

**Value Relevance of Information in High-Tech Industries in  
Australia: Financial and Non-Financial**

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## **Declaration**

“I, Nadana Abayadeera, declare that the PhD thesis entitled **‘Value Relevance of Information in High-Tech Industries in Australia: Financial and Non-Financial’** is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work”.

Nadana Abayadeera

Date

## **Abstract**

The aim of the study is to test the value relevance of financial information and non-financial information in high-tech industries in Australia. A cross sectional sample of ninety one companies from the sectors of Pharmaceuticals, Biotechnology and Life Sciences; Technology, Hardware and Equipment and Telecommunication Services of ASX were selected for the analysis. Both financial and non-financial sections of company annual reports were scrutinized to obtain data: earnings, book value and intangible asset disclosures. Value relevance was examined by partially replicating and modifying Ohlson's (1995) Value Relevance Model, by incorporating quantified voluntary disclosures of intangible assets.

The assessment of value relevance provides evidence that book value is a more significant factor than earnings in deciding share prices. This finding lends support to previous studies that showed that value relevance decreased for earnings while value relevance increased for book value. Further, this study demonstrates that voluntary disclosures of intangible assets are value relevant, providing support for the previous US and Australian studies that demonstrate that investors increasingly rely upon alternative information sources.

Factors impacting on value relevance revealed size and age of the company influence the increase in value relevance of financial and non-financial information. Additionally, the inter-industry comparison of reporting practice of intangible assets revealed that disclosures of some intangible assets are industry specific. Finally, disclosures of some intangible asset categories (for example, research and development) were identified to be significant in terms of the value relevance.

This study contributes to the understanding of the relevance of accounting information for decision making as well as the theoretical framework of 'share valuation'. The accounting standards setting authorities may also consider the findings of this study in assessing revisions of accounting standards related to high-tech industries. Further, the findings have the potential to inform company managers of refinements to corporate reporting models that address intangible asset disclosures.

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## **Chapter 1: Introduction**

Many claim that the shift from an industrial economy to a high-tech service orientated economy (such as telecommunication, pharmaceuticals and bio-technology and software development) has rendered traditional financial statements less relevant for assessing shareholder value. Studies in the USA documented that the value relevance of earnings has declined over the last few decades (Amir and Lev, 1996; Lev and Sougiannis, 1996; Goodwin and Ahmad, 2006). In investigating the reasons for the decline, researchers comment that the accounting measurement and reporting system is ill-equipped to provide value relevant information in emerging high-tech industries. Additionally, investment in intangibles is largely expensed in financial statements, leading to depressed and often irrelevant earnings and book value figures (Amir and Lev, 1996).

The large economic transformation from the industrial economy to the knowledge economy has been attributed to the growing Intangible Assets (IA) base of companies, such as goodwill, patents, and brand names. Compared to tangible assets of companies, intangible assets are associated with more complex information related to measurement and value. The current financial reporting model seems to be no longer sufficient to capture the company values and performance mainly due to the fact that it ignores many of the non-financial intangible factors (Helen, 2006).

In the absence of mandatory reporting requirements, one alternative way of disseminating information regarding IA is to engage in voluntary disclosure practices. The voluntary disclosures are mostly in non-financial form. The findings of prior

studies of a lower earnings-return correlation for companies with higher levels of intangible assets may also reflect the greater presence of supplementary information. The inadequacies of information has been identified as one cause of the volatility of stock prices and the resulting undue losses to investors and misallocation of resources in capital markets (Helen, 2006).

The presence of considerable additional information does not always relate to the drawbacks and restrictions of the accounting process, and firms operating in fast changing, high growth and technology-based industries find that supplementary disclosures are necessary simply because of the rapid pace of change in their industry (Tasker, 1998). Thus, the additional disclosures may reflect investors' increased information requirements rather than the inadequacies of the accounting process. Further, there is evidence that the value relevance of financial information has not declined, in fact, there is evidence to suggest that it has increased (Collins et al., 1997; Brimble and Hodgson, 2007).

This chapter introduces the main research question and sub-questions; the aim and scope, as well as the conceptual framework of this study; followed by an overview of the study.

## **1.1 Main Research Question and Sub-questions**

Since there are different views and mixed findings about the value relevance of accounting information, it is important to further investigate the value relevance of financial information under dynamic economic conditions.



With the transformation from an industrial economy to a knowledge economy, companies around the world transform themselves to exploit intangible assets rather than tangible assets. However, the new regulatory reforms have restricted the capitalisation of intangible assets. For example, under AASB 138: Intangible Assets, requires the immediate expensing of all expenditure of the research component of R&D while development expenditure may be capitalised provided that certain conditions for deferral are satisfied (Australian Accounting Standard Board, 2004). Under these circumstances, companies shift from recognition to disclosure for intangible assets in business reporting. In this context, investigating the value relevance of voluntary, non-financial disclosure of intangible assets will be a valuable input to the re-design of business reporting models.

Based on the above propositions, this study addresses the following main research question and sub-questions.

**Main Research Question:** Is the financial information and IA disclosure in the form of non-financial information, value relevant in high-tech industries in Australia?

**Sub-Question 1:** What is the magnitude of IA disclosure in the form of non-financial information in company annual reports?

**Sub-Question 2:** To what extent is each category of IA disclosure significant in terms of value relevance?

**Sub-Question 3:** What are the factors that may influence the value relevance of information?

## **1.2 Aim and the Scope of the Study**

The aim of the research is to test the value relevance of financial information and intangible asset disclosures, in the form of non-financial information, in high-tech industries in Australia. The non-financial information contained in annual reports is mostly unregulated, unaudited and voluntary in nature (Gelb, 2000). The specific objectives of the research are to:

1. Identify and quantify (by way of word count) non-financial, intangible asset disclosures in annual reports.
2. Test the value relevance of financial information and non-financial, intangible asset disclosures in annual reports.
3. Identify the significance of each category of intangible assets in terms of value relevance.
4. Identify the factors that may influence the value relevance of financial and non-financial information.

