# Intellectual Capital Disclosures by Australian Companies

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**Abstract**

This research expands on previous studies of voluntary intellectual capital disclosure (ICD) in Australian company annual reports. Using content analysis it examined the level of ICD in the annual reports of 70 Australian publicly listed firms and also investigated the influence of the company's characteristics (industry type, ownership concentration, listing age, leverage and auditor type) on the level of ICD.

Levels of ICD were low, with external capital being the most frequently disclosed category. Correlation and regression analysis demonstrated that companies that operate in high intellectual capital intensive industries, and companies with large (Big Four) auditing firms show higher levels of ICD. A company's ownership concentration, leverage level, and listing age did not influence its level of ICD.

Journal of Economic Literature Classification Code: M41

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## 1. Introduction

Australia is shifting towards a knowledge-based economy. Companies based on high technology and knowledge are challenging commodity and resource based sectors, traditionally the mainstay of Australian business, for dominance in the Australian economy (Guthrie & Petty, 2000 p.531). With this shift in focus, intellectual capital (IC) is becoming increasingly important for firms to embrace and harness. Due to similar trends in many countries, international accounting standard regulators are now encouraging companies to enhance their business reporting by making extensive voluntary disclosures of IC information (Oliveira et al., 2006).

Consequently, IC has become the subject of a growing body of research in the last twelve years. Earlier research concentrated on informing, describing and making IC visible (Brennan, 2001; Goh & Lim, 2004) and very often the level of ICD was assessed using manual content analysis of the annual reports. Later studies, however, applied more rigorous reliability testing in their content analysis procedures (Whiting & Miller, 2008) and moved towards investigating firm-specific factors that could explain why companies voluntarily disclose IC (Bozzolan et al., 2006; Li et al., 2008).

An example of this trend is found in Australian research. Australia lacks an ICD standard (Sujan & Abeysekera, 2007) and so the majority of ICD is voluntary, making it an interesting research site. Published studies show a move from the earlier descriptive work (Guthrie & Petty, 2000; Sciulli et al., 2002) to explanatory studies using only one independent variable (Guthrie et al., 2006; Sujan & Abeysekera, 2007) and the latest offering investigates the relationship between a number of independent variables and ICD for biotechnological companies (White et al., 2007).

The potential exists to expand on and add to this body of Australian-located literature on ICD. Although White et al. (2007) is of an explanatory nature and incorporates five independent variables (board independence, firm age, leverage, firm size and ownership concentration) across ninety-six firms, their study is limited to only biotechnological firms. Accordingly, this study uses a stratified random sample of seventy publicly listed Australian firms of varying size to investigate the extent and content of voluntary ICD and to understand if the firm-specific characteristics of industry type, ownership concentration, listing age, leverage and auditor type are determinants of the level of voluntary ICD. This study is different and complementary to White et al (2007) in the more diverse industries sampled, the year of sampling used, and the study of the influence of leverage, auditor type and listing age.

The next section addresses the background literature and hypothesis development, whilst the later sections cover method, results and discussion.

## 2. Prior Literature and Hypothesis Development.

Although increasing in importance in the economy, IC is a complex concept and therefore difficult to define. This is evident in the number of different definitions existing in the literature (Sujan & Abeysekera, 2007) ranging from a subset of intangible capital (Hunter et al., 2005), the difference between the market value and the book value of a firm (Ordonez de Pablos, 2005) and knowledge based resources that contribute to the creation of a competitive advantage for the firm (Ordonez de Pablos, 2005). For this study, IC is defined to included all the knowledge-based intangible processes and assets which are not normally shown on the balance sheet, and can be leveraged to give rise to future value (Roos et al., 1997).

Perhaps an easier way to describe IC is by its components. A tripartite framework used in many of the prior ICD studies (Petty & Cuganesan, 2005) is that originally suggested by Sveiby (1997) and consisting of internal (structural) capital, external (relational/customer)

capital, and human capital (employee competence). Internal capital refers to "the knowledge embedded in organisational structures and processes" (Petty & Cuganesan, 2005, p.41) and consists of two main elements, intellectual property (e.g. copyrights, patents, and trademarks) and infrastructure assets (values, systems and processes used in day-to-day activities). On the other hand external capital category consists of the relationships a firm has with outside stakeholders (Petty & Cuganesan, 2005) such as customers and suppliers, and incorporates relationship methods such as brands, reputation and business collaborations. Finally human capital refers to "the skills/competences, training and education, and experience and value characteristics of an organisation's workforce" (Petty & Cuganesan, 2005, p.41). Human capital builds the internal structure, and these two categories of capital are mutually reinforcing within an organisation (Edvinsson & Malone, 1997).The three categories can be further divided into a number of elements/attributes, and depending on the study the number of elements has ranged from 18-25. One example is that presented in Table 1 in which there are six internal capital elements, seven external capital elements and five human capital elements.

*Insert Table 1 about here*

A growing body of research has focussed on using content analysis of annual reports to analyse ICD in terms of the framework described above. Content analysis "involves codifying qualitative and quantified information into predefined categories in order to derive patterns in the presentation and reporting of information" (Guthrie & Petty, 2000, p.244). Usually this procedure has been carried out manually using human coders (e.g. Bozzolan et al., 2003) but occasionally a computerised word-searching programme has been utilised (e.g. Bontis, 2003).

Earlier research was in the main descriptive, detailing the level of internal, external and human capital voluntary disclosure exhibited in the annual reports of individual countries

(Guthrie & Petty, 2000; Brennan, 2001; Goh & Lim, 2004; Abeysekera & Guthrie, 2005) and in general the findings indicated that the levels of voluntary IC disclosure are low worldwide. In addition, despite differing firm selection criteria and measurement unit in the content analysis, the studies consistently showed that external structure capital was the most frequently reported IC category, usually followed by internal structure capital, with human capital the least frequent (Whiting & Miller, 2008).

