Profitability (ROA)	0.190*	0.215**	0.116	0.185*	0.222**	0.092
Assets-in-place (SqAIP)	-0.078	-0.076	0.036	0.021	0.027	0.095
Leverage (SqLEV)	0.310***	0.239**	0.264***	0.181*	0.076	0.183*
Firm size (LnSA)	0.688***	0.704***	0.380***	Control Variable		

*** p<0.01, ** p<0.05, * p<0.10 (2-tailed)

Overall, significant size effects on IC disclosure in all three formats can be observed, hence the need to control for it to examine the marginal impact of other variables. Panel B of Table 7.2 reports the partial correlation results. Variables that are significantly correlated with IC disclosure in text form include four corporate governance variables (i.e. at p<0.01, board composition and audit committee size; and at p<0.10, directors' shareholding and frequency of audit committee meeting) and two company characteristics (i.e. profitability and leverage, p<0.10). For numerical form, all six corporate governance variables are significant i.e. at p<0.01, board composition and audit committee size; at p<0.05, frequency of audit committee meeting, share

concentration and directors' shareholding; and marginally at $p<0.10$, board directors with cross-directorships; together with profitability ($p<0.05$). For graph/picture form, only leverage shows a weak association ($p<0.10$). It suggests that the variation in IC disclosure in graph/picture form was mainly due to size effects.

To summarise, significant impacts of corporate governance factors are identified for IC disclosure in text and especially in numerical forms after controlling for size effect. This indicates that text and numerical disclosures of IC information are better governed by firms, perhaps because they are of greater use by the market for firms' valuations. Based on the partial correlation statistics at subcategory level shown in Appendix 7-K, corporate governance variables show greater impact on structural capital disclosure in numerical form than in text form. This may indicate the importance of numerical structural capital information over which boards of directors put greater monitor and control. For relational capital disclosures, the impact of corporate governance variables is broadly similar for text and numerical forms, suggesting their equal importance. In addition, it can be observed from the results (see Appendix 7-K) that corporate governance variables, such as board composition and frequency of audit committee meeting are very significantly related to the format of human and structural disclosure; and share concentration and directors' shareholding are significantly associated with the format of relational capital disclosure. The indication is that the effect of corporate governance factors on IC disclosure in its various forms and presentational formats varies.

The insignificant impact of corporate governance variables on IC disclosure in graph/picture form may indicate insufficient monitoring and control on graph/picture use in annual reports for IC communication, leading to less value-relevance of such disclosures to the information users. The variations in IC disclosure in graph/picture

form are largely due to size effects. It also provides some support for Davison and Skerratt's (2007) argument that regulation has not kept pace with the craftsmanship of such material. Hence, greater attention needs to be paid to such disclosures at board level and future involvement of regulatory parties in the use of graphs/pictures in annual reports would help the development of their use in IC communication.

Regarding company characteristics, profitability is significantly related to IC disclosure in numerical form, especially for relational capital (see Appendix 7-K), suggesting that financially healthy firms are more likely to communicate IC information in quantitative form, to signal their good performance and efficient management, where numerical disclosures provide measurable evidence.

The weak positive association between listing age and IC disclosure in numerical form, shown in panel A of Table 7.2, is mainly due to its significant positive association with structural capital disclosure in numerical form (see Appendix 7-K). It implies that although younger listed firms are more enthusiastic in disclosing IC information, the lack of established management and accounting routines and track records determines their ability in the provision of structural capital information in numerical form. Firms with a longer listing history are usually larger in size and have a broader set of management and accounting routines (Chaminade and Roberts, 2003), giving them greater capability in providing structural capital disclosure in quantitative form. It implies that there is a lack of uniform framework for smaller, younger listed firms to follow, in order to make their IC disclosures more relevant and decision-useful.

Moreover, industry difference in the format of IC disclosure was also examined, using Kruskal Wallis and one-way ANOVA tests. The results are provided in Appendix 7-L, Tables 1 and 2. The results based on both tests indicate significant industry differences in IC disclosure in numerical form. In order to identify which industry sectors are

significantly different from each other, the Bonferroni test was conducted using SPSS. The results (not included) report that banks & insurance firms provide significantly more IC disclosure in numerical form than business services providers ($p<0.05$). No significant difference in such disclosure in text or graph/picture form was identified.