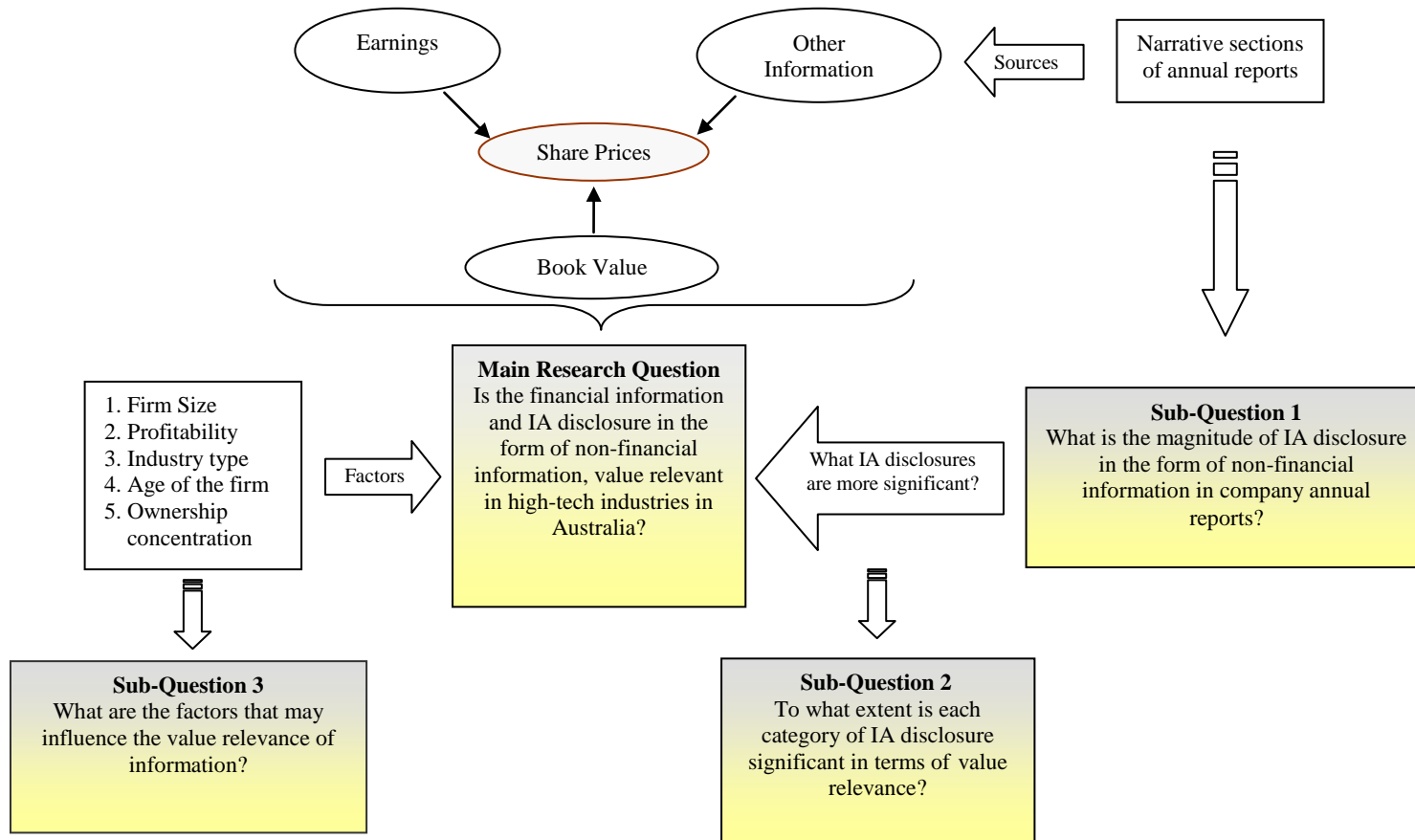
## **1.3 Conceptual Framework of the Study**

As stated earlier, the aim of the study is to examine the value relevance of financial information and non-financial, intangible assets disclosures, in high-tech industries in Australia. The conceptual framework is presented in Figure 1.1. In accordance with Ohlson's (1995) value relevance model, earnings and book values are considered as financial information in the conceptual framework. Although there are several sources available for providing non-financial information, annual reports are considered the most important and the most formal source of information to capital markets. As such, this study particularly focuses on the narrative sections of the annual reports to identify

the intangible asset disclosures in the form of non-financial information. Since it is necessary to identify the magnitude of the non-financial, IA disclosures, sub-question 1 of the research focuses on the identification and measurement of each IA disclosure. Themes for the intangible assets disclosures are developed based on the 'Intangible Assets Monitor' developed by Sveiby (1997).

Once the voluntary disclosures of intangible assets are measured by word count, significance of disclosure of each intangible assets category is tested in terms of value relevance (sub-question 2 of the research). Given that there are several factors that may influence the value relevance of information, sub-question 3 of the research will test the factors influencing the value relevance of information. The selected factors are widely used in literature related to accounting and finance.

**Figure 1.1: Conceptual Framework**



## **1.4 Overview of the Study**

The study consists of eight chapters, including the introductory chapter. Having presented the aim of the study with the main research question and sub-questions and the conceptual framework, the next two chapters review the related literature. Chapter 2 reviews the literature related to reporting practices of intangible assets and value relevance of financial and non-financial information, with specific attention to studies examining value relevance of accounting information, value relevance of capitalisation versus disclosures and impact of value relevance literature on accounting standards settings. The chapter concludes by identifying gaps in the literature that form the basis for the development of the research questions.

Chapter 3 reviews literature related to content analysis and value relevance methodologies. Initially, the application of content analysis methodology in analysing non-financial disclosures of corporate reports is evaluated. The methodologies of testing value relevance, with specific reference to Ohlson's contribution to development of value relevance models are also examined.

Based on Chapters 2 and 3, Chapter 4 develops the appropriate research method for collection and analysis of data to achieve the aim of the study. Chapter 4 introduces the two main phases of the research: quantification of IA disclosures in the form of non-financial information; and examination the value relevance of financial and non-financial IA disclosures. Ohlson's (1995) value relevance model (modified) is outlined, followed by the development of hypotheses and regression models.

The next three chapters focus on the analysis of data and discussion of results. Chapter 5 addresses the main research question, provides the findings of examination of value relevance of financial and non-financial information and discusses the results referring to prior literature. The results of analysis of factors influencing value relevance of information; and assessment of interaction effect between factors influencing value relevance and non-financial, IA disclosures are provided and discussed in Chapter 6. Chapter 7 compares the top companies in terms of intangible assets reporting practices, providing an inter-industry and intra-industry comparison. Further, Chapter 7 presents the results of testing the significance of disclosure of each intangible assets category in terms of value relevance. Finally, Chapter 8 provides the conclusions of the findings, as well as outlining the limitations of the study and suggestions for further research.

## **Chapter 2**

### **Review of Literature:**

#### **Reporting Practices of Intangible Assets and Value Relevance of Financial and Non-financial Information**

This chapter reviews the literature related to intangible assets and value relevance of financial and non-financial information. Initially, the evidence of disclosure practices of intangible assets is addressed with particular attention focussed on: how voluntary disclosures of annual reports are perceived by the markets; relevance of voluntary disclosures for the assessment of competitive advantage; development of intangible assets indexes; and the relationship between disclosures and corporate characteristics. This chapter also provides the results of comparative studies of disclosure practices of intangible assets; unrecorded intangible assets and earnings persistence; and incorporates the challenges facing researchers, practitioners and policy makers regarding intangible assets. Literature related to value relevance of financial and non-financial information provides evidence of the early studies of value relevance; findings of studies of value relevance of accounting information; measures other than ‘traditional profit’; capitalisation versus disclosure; changes of value relevance of information across time; and the impact of value relevance literature on accounting standards setting. The chapter concludes with a summary of the literature review followed by the identification of the gaps in the literature that underpin the development of the research questions for this study.