However, most of these descriptive studies provided little evidence that their coding instruments and application of those instruments were reliable (Milne & Adler, 1999) in terms of coder accuracy, reproducibility and stability (Krippendorff, 1980). Coder reliability increases the ability of making replicable and valid inferences from the study's results (Guthrie et al., 2004). The earliest paper to do so was that of Bozzolan et al (2003) but coder reliability testing is becoming increasingly common practice (White et al., 2007; Whiting & Miller, 2008; Xiao, 2008), thereby increasing confidence in the results of these studies.

Another development in the ICD literature is the incorporation of theoretical reasoning and investigation of firm-specific factors to explain why companies voluntarily disclose IC (Bozzolan et al., 2006; Li et al., 2008). Since the earliest attempts by Williams (2001), April et al. (2003) and Bozzolan et al. (2003), an increasing number of explanatory theories and influences on ICD have been suggested and tested (see Table 2). Explanatory factors tested have been industry, firm size, leverage, profitability or financial performance, auditor type, listing age or firm age, intellectual capital performance, and corporate governance variables such as board composition or independence, ownership structure or concentration, audit committee size, frequency of audit committee meetings and CEO role duality.

*Insert Table 2 about here*

In general, firm size and industry are found to be significant explanatory variables (Bozzolan et al., 2006), but the others have mixed or only singular results. In fact, firm size and industry are now either being omitted from some studies (Sonnier et al., 2007) or included only as control variables (Li et al., 2008) in ICD explanatory studies. Explanatory theories used to explain ICD are also many and varied and range from stakeholder and legitimacy theory, agency and political cost theory, signalling, information asymmetry, proprietary cost, institutional and media-agenda setting theory. Consequently only the literature relating to the factors investigated in the following empirical study is presented below.

It is argued that IC intensive industries will engage in more ICD than industries that rely mainly on physical assets to be profitable. This relationship has been explained by stakeholder theory, legitimacy theory and media agenda-setting theory. Stakeholder theory purports that shareholders have a right to be provided with information about how the organisation's activities affect them (Vergauwen & van Alem, 2005), particularly if they are less powerful shareholders who cannot access information through private meetings (Holland, 2001). Firms are not required to provide information about their knowledge assets in the annual reports, so in order to satisfy the stakeholders' need for information, firms in IC intensive industries will be forced to make voluntary disclosures about their IC.

Legitimacy theory asserts that organisations, as part of a social contract, will take action to ensure that their activities are perceived as legitimate. Firms with high levels of IC are more likely to engage in voluntary ICD because they cannot legitimise their status through the traditional symbols of corporate success, the tangible hard assets (Guthrie et al., 2004). They need to communicate how the firm uses its IC to generate value (Sciulli et al., 2002).

The third theory that has been used to explain the level of voluntary ICD is that of media agenda-setting theory. This theory suggests that firms (as a form of media) set the agenda for

public opinion by emphasizing or highlighting certain issues (Sujan & Abeysekera, 2007). Therefore IC intensive firms "boast of their IC assets to signal their superiority over competitors (Sujan & Abeysekera, 2007).

Most studies have supported the hypothesis that firms that are high in IC (e.g. "high-tech.", knowledge intensive industries) are more likely to engage in voluntary ICD (e.g. Bozzolan et al., 2003; Petty & Cuganesan, 2005; Bozzolan et al., 2006; Oliveira et al., 2006) and some studies have chosen to base their studies solely on samples of firms from high IC industries (e.g. Sonnier et al., 2007; White et al., 2007). Accordingly the first hypothesis is:

**$H_{A1}$:** ***Companies operating in high IC intensive industries will voluntarily disclose IC information to a greater extent, than those companies in low IC intensive industries***

Both agency theory and legitimacy theory have been used to explain how firms' ownership concentration has an effect on ICD disclosure. To contain agency costs that occur because of a conflict of interest between principals and agents, shareholders monitor managers by requiring greater disclosures. Fama and Jensen (1983) argued that if share ownership is widely held, then the prospect of a conflict of interest arising between principals and agents is greater compared to closely held companies. Therefore, it follows that disclosure would increase in association with the level of outside owners of the firm (Chau & Gray, 2002). In addition, legitimacy theory states that firms with a large number of stakeholders will disclose more information in order to increase their accountability and visibility due to the greater pressures they face from having a wider ownership base (Cormier & Gordon, 2001).

Three studies have examined firms' ownership concentration's effect on ICD. Both Oliveira et al. (2006) and Li et al. (2008) found that firms with a low shareholder concentration (i.e. more diffuse ownership) engaged in more voluntary ICD. However, White et al. (2007) found no relationship between the disclosure practice of Australian biotechnology companies and

the level of ownership concentration, suggesting that "institutional shareholders may not be lobbying management and the board for greater accountability (White et al., 2007, p.531).

This study proposes that there will be a negative association between ownership concentration and ICD. That is, the higher concentration of ownership the fewer disclosures will be made.

**$H_{A2}$:** ***There is a negative association between levels of ownership concentration and level of voluntary ICD***

Agency theory can also be used to explain the influence of leverage on the level of voluntary disclosure by a firm. When firms incur outside debt, agency costs arise from conflicts of interest between equity and debt investors (Berger & Bonaccorsi di Patti, 2006). These agency costs are comprised of a reduction in value of the firm and increased monitoring costs owing to the fact that the manager will try and reallocate the wealth of the debt-holder to the firm. The greater the level of debt, the wider apart the two parties' interests (Jensen & Meckling, 1976) and hence the need for higher monitoring costs. Increased disclosure by a firm can reduce these monitoring costs. Thus, firms with high leverage levels have an incentive to make voluntary disclosures in order to reduce agency costs.