Further analysis of industry difference in IC disclosure in numerical form at subcategory level was conducted. The results, shown in Tables 3-5 in Appendix 7-L, reveal that generally firms use more numerical information for the illustration of relational capital than for human and structural capital.[17] The Kruskal Wallis and one-way ANOVA tests produced different results, with the former suggesting no significant industry difference in the level of IC disclosure in numerical form at subcategory level and the latter showing significant results. The Bonferroni test (not included) was conducted again, which revealed that, at $p<0.05$, 1) banks & insurance firms provide significantly more numerical disclosure of human capital than IT firms; 2) biotechnology & pharmaceutical firms disclose more structural capital information in numerical form than business services providers; and 3) banks & insurance firms provide significantly more disclosure of relational capital in numerical form than business services providers.

7.3 SUMMARY AND CONCLUSIONS

Having identified significant associations between intellectual capital (IC) disclosure and corporate governance and company characteristics in Chapter 6, supporting the main proposed hypotheses (H01 and H02), this chapter attempts to examine whether these relationships hold at IC subcategory level, and as such to uncover relationships hitherto unexplored. A summary of the regression results at both overall and subcategory levels is shown in Table 7.3.

[17] On average, 6 of the 22 human capital items (27%), 5 of the 18 structural capital items (30%) and 7 of the 21 relational capital items (34%) in the research instrument were disclosed with numerical information in the sampled annual reports (see Table 5.2 in Chapter 5).

Table 7.3 Summary of Multivariate Analyses of Human, Structural and Relational Capital Disclosure in Three Measures[18]

Corporate Governance Structure and Company Characteristics													
Variables	Hypotheses	ICDI	HICDI	SICDI	RICDI	LnICWC	LnHICWC	LnSICWC	LnRICWC	ICWC%	SqHICWC%	LnSICWC%	SqRICWC%
Board composition (INED)	H01a	Moderate	None	Strong	Moderate	Strong	None	Strong	Strong	Moderate	None	Moderate	Weak
Role duality (RDUAL)	H01b_1	None	None	None	None	Weak	Moderate	None	None	None	None	None	None
Non-executive chairman (NEC)	*H01b_2*	Weak	Moderate	None	None	None	None	None	None	None	None	None	None
Share concentration (SqSCON)	H01c	Moderate	None	Strong	None	Strong	None	Weak	Strong	Weak	None	None	Strong
Directors' shareholding (LnDISH)	*H01d*	None	None	None	Weak	Moderate	None	Moderate	None	None	Moderate	None	None
Board directors with cross-directorships (XDIR)	*H01e_1*	None	None	None	None	Moderate	None	Moderate	Weak	None	None	None	None
Chairman with cross-directorships (CXDIR)	*H01e_2*	None	None	None	Weak	None	None	None	None	None	None	None	None
Audit committee size (SAC)	H01f_1	Strong	Strong	None	Moderate	Strong	Strong	Strong	Strong	None	None	None	None
Frequency of audit committee meeting (MAC)	H01f_2	Moderate	None	Weak	Weak	Strong	Moderate	Moderate	Moderate	None	None	None	None
Firm size (Sales: LnSA)	H02a	Strong	Strong	Moderate	Strong	Strong	Strong	Moderate	Strong	None	None	Weak	None
Listing age (LnAGE)	H02b	Moderate	Moderate	None	Moderate	None	Moderate	None	Moderate	Moderate	Moderate	None	Strong
Profitability (ROA)	H02c	Moderate	None	None	Moderate	None	None	None	None	None	None	None	None
Leverage (SqLEV)	*H02d*	Weak	None	None	Weak	None	Moderate	None	None	None	None	None	None
Assets-in-place (AIP)	*H02e*	None	None	Strong	None	None	None	None	None	None	None	None	None
Auditor type (AUD)	H02f	None	None	None	None	None	None	None	None	None	None	None	None

Strong = $p<0.01$, Moderate = $p<0.05$, Weak = $p<0.10$

[18] The results for the variables shown in italic were based on the results from sensitivity tests.

It also attempts to find the association between the presentational formats of IC disclosure and the two groups of explanatory variables. Such analyses were conducted to help in understanding the disclosure policy adopted by firms with regard to categories and formats of IC disclosure.