## **2.1 Intangible Assets and Financial Reporting**

The paradigm shift from focussing on tangible assets to intangible assets not recognised in financial statements has challenged the decision relevance of information provided by financial reporting systems. The recent mega corporate collapses in several developed countries (such as Enron in the USA and HIH in Australia) has highlighted the need to review provisions of relevant information to investors (Bontis, 2000; Coy, 2001).

Intangible assets are generally defined as non-monetary assets without physical substance. These are frequently classified either as identifiable or unidentifiable. Identifiable intangible assets include patents; trade-marks; license; research and development; brand names; mastheads; and copy rights. Such intangible assets can be considered identifiable because a specific value can be placed on each individual asset, which can be separately identified and sold. Unidentifiable intangible assets are those intangible assets that cannot be separately sold. Although they are valuable to the business, they cannot be individually measured with acceptable levels of reliability. As such, this composite asset is titled goodwill (Deegan, 2008). The accounting for many intangible assets is biased due to the predominant use of historical cost accounting where intangible assets are considered uncertain. As a result, the vast majority of internally generated intangible assets are not recognised in the financial statements.

The disclosure of intangible assets becomes important as a signal to investors about the affairs of firms in an intense globally competitive economic environment. For instance, intangible assets can give rise to agency problems as 'insiders' of firms can take advantage of such information to earn excess profits, since the unrecorded intangible assets cause earnings persistence which can create abnormal earnings. Disclosure of



intangible assets in annual reports assists in making capital markets more efficient by reducing information asymmetry between insiders and investors (Guthrie et al., 1999). Further, managers believe that the voluntary disclosure of information about intangibles has positive effects on their governance mechanisms and strengthens relationships with their stakeholders, as well as enhancing their public image (Garcia-Ayuso, 2003).

The following sections present the summarised findings of prior studies and provide implications related to intangible assets and corporate reporting practices. Initially, an overview of voluntary disclosure practices related to intangible assets is undertaken followed by a review of how the company characteristics affect the disclosures. A comparison of disclosure practices between developed, moderately developed and emerging markets are also provided. Further, this section investigates the reasons for measuring intangible assets; how unrecorded intangible assets cause for earnings persistence; and finally, the challenges faced in the future related to intangible assets.

### **2.1.1 Disclosure Practices of Intangible Assets**

Researchers have paid attention to the disclosure practices of intangible assets since the current financial reporting model seems ill-equipped to recognise most of the intangible assets. This is particularly relevant given recent technological advancements.

Various studies have presented evidence on how intangible assets affect firms' disclosure. Gelb (2002) extends the current literature by adopting a more direct approach and examining whether firms with significant levels of intangible assets choose to subordinate traditional Generally Accepted Accounting Principles (GAAP) based accounting reports to more flexible voluntary supplemental disclosures. He found

firms that obtain significantly higher analysts' ratings for either their investor relations programs or voluntary publications than for their annual reports, tend to have greater levels of R&D and advertising expenditures. These results suggest that firms with higher levels of intangible assets perceive accounting disclosures as a relatively ineffective means of communicating with investors and, therefore, are more likely to emphasise supplementary disclosures such as voluntary publications and investor relations.

Similarly, an overview of intellectual capital (IC) reporting practices of Australia was provided by Guthrie and Richard (2000) examining corporate annual reports of the top 20 companies by market capitalisation. The study examined the various categories of IC using content analysis methodology. The results focus purely on (voluntary) information not required by an accounting standard or under corporation law.

The most significant finding of Guthrie and Richard's (2000) study was that nearly every instance of reporting involved IC being expressed discursively rather than in numerical terms. The three main findings of the research are summarised as follows. First, the key components of IC are not reported within a consistent framework, if reported at all. Second, the main areas of IC reporting focus on human resources, technology and intellectual property rights, and organisational and work-place structure. Finally, there is no established and mutually agreed framework for reporting IC by large Australian companies and the accounting profession.

The results from the Australian studies seem differ from overseas studies. For example, Gray and Skogsvik (2004) investigated the disclosure behaviour of Swedish and the UK

pharmaceutical companies for the period of 1984-1998. Results showed that the companies in both countries consistently provided voluntary disclosures relevant for the assessment of competitive advantage, in particular, with regard to research and development activities. Findings indicated that the disclosures about business growth, dividend policy and earnings persistence were more prevalent among the Swedish companies, indicating a stronger concern about stock market investments. Conversely, voluntary segmental disclosures were similar over time with a reluctance to disclose line-of-business and geographical segment profits.

An intangible asset-monitor to measure the non-financial intangible assets of a company was developed by Sveiby (1997). The argument for financial information systems that relates profits or cash flow to tangible assets, capital employed or equity states that by focussing on financial indicators, shareholders are guaranteed that management will create shareholder value. However, it is possible to create superior shareholder value by focussing management attention on intangible assets rather than tangible assets and financials. A non-financial measurement system rests on the notion that people are the only true agents in business; all assets and structures, whether tangible physical products or intangible relations, are of human action and depend ultimately on people for their continued existence (Sveiby, 1997).

The above intangible assets monitor classifies the invisible part of the balance sheet as a family of three;

1. **Employee competence:** This includes the capacity of employees to act in a wide variety of situations. People create two kinds of intangible structures, internal and external.
2. **Internal structure:** Creation of patents, concepts models and computer and administration systems. These are created by people and generally ‘owned’ by the organisation and are adhered to.
3. **External structure:** Include relationships with customers and suppliers, brand names, trade-marks and reputation or image. Some of these are legal property, but the bond is not as strong as in the case of internal assets because investments in them cannot be made with the same degree of confidence.

Further, different indicators are introduced under each of the following headings: growth/ renewal, efficiency and stability.

Findings of the research related to disclosure practices of intangible assets have important policy implications because they indicate that the supplementary disclosures, which are largely unregulated and unaudited, are an important disclosure medium for firms with significant levels of intangible assets. Standard setters may consider incorporating additional disclosures about intangible assets within the framework of Generally Accepted Accounting Principles (GAAP).

### **2.1.2 Studies related to Disclosure Practices and Company Characteristics**

Since the preceding section indicates that the voluntary disclosures of intangible assets are popular in corporate reporting, it is important to investigate the factors influencing disclosure practices. Many overseas studies have examined the factors influencing

disclosure practices. A few of the more recent studies (covering companies in Bangladesh, the US, the UK and Jordan) are summarised below to demonstrate that the factors influencing disclosure practices vary from one country to another.

In order to see how companies have complied with mandatory disclosure requirements established by the three regulatory bodies, Akhtaruddin (2005) investigated the disclosure practices of listed companies in Bangladesh. In addition, this paper examined the association between company characteristics and the extent of disclosures. The results indicated that companies in general have not responded adequately to the mandatory disclosure requirements of the regulatory bodies. It has been found that companies, on average, disclose only 44% of the mandatory disclosure requirements. Results of the association between company characteristics and the extent of disclosures revealed company age to be an insignificant factor for mandatory disclosure. Thus, there was little support for industry type as a predictor of mandatory disclosure. Profit and status (modern or traditional) were also found to have no effect on disclosure.