Media agenda-setting theory has also been used to explain why a firm's leverage level could be associated with its ICD levels. If a firm has 'good news', low levels of debt for example, then it will attempt to highlight this positive information to the market through making voluntary disclosures in its annual report (Sujan & Abeysekera, 2007). Media agenda setting theory therefore suggests the opposite of agency theory. If a company has low leverage levels it will increase its voluntary disclosures to inform the market of its strong position.

Prior studies have provided mixed results on the association between leverage and ICD levels. Oliveira et al.'s (2006) study showed no association between the extent of voluntary ICD and leverage, whereas White et al. (2007) observed a significant positive relationship.

With these contrasting theoretical expectations and weak empirical evidence, the hypothesis linking leverage to ICD is stated in the null form.

**$H_{O3}$:** ***There is no association between leverage levels and the extent of voluntary ICD***

There is evidence of a positive relationship between risk and extent of information disclosed by a firm (Cormier et al., 2005). Investors in higher risk firms can reduce their information costs if they are given additional discretionary information (Lang & Lundholm, 1993) and disclosures reduce the cost of equity for a firm (Botosan, 1997). Therefore, a firm that is high risk will be more likely to disclose information in an effort to lower its risk profile. Research has shown that well established firms are less risky (Bukh et al., 2005), therefore older firms would provide less voluntary disclosure than a younger, more risky firm.

Younger companies do show more disclosure (Cormier et al., 2005). Firms that have recently listed on the Stock Exchange are more likely to be seeking capital from outside the business to raise funds rather than internal generation, and therefore to access these funds at the lowest cost of capital they increase their disclosures (Choi, 1973). In addition, "newly listed companies need to disclose more information to reduce scepticism and boost confidence of investors who may perceive them as more risky" (Haniffa & Cooke, 2002, p.330).

Empirically, the evidence is mixed. Bukh et al (2005) investigated the effect of listing age on ICD in Initial Public Offering prospectuses, not in annual reports, and found no significant association. However White et al. (2007) observed a strong positive relationship between ICD and firm age since incorporation (not listing), when a negative association was expected. Although Li et al. (2008) only included listing age as a control variable in their study, they

did observe a significant negative association. Due to these mixed results the hypothesis is stated in the null form.

**$H_{O4}$:** ***There is no association between listing age and the extent of voluntary ICD***

The final factor to be investigated is the size/type of auditor employed by the firm (large/small or Big Four or not). Many authors have suggested "that auditors play a role in defining the disclosure policy of their clients" (Raffournier, 1995, p.256). Chow and Wong-Boren (1987) suggested that the former Big Six audit firms could maintain independence from their clients' demands for limited disclosure more easily than smaller audit firms as they had a reputation to uphold. Therefore, bigger audit firms encourage their clients to disclose more information in annual reports (Hossian et al., 1995). Oliveira et al. (2006) argued that large auditing firms may encourage their clients to disclose more information as they want to preserve their reputation, develop their expertise, and ensure that they retain their clients.

Oliveira et al. (2006) is the sole study to examine the relationship between the type of auditor a firm has and the extent of its ICD. They concluded that companies with a Big Four auditor disclose more IC information compared to companies with non-Big Four auditors. Accordingly the final hypothesis is:

**$H_{A5}$:** ***Companies audited by a Big Four auditing firm will disclose more information on IC compared to companies audited by non-Big Four auditors***

The investigation of these five hypotheses uses Australian data. Australia is placing increasing emphasis on the need to be a "knowledge economy" (Guthrie & Petty, 2000), however it has no legal or financial reporting standards requiring ICD (Sujan & Abeysekera, 2007; White et al., 2007). A number of ICD studies have been located in Australia and these are displayed in Table 3.

*Table 3 about here*

The earliest Australian studies were largely descriptive work (Guthrie & Petty, 2000; Sciulli et al., 2002) concentrating on illustrating the level of ICD and its composition. The latter three studies (Guthrie et al., 2006; Sujan & Abeysekera, 2007; White et al., 2007) also appear in Table 2 as they are explanatory studies, focusing on the variables of firm size (Guthrie et al., 2006; White et al., 2007), industry (Sujan & Abeysekera, 2007) and in the case of White et al. (2007) a number of corporate governance variables. All the studies except for Sciulli et al. (2002) which investigated public sector annual reports, show that external capital is the most heavily reported upon category, followed by internal capital and then human capital. The amount of disclosure is in general low, although the average number of IC attributes is difficult to interpret and compare as some studies measure presence/absence whilst others count the number of appearances and others weight the observation more heavily if the disclosure is quantitative (Steenkamp & Northcott, 2007).

The industry and size relationships with ICD are supported in Australia. White et al. (2007) is the most developed study but specialised in the effect of corporate governance factors on ICD for biotechnological companies. In common with this current study it investigated the link between ownership structure and ICD, but also controlled for firm age. They found no relationship with ownership concentration, but did find a strong positive relationship between ICD and firm age since incorporation (not listing), when a negative association was expected.