In addition, IC items that are significantly associated with the two groups of explanatory variables were also analysed to further enhance our understanding of the effects of these variables on IC disclosure.

Regressing the three measures of human, structural and relational capital disclosures on the explanatory variables, this chapter finds support for the significant relationships identified in Chapter 6 between the explanatory variables and overall IC disclosure, and uncovers some significant relationships undetected by examining such disclosure at the aggregated level. It provides further evidence towards Keenan and Aggestam's (2001) argument that corporate governance impacts on efficient IC (i.e. human, structural and relational capital) communication to stakeholders.

Results based on multiple regression models (see Table 7.1 and Tables 1-5 in Appendix 7-I) indicate that, with the exception of type of auditor, all corporate governance variables (i.e. board composition, share concentration, audit committee size and frequency of meeting, directors' shareholding, board directors and chairman with cross-directorships, non-executive chairman, and role duality), together with company characteristics (i.e. firm size, profitability, listing age, leverage, assets-in-place, and industry type) are associated with the disclosure of one or more of the three IC categories in one or more disclosure measures to various extents.

In the case of corporate governance factors, the significant positive associations for board composition with structural and relational capital disclosures, in all three measures, provide further evidence for independent directors' function as a monitoring mechanism. Moreover, from a resource-based theory perspective, their breadth of

expertise and knowledge heighten the board's awareness of the importance of IC, especially structural and relational capital, disclosure.

The weak negative association between role duality and the volume of IC disclosure was mainly due to its significant negative association with human capital disclosure. The negative impact of block shareholders is mainly on the variety of structural capital disclosure and the volume and focus of relational capital disclosure. Where share ownership is highly concentrated, smaller shareholders' interests need to be protected via better structural and relational capital communication.

Confirmation of the impact of audit committee size and frequency of audit committee meeting on IC disclosure, underpinned by agency theory arguments, was also found at subcategory level. Audit committee size and frequency of meeting are significantly related to the volume of disclosure of all three IC categories, with the former being positively associated with the variety of human and relational capital disclosures and the latter with the variety of structural and relational capital disclosures. Audit committee function was further evidenced to have no significant effect on the focus devoted to IC disclosure in annual reports, indicating that the committee does not have editorial power when there exists information demands over many aspects.

In addition, the negative effect of directors' shareholding is mainly on the volume of structural capital disclosure and the variety of relational capital disclosure, while the positive effect of board directors with cross-directorships is mainly on the volume of structural and relational capital disclosures.

Associations that were undetected via analysis of IC disclosure at an aggregated level include, 1) the negative effect of role duality on the volume of human capital disclosure; 2) the positive effect of directors' shareholding on the focus of human capital disclosure; 3) the weak support of chairman with cross-directorships for the variety of relational capital disclosure; and 4) the negative association between non-

executive chairman and the variety of human capital disclosure.

For company characteristics, significant size effects on the variety and volume of all three IC categories are found. The focus on human, structural and relational capital disclosures in annual reports is not size dependent. Financially healthy firms provide greater variety of relational capital information. The negative effect of listing age is found to be mainly related to the variety and volume of human and relational capital disclosures. However, given the different effects of listing age on the disclosure volume of IC items, the variable showed no significant effect on the overall volume of IC disclosure. Despite the insignificant results for leverage and assets-in-place at the aggregated level, leverage is positively related to the variety of relational capital disclosure and volume of human capital disclosure, and assets-in-place shows positive association with the variety of structural capital disclosure. Industry differences were also identified, but not in a systematic manner across the three measures, consistent with the findings in Chapter 6.

Regarding the format of IC disclosure, text and numerical forms were found to be more significantly affected by corporate governance variables than graph/picture form. The implication is that while greater emphasis needs to be put on the development of a uniform framework for IC disclosure, regulatory parties also need to devote more attention to graph/picture use in annual reports.

Although the effect of audit committees on the level of IC disclosure was evidenced by both univariate and multivariate analyses, at both overall and subcategory levels, in Chapter 6 and this chapter based on its size and level of activity, various impacts of other audit committee characteristics were not examined. As such, further analyses of the impact of audit committee characteristics on level of IC disclosure were conducted and the results are presented and discussed in Chapter 8.