Ahmed and Courtis (1999) integrated prior disclosure studies to identify the underlying factors that moderate the apparent variation of the results of those studies, using meta-analysis techniques. Findings have consistently shown corporate size and listing status to be significantly associated with disclosure levels, while mixed results have been reported for leverage, profitability and audit firm size (Cooke, 1989a; Cooke, 1989b; Cooke, 1992; Ahmed and Nicholls, 1994; Hossain et al., 1994; Wallace et al., 1994; Inchausti, 1997).

The voluntary disclosures (provided in the US) of the US listed Asian Companies (USLAC) were examined by Kumar et al. (2008), addressing three issues in the study. First, the effect of strictness of mandatory disclosure regime on the voluntary disclosures of USLAC; second, the effect of domestic and 'global' culture on those disclosures; and third, the effect of firm size and proportion of foreign sales on the voluntary use of 'international' standards. Results indicated that the USLAC's less strict mandatory disclosure regimes were likely to provide more voluntary disclosures in the US than companies with stricter mandatory disclosure regimes. One possible reason for this finding is that companies with a relatively strict mandatory disclosure regime in their home country will try to provide maximum disclosure to meet the stringent US disclosure expectations. Regarding the second issue, Kumar et al. argued that domestic culture affected the voluntary disclosures of USLAC in the US to only a small extent. Regarding the third issue, the findings indicated that the choice to use international standards was not related to either proportion of foreign revenue or size of the firm.

The patterns in voluntary environmental disclosure made by a sample of large UK companies were examined by Brammer and Pavelin (2006). The analysis distinguishes between the decision to make a voluntary environmental disclosure and decisions concerning the quality of such disclosures and examines how each type of decision is determined by firm and industry characteristics. Brammer and Pavelin (2006) found that larger, less indebted companies with dispersed ownership characteristics are significantly more likely to make voluntary environmental disclosures. Further, the quality of the disclosures is positively associated with firm size and corporate environmental impact. They also found a significant cross-sectional variation in the determinants of both participation and quality decisions.

It is important to compare the evidence of the level of voluntary disclosure provided in annual reports of Bangladesh, the US and the UK companies with Jordanian companies. Haddad et al. (2009) measured and examined the impact of disclosure levels on stock market liquidity and found that there is a considerable variation in the extent of voluntary disclosure amongst Jordanian companies. On average, a company disclosed 28% of the items of information included in the disclosure index (a self-constructed index). Further, the relative bid-ask spread was used as a proxy for stock market liquidity to examine the impact of disclosure level on the stock market liquidity. The results of regressing the bid-ask spread on disclosure level, after controlling for other variables showed, that the higher the level of disclosed information provided in the Jordanian annual reports, the lower the spread between the bids and asks, which led to an increase in their stock market liquidity.

The above studies indicate the researchers attempted to test the factors influencing disclosure practices in different markets. Most of the studies have considered factors such as age, size, profitability, listing status, leverage of the firm, and audit firm size to test the relationship with disclosure practices. However, the mixed results indicate that the relationship between company characteristics and disclosure practices depend on the nature of the market.

### **2.1.3 Comparative Studies of Disclosure Practices of Intangible Assets: Emerging Markets, Moderately Developed Markets and Efficient Markets**

In addition to testing the factors influencing disclosure practices in different markets, there are studies comparing the disclosure practices between markets, highlighting the differences in overall IA disclosures. For example, Abeysekera and Guthrie (2004)

Guthrie et al. (1999) and Abeysekera (2008) contributed to the literature by comparing the disclosure practices of Sri Lanka (an emerging market) Singapore (a moderately developed market) and Australia (a developed market).

Abeysekera and Guthrie (2004) examined the state of Human Capital Reporting (HCR), as demonstrated in the annual reports of the largest listed Sri Lankan firms. This allows some comparisons between Sri Lanka (an emerging market) and Australia (a developed market); thus providing the basis for speculative commentary on the differences between the two situations. A content analysis was carried out on the annual reports of 30 companies listed in the Colombo Stock Exchange. The IC information collected from the analysis of annual reports was coded separately for two consecutive years. The frequency and line count for each IC line item was aggregated for the total sample (30 companies). The frequency was determined by the number of times an IC item was described, whether qualitatively or quantitatively. Further, the 'word unit' method was chosen out of the four available methods of counting units (word phase, theme, character and set of interactions) since it is easily identifiable in annual reports.

For the two years examined, it was found that companies in Sri Lanka demonstrated an insignificant increase in the three categories of IC reporting by the frequency and line count. The most reported category, both by frequency and line count was external capital followed by HC which was the second most reported category. The least reported category, internal capital, was reported as decreased by line count. Further, the study reported that the group of employees most featured were from senior and middle management, which, it could be argued, represents the most value-adding group of employees in the firm. Also the study reports that Sri Lankan firms invest a substantial



amount into training their work force. However, the study shows that the emphasis of this training was not to direct work-related skills but to strengthen the 'soft qualities' of employees.

By comparing the findings of a similar study carried out by Guthrie et al. (1999) in Australia, it was reported that 'entrepreneurial spirit' was the most frequently reported attribute of HC in Australia, as opposed to 'featuring of employees' in Sri Lanka. In contrast, 'entrepreneurial spirit' was one of the least reported items in Sri Lanka. Firms in Australia are at the forefront for R&D and the business culture provides incentives to encourage the entrepreneurship of employees. The cost of innovation is not an issue and the innovators in Australia have the confidence to market new products at a high initial price.

The IC disclosure practices were examined by Abeysekera (2008), by comparing firms in a moderately developed country setting (Singapore) and developing country setting (Sri Lanka). This comparative study investigated two research questions: first, whether there is an increasing trend of IC disclosure across the three year study period; and second, whether the types and level of IC disclosure provide insights into the importance attached to IC categories and items. Abeysekera (2008) investigated annual report disclosures for each of the three years (1998 to 2000) of the top 20 public listed companies by market capitalisation in the Colombo Stock Exchange. These results were compared with counterpart firms in the Singapore Stock Exchange from the unpublished study. The author employed the content analysis methodology.

The results for Singapore showed a significant increase in the level of IC disclosure for firms from 1998 to 2000. The results for Sri Lanka were not significant for overall IC disclosure. The Singapore study suggested the mandatory reporting of corporate governance encouraged firms to disclose credentials, expertise and educational levels of their directors. Further, it highlights the need to establish a uniform methodology for financial disclosure under International Financial Reporting Standards (IFRS) that can mobilize globally uniform IC disclosure practices.

Godfrey et al. (2006) examined how combinations of accounting practices and different institutional settings can affect the relevance of accounting for intangible assets, particularly goodwill to equity valuation. During 2001, there were marked differences between the accounting practices allowed in the UK, the US, Australia and China. There were also differences in other countries in the treatments of different types of intangibles including goodwill, brands and R&D.