## 3. Method

All listed companies on the Australian Stock Exchange (ASX) as at 05 June 2007 formed the population of this study's sample (n= 2036). These companies were classified as either high-IC intensive (n=836) or low-IC intensive industries (n=987) using the Global Industry Classification Standard (GICS) and prior literature in this area[1] (see Appendix 1). A

[1] As no one classification dominates the literature, this study amalgamated the classifications of Brennan (2001), Bozzolan et al. (2003), Oliveira et al (2006) and Sujan and Cuganesan (2007).

stratified random sample was then taken to get thirty-five companies from each IC intensity classification to form this study's sample (see Appendix 2). This approach was to ensure a wide variation of IC data for regression and it also provided the measure of the industry independent variable.

To measure the dependent variable (extent of ICD), content analysis was undertaken on the 2006 annual reports of each of these seventy companies. While each company's entire annual report was analysed, the Chairman's Report and Managing Directors' Report were the predominant areas where IC was disclosed. The IC framework presented in Table 1 was used for categorising the disclosures, enhanced by the detailed definitions and examples of the eighteen attributes provided by Guthrie et al. (2003). The sentence was the recording unit for analysis (Milne & Adler, 1999). If an attribute occurred more than once throughout the report it was only recorded once. Based on Oliveira et al. (2006) a weighting system was used to differentiate between quantitative and qualitative disclosure. A disclosure index was then calculated as shown below.

$$\textbf{Overall Disclosure Index Score} = \sum_{i=1}^{M} d_i / M$$

where $d_i$ expresses $attribute_i$ with the value of 2 if ICD is in quantitative form, 1 if a qualitative disclosure, and 0 if the intellectual attribute is not referred to. M expresses the maximum possible score a company could achieve, i.e. 36 (18 items multiplied by two [quantitative disclosure]).

Based on Whiting & Miller (2008), rigorous reliability testing of the content analysis was undertaken. The main coder practised on five additional annual reports before commencing the sample coding and these were recoded after 20 annual reports had been coded and at the conclusion of the coding. Both times the Krippendorff's alpha was above the minimum

acceptable standard of reliability of 0.75 (Milne and Adler, 1999)[2] indicating an acceptable level of stability in coding over time. To test the reproducibility aspect of reliability, another coder coded the initial five reports achieving Krippendorff's alpha of 0.7329 and 0.7426. Although just below the minimum threshold of acceptance, +0.75, it was deemed to be acceptable considering the second coder's minimal training.

Measures of the independent variables were obtained from the annual reports and the Australian Securities Exchange's website. Ownership concentration and leverage measures were consistent with those used in Oliveira et al. (2006) and listing age followed that used by Hannifa and Cooke (2002). Table 4 summarises the independent variables, their measures, and their symbols.

*Table 4 about here*

The resultant data were checked for normality and the assumptions of regression (Coakes et al., 2006). In general, the data was not normally distributed and so non-parametric tests (Spearman's rank-order correlation and Mann-Whitney U) were used. In particular the nature of the leverage data was distinctly non-normal (skewness and kurtosis figures of -7.603 and 62.153 respectively). Overall, the assumptions for multiple regression were met (normality, linearity, non-multicollinearity, homoscedasticity, and independence of residuals etc), but one significant outlier (with respect to leverage) was identified and subsequently removed from the analysis to give a sample size of sixty-nine.

## 4. Results

The total number of attributes disclosed by the seventy sample firms was 443, making an average of 6.33 per firm. Seventy-six percent of this ICD was in qualitative terms and 24% was quantitative. Of the eighteen attributes, 'business collaborations' was disclosed the most

[2] Test 1: $\alpha$= 0.8474 (ICD or not) and $\alpha$= 0.8420 (category); Test 2: $\alpha$= 0.8141 and 0.8166

(n=52, out of a possible 70) and 'customer satisfaction' the least often (n=9). With regard to the attributes' scores[3], 'employees' scored the highest, with 91 (out of 140). This was due to the number of times this attribute was reported in quantitative terms. The 'Information and networking systems' and 'education' had the lowest disclosure scores (10). At the category level, 42% of the ICD was about external capital information, 32% about internal capital, and 26% concerned human capital. Firms in the high-IC intensity group showed greater ICD (average of 7.4), compared to an average of 5.3 by low-IC intensive firms.

These results mirror those found in the Australian studies to date (see Table 3). ICD levels were low, and even lower than those observed in the other studies. However this is consistent with the sample selection. Guthrie & Petty (2000), Guthrie et al. (2006) and Sujan & Abeysekera (2007) all analysed the largest companies, whereas this study used a random sample so firms were of varying size. Large companies are "likely to be more progressive and innovative because they have the financial resources that enable this type of behaviour" and therefore have more IC on which to report (Guthrie and Petty, 2006, p. 258). Firm size has been consistently found to be positively correlated with ICD. In addition, "high tech" industries display more ICD than more traditional industries (e.g. Bozzolan et al., 2006). Therefore as this study used a mix of industry type, it would be expected that its ICD would be less than that detected in the White et al. (2007) which sampled only biotechnology firms. The proportions across the categories were consistent with all the Australian studies barring Sciulli et al (2002), which, as a public sector study could be expected to have less disclosure about external capital attributes such as business collaborations. Business collaborations was also the top-scoring attribute in Sujan & Abeysekera (2007).

The percentage of shares owned by the top three shareholders (ownership concentration) ranged from 12 to 92 % with a median of 38% and firms had been listed for between one and

[3] The scores are the sum disclosures, which take into account whether the attribute was disclosed in a quantitative way, which was coded 2, or in qualitative form, which was coded 1.

44 years (median =11). Fifty-nine percent were audited by Big Four auditors and leverage's median of 46% was skewed by one negative outlier, which was deleted from the sample.

The hypotheses were tested through correlations and regression. Table 5 presents the results of the Spearman's correlations and Kruskal Wallis tests (n=69).