Godfrey et al. (2006) found that Australian firms have a tradition of capitalising identifiable intangible assets and amortising them in a manner that is relatively consistent with all intangibles. Additionally, Australian capital market participants are familiar with accounting standards that do not permit assets to be capitalised or carried at amounts that exceed their fair values. In contrast, China is an emerging capital market where accounting has not served the same information role as in western countries; instead the capital market is in relatively early stages, and the rules governing accounting practice are less well-developed and less familiar to capital market participants.

The high and significant economic association between Australian firms' market value of equity and the book value of their capitalised assets, including intangible assets, indicates that if investors do not obtain information about levels of expenditure on intangible assets and its probable success from sources other than capitalised balances on balance sheets, then the market value of Australian firms' equity is likely to fall since the rules governing accounting for intangibles have changed. Internationally, the most likely outcome is somewhere between these extremes as IFRS become more or less aligned with individual country's accounting practices, capital markets adjust with some uncertainty to the adoption of IFRS rules, and firms disclose information in notes rather than on the face of their financial statements.

The results of the comparative studies revealed that there are significant differences of disclosure practices between developed markets (Australia, the UK and the USA), a moderately developed market (Singapore), and emerging markets (Sri Lanka and China). Findings indicate that the role of company annual reports as an information source is high in developed markets and less in emerging markets.

#### **2.1.4 Rationale for Measuring Intangible Assets**

The empirical evidence related to intangible assets extends to finding the rationale for measuring IC. Marr et al. (2003) conducted a systematic literature review which enabled them to identify a set of reasons or motives that drive the measurement of IC, in order to shed some light into this complex field by segregating and explaining the different rationales for the measurement of IC. The study reported five main reasons for the measurement of IC: to help organisations formulate their strategy; to assess strategy

execution; to assist in diversification and expansion decisions; to use these as a basis for compensation; and to communicate measures to external stakeholders.

Marr et al. (2003) highlighted the limitations of the existing studies such as problems of the independent variables, problems of equation modelling, and a reliance on short-time series which might not be sufficient to confirm fully the findings. As a result, they believe that further research is needed to overcome the limitations of previous studies and to enhance the understanding of: the complex relationships between IC measures and performance of individuals; the applicability of IC performance measures that are useful for valuing the firm for assessing a manager's performance; the ideal structure of incentive plans; and how managers react to the use of less tangible measures in the evaluation of their performance. Furthermore, the study reported that the overall benefits of externally disclosing information on IC were not clear at that point. Thus far, the disclosure of information on IC is mainly voluntary. An effective, strategically managed disclosure process can help analysts and investors to understand the long-term view of the company, which should help with a fairer share price valuation and, hence, lower cost of capital.

In order to measure this assertion and enable companies to realise the benefits of their IC measurement costs, more research is encouraged to investigate whether the disclosure really does provide benefits such a lower cost of capital (Marr et al., 2003).

### **2.1.5 Unrecorded Intangible Assets and Earnings Persistence**

Since unrecorded intangible assets may lead to the creation of abnormal earnings, Kohlbeck and Warfield (2007) examined whether unrecorded intangible assets are a

source of earnings persistence and how such persistence is priced. Kohlbeck and Warfield used the Residual Income Model (RIM) introduced by Ohlson (1995), Feltham and Ohlson (1995) and Feltham and Ohlson (1996). Results showed higher persistence of abnormal earnings for banks with greater relative levels of unrecorded intangible assets. Further, the persistence of bank abnormal earnings and, consequently, the pricing multiples on bank abnormal earnings vary with the level of unrecorded intangible assets. Also Kohlbeck and Warfield (2007) report that adjusted book value of equity is sufficient for valuation, consistent with the unrecorded intangible assets being the primary source of bank abnormal earnings. Their findings imply that intangible asset measures or factors that are indicative of intangible assets should be considered when assessing value. That is, the unrecorded intangible assets are important in determination of bank value through the persistence of abnormal earnings, which complements the growing area of intangible asset research.

The above findings indicate the significance of recognition of intangible assets for the proper fund allocation in capital markets, avoiding abnormal earnings.

#### **2.1.6 Challenges facing Researchers, Practitioners and Policy Makers regarding Intangible Assets**

The disclosures of intangible assets are popular in companies with recent regulatory reforms, which limit the recognition of intangible assets. Under these circumstances, the development of a proper format to disclose intangible assets is a challenge.

Garcia-Ayuso (2003) reported that in his view, among the many challenges facing researchers, practitioners, and policy makers in the near future, the following are

particularly relevant. Future research must be aimed at improving our understanding of the knowledge production function within organisations by means of case studies. Both researchers and business managers have devoted efforts to the development, implementation and disclosure of methods for the visualisation, measurement and management of intangibles within companies. Companies should (continue to) disclose timely and reliable information on their intangibles, and descriptive research studies should analyse the reporting efforts and provide suggestions for the improvement of the business reporting model. Researchers should attempt to establish empirical relationships between current intangible investments and future value creation in companies so as to provide guidance for the fair value of intangibles. Moreover, governments and regulatory bodies must also be strongly committed to the improvement of corporate governance mechanisms.

The overall review of prior literature related to intangible assets and financial reporting reveals that there is a dire need to disclose intangible assets to the management of companies, since intangible assets represent their invisible strengths. The existing informal intangible assets reporting model leads to a misallocation of resources in capital markets. Hence, it is important to extend the research related to reporting practices of intangible assets to improve the corporate reporting model.

## **2.2 Value Relevance of Financial and Non-financial Information**

Accounting theorists have generally evaluated the usefulness of accounting practices by the extent of their agreement with a particular analytic model. The limitations of the complete usefulness of analytical approaches are illustrated by an argument that income numbers cannot be defined substantively, that they lack ‘meaning’ and are therefore of

doubtful utility (Ball and Brown, 1968). In accordance with prior studies, Hung (2001) defined the value relevance of financial statements as the ability of accounting data to summarise information impounded in market prices.

It has been argued that the financial information of firms in fast-changing technology-based industries is of limited value to investors (Amir and Lev, 1996), and non-financial data largely dominate accounting information in high-tech industries (Jorison and Talmor, 2001). Since the traditional financial statements based on an evaluation of tangible assets are incapable of fully evaluating the high-tech industries, there is a significant difference between corporate market value and book value (Liang, 2005). Under Australian GAAP, disclosure of intangible amortisation, write-offs and the total of intangible assets are mandatory. Disclosure of intangible expenditures is not required except for R&D expenditure. There are, however, no specific standards for most intangibles meaning that recognition and measurement of intangibles are subject to only a general provision (Goodwin and Ahmad, 2006).