*Table 5 about here*

The Spearman's rank-order correlation and the Mann-Whitney U test showed support for $H_{A1}$ and $H_{A5,}$ with significant relationships ($p<0.01$)) between industry type and auditor type and the level of ICD. That is, firms in high IC intensive firms and with auditors from large firms (proxied by Big Four auditors) made significantly greater IC disclosures compared to low IC intensive firms and those audited by smaller accounting firms.

Leverage was significantly correlated with the levels of ICD. The positive correlation coefficient suggests that the higher the proportion of total liabilities to equity the greater amount of ICD, indicating that $H_{03}$ was not supported. Ownership concentration and listing age showed no relationships with ICD so $H_{A2}$ was not supported and $H_{04}$, which proposes no relationship was supported.

These results were examined further by the use of multiple regression. The resultant significant regression model (F=6.013, p=0.000) was:

$$\boldsymbol{ICD = 0.127_o + 0.069I_i - 0.039OC_i + 0.011L_i + 0.001LA_i + 0.085TA_i + e_i}$$

Where *I*= Industry Type, *OC*= Ownership Concentration, *L*= Leverage, *LA*= Listing Age, *TA*= Type of Auditor, and *e*= error term.

Thirty-two percent of the variation in ICD ($R^2$) was explained by the five independent variables. In addition, the adjusted $R^2$ was 0.269, which shows how well the five independent variables would predict ICD in another sample of Australian companies.

Examination of the five independent variables showed that ownership concentration and listing age continued to show no significant relationship with ICD (p= 0.588 and 0.343 respectively), but that industry type and auditor size had statistically significant positive associations with overall ICD (p=0.005 and 0.001). While these results confirmed the correlation analysis results, leverage was not found to be significant in the regression model (p= 0.103) as it was in the correlations. However, as the leverage data had several other borderline outliers, the regression test was repeated with a trimmed sample (removal of the top and bottom five percent (n=61) of the variable's data). While reducing cases ignores some real data and lowers the model's robustness, the trimming helped stabilise the variable. A significant modelresulted[4] and this time industry type, auditor type and leverage were all significantly positively related with ICD (p= 0.030, 0.019 and 0.005 respectively).

Stepwise regression (n=69) incorporating industry and auditor type variables as the only two independent variables was conducted to examine the effect of these two variables on the overall explanatory power of the model. Adjusted $R^2$ (0.258) was almost identical to that of the previous model with the five independent variables, showing that the three other variables, ownership concentration, leverage, and listing age barely contributed to the explanatory power of the model.

To provide further insight into the results, regression was also run with the three IC category indices (internal, external, and human capital) as the dependent variables. The regression models for each of the three indices were all statistically significant although explanatory power decreased when moving from internal to external to human capital[5]. In all three cases,

[4] p=0.000, $R^2$ = 0.387, adjusted $R^2$ = 0.332

[5] The $R^2$ values were 0.236 (p=0.004), 0.212 (p=0.009), and 0.198 (p=0.014) and adjusted $R^2$ values were 0.176, 0.150, and 0.134 for the internal capital, external capital, and human capital indices respectively.

the coefficients for industry type[6] and auditor type[7] were significant and positive. In addition listing age surfaces as a positive but marginal explanatory factor (p=0.091) of human capital, but with a positive coefficient.

In summary therefore, the directional hypotheses $H_{A1}$ and $H_{A5}$ were supported and the null hypotheses $H_{03}$ and $H_{04}$ could not be rejected. The final directional hypothesis $H_{A2}$ was not supported. That is, firms in high-IC intensive industries and with large accounting firm auditors (proxied by Big Four auditors) will make more, and/or will quantify more, ICD. These findings add further support to those of Bozzolan et al. (2006), Oliveira et al. (2006), Petty and Cuganesan (2005), Bozzolan et al. (2003) and others with respect to industry type and Oliveira et al. (2006) regarding auditor type.

On the other hand, less concentrated ownership, higher leverage and younger publicly listed companies do not show evidence of higher levels of ICD. The finding in relation to ownership concentration confirms the results of the other Australian study (White et al., 2007) but is in contradiction to that of Oliveira et al. (2006) and Li et al. (2008) who found a negative relationship. The findings on leverage have added to the mixed prior studies' results. This study has confirmed the findings of Oliveira et al. (2006) of no association between the extent of voluntary ICD and leverage, but contradicted those of White et al. (2007) who observed a significant positive relationship. However the concerns with outliers, and the evidence from the correlation analysis and the trimmed sample regression provide a stimulus for further research with regard to the relationship between leverage and ICD. The lack of a relationship between listing age and ICD adds to the already mixed results from Bukh et al (2005), White et al. (2007) and Li et al. (2008). The only observable result was a positive relationship between listing age and human capital ICD which is contrary to that theorised but consistent with the findings of White et al. (2007).

[6] p= 0.008, 0.066 and 0.073 (internal ICD, external ICD and human ICD respectively
[7] p= 0.026, 0.005 and 0.056 (internal ICD, external ICD and human ICD respectively

## 5. Discussion and Conclusion

Contrary to the notion of a knowledge economy, this study adds to previous findings that demonstrate that Australian companies provide little in the way of ICD. Sujan and Abeysekera (2007) suggest three possible reasons for this paucity of ICD, Firstly, the fact that there is no ICD disclosure standard in Australia, and secondly firms may not be equipped with the mechanisms for assessing and disclosing their IC. This is particularly relevant in this study as it did include small firms which might not have the resources and tools necessary to report on their IC. A third reason is that ICD just may not be high on the management's list of priorities. For those companies who do disclose IC, the ability to influence the public (media agenda-setting theory) may be a significant motivator for ICD.

In terms of the three IC categories, external capital information was disclosed most often. This finding is again a close reflection of the results gained by White et al. (2007), Sujan and Abeysekera (2007), Guthrie et al. (2006) and Guthrie and Petty (2000). This dominance of external capital disclosures might be a result of increased competition, both domestically and internationally, facing Australian companies (Sujan and Abeysekera, 2007). Therefore firms, in order to counter this competition, might want to emphasise relations with their customers and other organisations, and promote their brand, which are all attributes of external capital.

This finding highlights the possible need for a mandatory ICD regulation, as "in the absence of a uniform external IC reporting framework, the questions still remain [for companies] as to what to report and how to report" (Sujan and Abeysekera, 2007, p. 17). Accounting standard setters may need to intervene and perhaps make some ICD mandatory as the occurrence of ICD is important in providing information which helps stakeholders make decisions about the firm (Sujan and Abeysekera, 2007). Petty and Cuganesan (2005) list further benefits of ICD to include favourable reactions by labour and capital markets (Lev, 2001) in terms of stock prices, capital market efficiency and cost of capital.

This study also investigated the effect of five firm-specific characteristics, industry classification, ownership concentration, leverage, listing age, and auditor type on ICD by Australian companies. Industry type, leverage, ownership concentration and firm age (/listing age) had been previously tested in various Australian studies, but auditor type had not. In line with prior research, correlation and regression tests confirmed positive relationships of industry and auditor type with ICD. That is, firms in high-IC intensive industries and with large accounting firm auditors (proxied by Big Four auditors) engage in more ICD.

The influence of industry confirms the claims of the stakeholder and legitimacy theories which propose that if a firm is IC intensive it has no option but to disclose information about its IC so that its stakeholders' need for information is satisfied. Moreover, IC intensive firms could have limited physical assets on which they could report, and therefore disclose information on IC to gain a legitimate status in their communities. However the aforementioned suggestion of mandated ICD would mean that low-IC intensive firms would also be encouraged to provide information on their IC.

The association between audit firm type and ICD may occur because large auditing firms have a reputation to preserve and so encourage their clients to provide more voluntary ICD, rather than limiting disclosure behaviour (Oliveira et al., 2006). Also, the Big Four auditing firms might possess greater expertise on IC compared to smaller auditing firms, and therefore are able to help their clients make a greater number of disclosures (Oliveira et al., 2006). Mandated ICD could open up a further training role for the Big Four. For example, "spreading any protocols or techniques [of Big Four audit firms] to non-Big 4 audit firms, possibly through the continuing professional development activities of professional accounting bodies" in Australia could result in consistent ICD among companies, no matter who their auditor is (Oliveira et al., 2006, p. 26).

Ownership concentration, leverage and listing age were not significantly related to ICD. Ownership concentration does not appear to have a great impact on agency costs in an Australian context. In other words, firms incur agency costs no matter how diffuse their shareholding. It could also be proposed that firms are trying to mitigate agency costs through other means, such as making remuneration to managers to further align their interests with those of the company, or through disclosures of other voluntary information (e.g. social and environmental information). One possible reason for the lack of a relationship between listing age and ICD is offered by legitimacy theory. As community expectations change, the firm must provide legitimacy by making disclosures to show that it is also changing (Deegan & Samkin, 2004). Therefore, according to legitimacy theory, it does not matter for how long a company has been operating, or been listed on the securities exchange, it must continually make disclosures to show it is aligned with the community's expectations of legitimacy.

An interesting result was observed with leverage. Although the null hypothesis was rejected, correlation analysis and regression on a trimmed sample showed a positive relationship and both indicate a need for further investigation. Like ownership concentration's proposed association with ICD levels, leverage's hypothesised association was justified through agency theory. Like hypothesis two, this hypothesis was also rejected. Therefore, perhaps the relationship shareholders and debt-holders have with the company and its management possess different qualities in the Australian business environment to that which the literature suggests, and agency costs are not so pronounced. Furthermore, firms might be limiting these agency costs, which occur through incurring debt, by making other voluntary disclosures with ICD only playing a small part in the disclosures that limit agency costs.

As well as further research into the effect of leverage on ICD, a number of other directions are suggested that could address some of the limitations of this study. A move to analysing the ICD in other media, such as websites (Unerman et al., 2007; Gerpott et al., 2008) and

over multiple time periods would be insightful. Investigating further corporate governance variables such as those studied in Li et al. (2008) may provide further clues into the absence of a relationship between ownership concentration and ICD. As well as additional independent variables, future studies would benefit from a firm size variable to control the associations firm-specific characteristics may have with ICD. Additionally, it appears that the time is right for a series of in depth interviews with Australian company managers/financial officers (Unerman et al., 2007) in order to probe the findings of the five Australian content analysis studies to date.

## Appendices

### Appendix 1 Classification of GICS Sectors by IC intensity

| High-IC Intensive Industries | Low-IC Intensive Industries |
|---|---|
| Automobile and Components | Commercial Services and Supplies |
| Banks | Consumer Durables and Apparels |
| Capital Goods | Consumer Services |
| Commercial Services and Supplies | Energy |
| Consumer Services | Food, Beverage, and Tobacco |
| Diversified Financials | Food Staples and Retailing |
| Health Care Equipment and Services | Materials |
| Insurance | Retail |
| Media | Transportation |
| Pharmaceuticals, Biotechnology, and Life Sciences | Utilities |
| Real Estate | |
| Semi Conductors and Semi Conductors Equipment | |
| Software and Services | |
| Technology, Hardware and Equipment | |
| Telecommunication Services | |