The following sections present the summarised research findings of the value relevance of financial and non-financial information and related studies and their implications. Starting from the contribution of Ball and Brown, the next section investigates the recent studies examining the usefulness of financial information in modern markets. In addition to traditional performance measurement methods, the value relevance of non-traditional performance methods are addressed in the following section. Further, the findings related to value relevance of capitalisation versus disclosure; changes of value relevance across time; value relevance of mandatory and voluntary disclosures are also presented indicating the importance of continuous research for the development of

better corporate reporting models for companies. Finally, studies related to the impact of value relevance literature on accounting standard settings are presented, highlighting the significance of incorporating the research findings to accounting standards settings.

### **2.2.1 Early Studies Testing the Relationship between Income Numbers and Market Value of Shares**

The studies of Ball and Brown (1967) and Ball and Brown (1968) can be considered as the initial studies that examined the association between accounting numbers and market value of stocks.

Brown and Ball (1967) investigated whether there was some ‘significant’ degree of association between the earnings of an individual firm, the earnings of other firms in its industry, and earnings of all firms in the economy. A strong association was found between the returns to a firm’s stockholders, returns to stockholders of firms in the same industry, and returns to stockholders in the market. Further, the study concluded that accounting measurements of net income reflect both events which affect all firms and, at least to some degree, events which affect only those firms that are members of a given industry.

Using a regression model and a Naive model, Ball and Brown (1968) tested the statistical association between income numbers and market returns. The study assumed that in the unlikely absence of useful information about a particular firm over a period, its rate of return over that period would reflect only the presence of market-wide information which pertains to all firms. The results indicated that of all information about an individual firm which becomes available during the year, one half or more is



captured in that year's income numbers. Its content is therefore considerable. However, the annual income report does not rate highly as a timely medium, since most of its content (85 to 90 percent) is captured by prompt media which perhaps includes interim reports. Since the efficiency of the capital market is largely determined by the adequacy of its data sources, Ball and Brown did not find it disconcerting that the market has turned to other sources which can be acted upon more promptly than annual net income.

The above findings provide evidence for the value relevance of income statement numbers. Also it provides evidence for the usefulness of accrual accounting, since the income number is a product of accrual accounting.

### **2.2.2 Studies examined the Value Relevance of Accounting Information**

Although the early studies emphasised the usefulness of financial statements as a media of communication and proved the accounting numbers are value relevant, the usefulness of financial information in the modern market is doubtful.

The value relevance to investors of financial (accounting) and non-financial information of independent cellular companies was examined by Amir and Lev (1996). Telecommunications, bio-technology, and software producers among other growth companies invest heavily in intangibles. Since intangible investments are immediately expensed in financial reports or arbitrarily amortised, there will be anomalous relations between market values and financial variables. Amir and Lev (1996) found that, on a stand-alone basis, financial information is largely irrelevant for the valuation of cellular companies. However, when combined with non-financial information, and after adjustments are made for the excessive expensing of intangibles, some of those

variables do contribute to the expression of stock prices. This finding demonstrates the complementarities between financial and non-financial information. Further, the results reported that the value relevance of non-financial information overwhelms that of traditional financial indicators.

Consistent with Amir and Lev (1996), Jiang (2010) reported that institutions tend to buy (sell) shares in response to positive (negative) intangible information. Further, the reversal of the intangible return is most pronounced among stocks for which a large proportion of active institutions trade in the direction of intangible information. However, Shukor et al. (2009) study of Malaysia demonstrated that intangible non-current assets continuously show negative associations with share market price in financial crisis situations, as well as in excellent economic conditions.

Barth and Beaver (1996) investigated the value-relevance of fair value disclosure under SFAS 107 (FASB 1991) by examining whether differences between the market and book values of common equity can be explained in a predictable way as a function of differences between fair values estimates disclosed under SFAS No. 107 and their related book values. An important finding is that non-performing loans and interest-sensitive assets and liabilities have significant explanatory power. Barth and Beaver (1996) also report that loans' fair values provide significant explanatory power incremental to non-performing loans and interest-sensitive assets and liabilities and vice versa. As predicted, the coefficient on loans' fair value is significantly higher for banks with relatively high regulatory capital ratios. Finally, consistent with the assertions of bank managers and analysts that omission of the core deposit intangible asset from estimates of deposits' fair value misstates banks' net balance sheet positions, the study

found a proxy for the core deposit intangible is significantly associated with bank share prices.

The association between prior accounting information and the stock price reaction around the announcement of open-market stock repurchases were examined by Ho et al. (1997). This study included regressing cumulative abnormal returns surrounding the repurchase announcement on profitability, sales growth and capital announcements in two fiscal years prior to the announcements. Findings indicated that the market's assessment of the announcement is positively associated with prior profitability and sales growth after controlling for the announced size of the repurchase program, prior returns and the size of the firm.

The result is consistent with the market reinterpreting previously released accounting information when interpreting a subsequent repurchase announcement by a firm. This suggests that the degree of reinterpretation of prior accounting information at the time of the purchase announcement increases the information asymmetry between managers and investors. In addition, the market reaction to the repurchase announcement is negatively associated with the size of the firm or the number of analysts following the firm. The association between the market response and prior accounting variables is driven by the firms that are smaller and have fewer analysts following them. The complementarity of multiple disclosures is larger when there is greater information asymmetry.

Conservatism was interpreted by Basu (1997) as 'capturing the accountant's tendency to require a higher degree of verification for recommending good news than bad news in

financial statements'. Under this interpretation of conservatism, earnings reflect bad news more quickly than good news. The results of Basu (1997) were consistent with the predictions of the research under conservatism. Earnings represent more timely public reporting in terms of availability of 'bad news' compared with 'good news', as measured by the difference in either adjusted  $R^2$  or slope coefficients. These results were consistent with bad news earnings changes having a greater tendency to reverse in the next period than good news changes. Further, it revealed in this test that the sensitivity of earnings to concurrent negative returns has increased relative to positive returns over the last three decades, suggesting that conservatism has increased over time.

The author quotes the following arguments to justify the results.

1. Mc Nichols (1998) argues that opportunistic managers have incentives to leak up-coming good news before earnings are disclosed, and earnings announcements will thus reveal relatively more 'bad earnings news' to market.
2. Skinner (1994) argues that managers release bad news early before earnings are announced to reduce their investor-litigation exposure.
3. The large one-time transition effects that the firms recognised when the new accounting standards adopted for liabilities such as pensions and healthcare benefits could potentially confound the results of this research on conservatism.

Ahmed et al.(2000) investigated the effect of accounting conservatism on the stock market valuation of operating assets in the context of Feltham and Ohlson (1996) model and the weights on operating assets in the Feltham and Ohlson (1996) operating

earnings dynamics. They found that accounting based conservatism proxies are positively related to the valuation weight on operating assets.

Kousenidis et al. (2009) examined effects of reporting conservatism on the value relevance of accounting earnings on a sample of Greek firms. Results proved that the value relevance increases when moving from low-conservatism firms to medium-conservative firms and decreases when moving further to high-conservative firms.

The relationship between accrual accounting and the value relevance of accounting measures in countries with different levels of shareholder protection, was investigated by Hung (2001). Accrual accounting provides a better measure of revenue and expenses than cash flow accounting and therefore makes accounting information more value relevant. But the author argues that managers are more likely to behave opportunistically in an environment with weak shareholder protection.

Findings indicated that the higher use of accrual accounting lowers the value relevance of accounting performance measures for countries with weak shareholder protection. As predicted the coefficients of accruals are significantly negative across all the models. Further, the coefficient of accrual\*anti-director rights and accrual\*legal system are positively significantly related. Also the analysis indicated that the use of accrual accounting does not negatively affect the value relevance of accounting information for countries with strong shareholder protection. Overall, the results are consistent with the belief that shareholder protection improves the effectiveness of accrual accounting. The findings suggest the importance of considering institutional factors such as shareholder protection when formulating accounting policies related to accruals.

Findings of Hung (2001) provide evidence for the impact of 'context' on value relevance. The study shows that the results of the value relevance of accounting information may differ from one country to another country, since the shareholder protection is a country specific variable. Further, Hung's results contradict Brief and Zarowin's (1999) results. Brief and Zarowin questioned about the benefits of accrual accounting, whereas Hung (2001) shows clear evidence that earnings measured under accrual accounting has value relevance in countries with strong shareholder protection.

Chen et al. (2001) empirically investigated the value relevance of accounting information in the emerging Chinese stock market. Chinese companies issue A-shares to domestic investors and B-shares to foreign investors. Different financial reporting practices are required for A-share companies with AB-Share companies (who also issue B-shares). For instance, A-share companies prepare only Chinese GAAP-based financial statements with those companies are usually audited by a local CPA firm. Conversely, AB-share companies are required to reconcile their financial statements to the International Accounting Standards (IAS) and have the IAS-based financial statements audited by another CPA firm (usually one of the big 5 auditors), in addition to a local audit firm. The existence of the dual reporting and dual auditing mechanisms may improve the value relevance of accounting information for AB-share companies.

Chen et al. (2001) addressed three main questions. First, whether accounting information is value relevant to domestics in the A-share market. Second, the factors affecting value relevance: positive versus negative earnings; firm size; earnings persistence; and industry stocks. Third, whether value relevance differs between companies issuing only A-share and companies issuing A-shares and B-shares. By

following most of the studies in the value relevance literature, Chen et al. also used the Ohlson's (1995) model (modified).

Results proved accounting information is consistently perceived as value relevant by investors in China, despite the relative young age of the market, according to the coefficients and  $R^2$ . The study concludes that the accounting information as reflected in the income statement and the balance sheet is value-relevant to domestic investors in the Chinese stock market. Further, the results reported that accounting earnings are less important in stock valuation when firms report negative earnings compared to positive earnings reported firms. Then the study concludes that earnings information is more value relevant in smaller firms because more competing information sources are there for larger firms in the market. The price model reveals that both net income and book value of equity are value relevant for small as well as for large companies. Also, the study reported that Chinese investors do not distinguish earnings from more permanent components as measured by income increasing items below operating income.

Testing value relevance of accounting information in the emerging Chinese market, using the same valuation model, is an interesting study since most research in this context is on the US market. Also, it is interesting to perceive the different socio-economic, cultural, and financial reporting and auditing settings in China. However, there is a question regarding the level of efficiency of the Chinese market, since the 'perfect market assumption' is an underlying assumption in Ohlson's valuation model.

Ibrahim et al. (2009) reported that accounting numbers played an important role in the valuation of firms in Malaysia even in the financial crisis. Their findings suggest that

accounting earnings and book value capture most of the information that is relevant to assess the firm. Further, they state that non-accounting beta is more valued during the financial crisis compared to after the financial crisis.

A Monte Carlo simulation model was developed by Healy et al. (2002) for a pharmaceutical firm to provide evidence on the trade-off between objectivity and relevance in reporting for R&D outlays. Their findings indicated that the successful-effort method of capitalising R&D is more highly correlated with economic returns and values than either the cash-expense or full-cost methods. Their findings suggest that both types of earnings management (loss avoidance and earnings decline avoidance) reduce the relationship between returns and write-downs. However, successful-efforts data still have a significant edge over full-cost and cash method data, even with widespread earnings management. In addition, tests of accuracy of industry value-to-book multiples for pricing firms show very little deterioration in forecast accuracy for successful-efforts data, even if 100% of sample firms decide to defer the R&D asset write-down.

Liang (2005) integrated general measurement of the information electronics industry based on the concepts of the balanced scorecard, intellectual capital and intangible assets. The study reported that the traditional financial performance measurement, net income, did not provide significant explanatory power in terms of the corporate value. However, after the net income was decomposed, the explanatory power was significantly changed. The component items of net income are found to be more effective in explaining the value of a company than merely looking at the bottom line. It is concluded that RI (residual income) and EVA (economic value added) have



significant and similar explanatory power in terms of evaluating the performance of the information electronics industry. Further, the results reported that the explanatory power of the non-financial performance measurement in relation to the corporate value was not significant.

The frequency of interim reports' impact to earnings timeliness and the speed with which accounting information is impounded into price was examined by Butler et al. (2007). Results showed that, after increasing reporting frequency, voluntary increases display significant improvements in intra-period timeliness (IPT), while mandatory increases do not. Results also indicated that voluntary increases tend to recognise bad news more quickly, but experience no change in the timeliness of good-news recognition. The study concluded that increases in reporting frequency do not necessarily lead to increased timeliness, especially when such changes are non-discretionary.

The effects of reporting conservatism on the value relevance of accounting earnings of a sample of Greek firms over the period from 1989 to 2003 was examined by Kousenids et al. (2009). Results depicts that the level of conservatism has increased after the market crisis of 1999, potentially, as a result of the additional regulation, imposed by the market authorities during the post-crisis period. Further, the results showed that there is a non-linear association between conservative reporting and value relevance of earnings. In particular, value relevance increases when moving from low-conservative firms to medium-conservative firms and decrease when moving further to high-conservative firms.

The value relevance of reliability of reported goodwill and identifiable intangible assets under Australian GAAP from 1994 to 2003 was examined by Dahmash et al. (2009), using Feltham and Ohlson's (1995) model. This period is characterised as relatively restrictive accounting treatment for goodwill and relatively flexible accounting treatment for identifiable intangible assets. Results suggest that for average Australian companies, the information presented with respect to both goodwill and identifiable intangible assets is value relevant but not reliable. In particular, goodwill tends to be reported conservatively while identifiable intangible assets are reported aggressively. However, different results were reported by Wines and Ferguson (1993) for ASX listed companies over the period of 1985-1989. They examined the accounting policies adopted for goodwill and for identifiable intangible assets. Findings revealed a general decrease in the diversity of goodwill accounting policies over the period but the conserve for identifiable intangible policies. Wines and Ferguson (1993) results support for the claims that companies have been recognizing identifiable intangibles to reduce the impact on reported operating profits of the requirements of accounting standards for the amortisation of goodwill.

The overall findings of the studies related to 'value relevance of financial information' do not provide clear evidence that the financial information is value relevant in all market conditions. However, the complementarities between financial information and non-financial information provide evidence that the corporate reporting model should be balanced between financial information as well as non-financial information of companies.