## Appendix 2 Sample Companies

| Low-IC Intensive (n=35) | | High-IC Intensive (n=35) | |
|---|---|---|---|
| **Company** | **GICS Classification** | **Company** | **GICS Classification** |
| PLATINUM AUSTRALIA LIMITED | Materials | COMMANDER COMMUNICATIONS LIMITED | Technology Hardware & Equipment |
| WOODSIDE PETROLEUM LIMITED | Energy | BRANDRILL LIMITED | Capital Goods |
| AMCOR LIMITED | Materials | WHK GROUP LIMITED | Diversified Financials |
| STUART PETROLEUM LIMITED | Energy | AUSTRALIAN INSTITUTE OF PROPERTY MANAGEMENT LIMITED | Diversified Financials |
| GONDWANA RESOURCES LIMITED | Materials | ASPEN GROUP | Real Estate |
| BORAL LIMITED. | Materials | ALTIUM LIMITED | Software & Services |
| INCITEC PIVOT LIMITED | Materials | INDIGO PACIFIC CAPITAL LIMITED | Diversified Financials |
| PERSEVERANCE CORPORATION LIMITED | Materials | CANDLE AUSTRALIA LIMITED | Commercial Services & Supplies |
| GOODMAN FIELDER LIMITED. | Food Beverage & Tobacco | ENVIRONMENTAL GROUP LIMITED (THE) | Capital Goods |
| MONARO MINING NL | Materials | BIOMD LIMITED | Health Care Equipment & Services |
| BLINA DIAMONDS NL | Materials | SOMNOMED LIMITED | Health Care Equipment & Services |
| AURORA MINERALS LIMITED | Materials | PIENETWORKS LIMITED | Software & Services |
| PAPYRUS AUSTRALIA LIMITED | Materials | CHANDLER MACLEOD LIMITED | Commercial Services & Supplies |
| TOX FREE SOLUTIONS LIMITED | Commercial Services & Supplies | ANSELL LIMITED | Health Care Equipment & Services |
| GALE PACIFIC LIMITED | Consumer Durables & Apparel | SEVEN NETWORK LIMITED | Media |
| REGIONAL EXPRESS HOLDINGS LIMITED | Transportation | RAMSAY HEALTH CARE LIMITED | Health Care Equipment & Services |
| CGA MINING LIMITED | Materials | TRANZACT FINANCIAL SERVICES LIMITED | Diversified Financials |
| SANDFIRE RESOURCES NL | Materials | PRIMELIFE CORPORATION LIMITED | Real Estate |
| AUSTRAL GOLD LIMITED | Materials | DARK BLUE SEA LIMITED | Software & Services |
| HAMPTON HILL MINING NL | Materials | MIRVAC REAL ESTATE INVESTMENT TRUST | Real Estate |

| | | | |
|---|---|---|---|
| HOUSEWARES INTERNATIONAL LIMITED | Retailing | CARINDALE PROPERTY TRUST | Real Estate |
| FOCUS MINERALS LTD | Materials | ABERDEEN LEADERS LIMITED | Diversified Financials |
| PETSEC ENERGY LIMITED | Energy | METABOLIC PHARMACEUTICALS LIMITED | Pharmaceuticals, Biotechnology & Life Sciences |
| TROY RESOURCES NL | Materials | MELBOURNE IT LIMITED | Software & Services |
| SAMSON OIL & GAS LIMITED | Energy | INTERMOCO LIMITED | Technology Hardware & Equipment |
| DIATREME RESOURCES LIMITED | Materials | CORDLIFE LIMITED | Health Care Equipment & Services |
| ORIENT RESOURCE HOLDINGS LIMITED | Materials | REVERSE CORP LIMITED | Telecommunication Services |
| SMORGON STEEL GROUP LIMITED. | Materials | PIENETWORKS LIMITED | Software & Services |
| COAL & ALLIED INDUSTRIES LIMITED | Energy | MDSNEWS LIMITED | Software & Services |
| AUSTRALIAN INFRASTRUCTURE FUND | Transportation | REALESTATE.COM.AU LIMITED | Media |
| GLOUCESTER COAL LTD | Energy | CCK FINANCIAL SOLUTIONS LIMITED | Software & Services |
| METALS AUSTRALIA LTD | Materials | VILLAGE ROADSHOW LIMITED | Media |
| AVOCA RESOURCES LIMITED | Materials | AVASTRA LTD | Health Care Equipment & Services |
| RIO TINTO LIMITED | Materials | AGENIX LIMITED | Pharmaceuticals, Biotechnology & Life Sciences |
| CENTRAL WEST GOLD NL | Materials | POCKETMAIL GROUP LIMITED | Technology Hardware & Equipment |

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**Tables**

**Table 1 Modified IC framework used by Guthrie et al. (2004) for coding in content analysis studies**

| Internal Structure Capital | External Structure Capital | Human Capital |
|---|---|---|
| Intellectual property | Brands | Employee |
| Management philosophy | Customers | Education |
| Corporate Culture | Customer satisfaction | Training |
| Management processes | Company names | Work-related knowledge |
| Information/networking systems | Distribution channels | Entrepreneurial spirit |
| Financial relations | Business collaborations | |
| | Licensing agreements | |

**Table 2 Explanatory Content Analysis ICD studies**

| Study | Country | Sample | Manual content analysis (CA) or automated wordsearch (WS) | Theories Used | Tests | Independent variables investigated for relationship with level of Intellectual Capital Disclosure (ICD) in Annual Reports |
|---|---|---|---|---|---|---|
| Li et al (2008) 2004-5 data) | United Kingdom | 100 listed high IC companies | CA | Agency | Regression | Corporate governance (board composition, ownership structure, audit committee size, frequency of audit committee meetings, CEO role duality) (Controls- firm age, profitability and size) |
| White et al (2007) 2005 data | Australia | 96 listed biotech. Companies | CA | Agency, political cost | Correlation Regression | Board independence, firm age, leverage, firm size and ownership concentration |
| Sonnier, Carson & Carson (2007) 2000 & 2004 data | U.S. | 143 high tech companies | WS | Information asymmetry | Correlation | Financial Performance |
| Sujan & Abeysekera (2007) 2004 data | Australia | 20 largest companies | CA | Media-agenda setting | t-test | Industry (knowledge based vs other) |
| Bozzolan. O'Regan & Ricceri (2006) | UK and Italy | 30 matched companies from each. Half high-tech and half traditional | CA | Information asymmetry, political cost, signalling and proprietary cost | t-test, correlation and regression | Country, industry, firm size, leverage, ownership structure and profitability |
| Oliveira et al (2006) 2003 data | Portugal | 56 companies | CA | Agency, signalling, political cost, legitimacy | Correlation and regression | Firm size, type of industry, type of auditor, ownership concentration, profitability, listing status, foreign activity and leverage |
| Guthrie et al. (2006) 2002 data | Australia | 20 largest companies | CA | Stakeholder, legitimacy | t-test Regression | Firm size |

| | | | | | | |
|---|---|---|---|---|---|---|
| Petty & Cuganesan (2005) 1992, 1998, and 2002 data | Hong Kong | 53 companies | CA | Legitimacy, Institutional | Regression | Firm size, industry and time |
| Bozzolan et al. (2003) 2001 data | Italy | 30 Non-Financial Companies -15 "High-Tech" -15 "Traditional" | CA | Agency, stakeholder and signalling | Regression | Industry and firm size. |
| Bontis (2003) | Canada | 10,000 annual reports from regulatory database (not all listed) | WS | Information asymmetry | t-test | Industry and firm size. |
| Williams (2001) 1996-2000 data | United Kingdom | 31 listed companies | ? | Political cost, agency, proprietary cost | t-test, Wilcoxon signed-rank, Multiple regression | IC performance (Controls - physical capital performance, leverage, industry type, firm size and listing status) |

**Table 3 Australian Content Analysis ICD Studies**

| Study | Sample | Summary of method: level of analysis, coding categories for disclosure, reported measure of IC | Framework for categorising IC | Average number of IC attributes reported per annual report* | Frequency of disclosure (per cent) in Annual Reports | | |
|---|---|---|---|---|---|---|---|
| | | | | | External structure capital attributes | Internal structure capital attributes | Human capital attributes |
| White, Lee & Tower (2007) | 96 biotechnological companies | IC element disclosed or not. Disclosure index (% of possible 78 items) | 78 items in 6 categories for Bukh et al (2005) | 11.7 (calculated from 15% mean disclosure index) | 41 (customer & strategic statement) | 39 (IT, processes & research and development) | 20 (employees) |
| Sujan & Abeysekera (2007) 2004 data | 20 largest companies | IC element disclosed or not within each report, disclosure qualitative/ numerically quantitative/ fiscally quantitative. | 25 elements in 3 categories. Modified Sveiby (1997) & Guthrie & Petty (2000) | 10.5 | 48 | 31 | 21 |
| Guthrie et al. (2006) 2002 data | 50 largest listed | Sentences, IC element disclosed or not within each report, disclosure qualitative/numerically quantitative/fiscally quantitative. Frequency within sample (proportion of companies disclosing IC) and average number per company | 18 attributes in 3 categories Modified Guthrie & Petty, (2000) | 31.6 | 49 | 41 | 10 |
| Sciulli et al (2002) | 77 Victoria state local councils | Number and percentage of councils that reported on each element. Qualitative, quantitative and fiscal reporting | 28 elements. Modified Guthrie & Petty (2000) for public sector | 26 | 27 | 45 | 28 |
| Guthrie & Petty (2000) 1998 data | 20 companies -19 largest -1 best practice | As in Guthrie et al (2006) | 24 elements in 3 categories. Modified Sveiby (1997) | 8.9 | 40 | 30 | 30 |

*Caution is required in comparing results as studies use differing coding units and frameworks

Adapted from (Xiao, 2008) and (Whiting & Miller, 2008)

**Table 4 Summary of the Independent Variables**

| Independent Variables | Measure | Symbol |
|---|---|---|
| Industry Type | Dummy variable, 1 if firm belongs to high intangibles intensive industry, 0 if firm belongs to low intangibles intensive industry | I |
| Ownership Concentration | Percentage of capital owned by company's top three shareholders | OC |
| Leverage | Total liabilities/Book value of equity | L |
| Listing Age | Years listed = 2006 – Year Listed | LA |
| Auditor Type | Dummy variable, 1 if company has a Big Four auditor, 0 if firm has a non-Big Four auditor | TA |

**Table 5 ICD Associations with Independent Variables (Correlation and Kruskal Wallis Results)**

| | Spearman's Rank Order Correlation | | Kruskal Wallis | |
|---|---|---|---|---|
| | **Spearman's rho** | **Level of Significance (2 tailed)** | **K-W statistic** | **Level of Significance (2 tailed)** |
| **Industry** | 0.334** | 0.005 | 392.5** | 0.009 |
| **Ownership Concentration** | 0.108 | 0.377 | | |
| **Leverage** | 0.647** | 0.000 | | |
| **Listing Age** | 0.143 | 0.240 | | |
| **Auditor Type** | 0.422** | 0.000 | 295.5** | 0.000 |

** Significant at the 0.01 level (2-tailed).