### **2.2.3 Value Relevance of Financial Information: Measures other than**

#### **‘Traditional Profit’**

Although traditional financial performance measurement techniques dominate in markets for communicating company performance, there are non-traditional performance measures, such as Economic Value Added (EVA), Residual Income (RI) and Cash Flows from Operations (CFO). Results of the studies testing the value relevance of non-traditional performance measures are presented below.

Biddle et al. (1997) tested whether the Economic Value Added (EVA) is more highly associated with stock returns and firm values than accrual earnings by evaluating which components of EVA, if any, contributed to the assertions. Results showed that  $R^2$  are significant at conventional levels. However, EBEI (earnings before extra-ordinary items) has a significantly higher adjusted  $R^2$  (9%) than each of the other performance measures. The RI (residual income) regression has a significantly larger adjusted  $R^2$  (6.2%) than does the EVA regression (5.1%), and both have a significantly larger adjusted  $R^2$  than CFO (2.4%). These results suggest that, in terms of relative information content, earnings significantly outperforms RI, RI significantly outperforms EVA (although with a smaller gap), and all three outperform CFO. These results confirm that earnings are more highly associated with returns and firm values than EVA, RI or CFO. This does not support claims that EVA dominates earnings in relative information content, rather it suggests that earnings generally outperform EVA.

The value relevance of book value and dividends versus book value and reported earnings was compared by Brief and Zarowin (1999). The study justifies modelling price in terms of book value and dividends in two ways. First, using Modigliani and

Miller's (1959) argument, dividends may have a stronger correlation with permanent earnings than reported earnings. Second, they derive a model of price in terms of book value and dividends from basic analytical relationships. Further, Brief and Zarowin (1999) justified replacing earnings with dividends in the regression of price on book value with two separate arguments. First, the dividends have 'information content' in the sense that dividends provide information about the firm's permanent earnings. Second, given the algebraic properties of accounting systems based on the clean surplus relation, an accounting valuation model can be derived in terms of book value and dividends.

Three sets of findings were reported. First, overall, the variables, BV and dividends, have almost the same explanatory power as BV and reported earnings. Second, for firms with transitory earnings, dividends have greater explanatory power than earnings but BV and earnings have about the same explanatory power as BV and dividends. Third, the most important, when earnings are transitory and BV is a poor indicator for value (for intangible intensive sectors), dividends have the greatest explanatory power of three variables.

The corporate signalling practices in a framework that includes dividends, stock repurchases, and accounting disclosures were examined by Gelb (2000). This study presents evidence for an alternative explanation. For some firms, dividends and stock repurchases may be less costly than accounting disclosures. Simple and multiple regressions were run to see the significance. The dependent variable was 'disclosure ratings'. Sales ratios, market capitalisation, profitability ratios and estimated Tobin's Q were identified as independent variables.

The results indicated that ‘good news’ firms that operate in markets with lower industry concentration ratios and therefore lower entry barriers are more likely to convey favourable news via dividends and stock repurchases instead of accounting disclosures. Further, it is found that firms in industries with lower entry barriers, which are likely to be concerned with releasing proprietary information to potential competitors, tend to rely on dividends or stock repurchases instead of accounting disclosures. Further, this study extends the findings that firms tend to rely on financial signals instead of accounting disclosures as a means of conveying favourable news to investors while protecting proprietary information.

A study by Kirkulak and Balsari (2009) examined the role of incremental information content of inflation-adjusted data. The results showed that inflation adjustment affects financial ratios significantly. Further, both inflation-adjusted and historical cost-based earnings and book values are significantly value relevant.

Reviewing the results of the research related to “Value Relevance Measures other than Traditional Profit”; the findings of Biddle et al. (1997) do not support the claims that EVA dominates earnings in relative information content, rather it suggests that earnings generally outperform EVA. Their results show that  $R^2$  is significant at conventional levels. However, this contradicts the results of Liang (2005) and the findings of Brief and Zarowin’s (1999), a study claims that dividends have more value relevance compared to accounting numbers. On the other hand, the findings of Biddle et al. (1997) confirms the usefulness of accrual accounting, when ‘earnings’ is a product of accrual accounting. However, Gelb (2000) proves the existence of information asymmetry in

the market, where companies are more concerned about releasing proprietary information.

#### **2.2.4 Value Relevance of Capitalisation versus Disclosure**

There are two main ways of presenting intangible assets in corporate reports: capitalisation and disclosure. However, the financial information is affected only by capitalisation. As such, markets may react differently for capitalisation compared to disclosure.

The value relevance of software capitalisation was examined by Aboody and Lev (1998) who noted that both the annual software capitalisation amount and the cumulative software assets are positively and significantly associated to stock returns and prices. Also, the results indicated that the capitalisation change variable is associated with subsequent earnings changes.

Barth and Clinch (1998) investigated whether relevance, reliability and timeliness of Australian asset revaluations differ across type of assets, including investments; property, plant and equipment; and intangibles. Also the study investigated whether relevance, reliability and timeliness differ if the valuation amount is determined by the firm's board of directors or an independent appraiser, for more versus less timely valuations, and for revalued amounts that are above or below historical cost. Results reported that revalued investments are consistently significantly associated with share prices, except for investments of non-financial firms in the associated companies. The study also found that revalued intangible assets are consistently, significantly and positively associated with share prices, contradicting the view that such estimates are

unreliable. Further, the results reported the revalued aggregate PPE is significantly positively associated with share prices for firms in all three industries.

Taken together, their findings suggest revalued financial, tangible, and intangible assets are value relevant in an Australian market. Although the financial assets findings are not surprising based on prior research, the intangible assets findings are striking in their strength and consistency. Findings for PPE are less consistent, although the stronger value relevance for plant and equipment than for property suggests revalued operating assets are more value relevant than assets less directly related to operations. Further, there is little evidence to indicate that director and independent appraiser-based valuations are viewed differently by investors, suggesting directors' private information enhances value estimates despite their potential self-interested financial statement management incentives. Finally, the evidence suggests that both upward and downward revaluations are value relevant, although the discretionary nature of asset write-ups through earnings can affect their value relevance.

Espahbodi et al. (2002) tested the equity price reaction to the pronouncements related to accounting for stock-based compensation, which assessed the value relevance of recognition versus disclosure in financial reporting. Results indicated that firms exhibited abnormal returns around the issuance of the ED proposing to require recognition of stock-based compensation (SBC) costs, and also around the event reversing that decision to require disclosure only (while encouraging recognition). Results showed that the abnormal returns are most pronounced for high-tech, high-growth and start-up firms. The study also documented that the stock price impact is positively related to the existence of tax loss carry-forward, the extent of stock option

usage (as reflected by its effect on EPS), and retained-earnings related debt constraint; and negatively related to the noise in stock price performance, free cash flow over total assets and firm size.

The significance of abnormal returns around the event reversing the decision to require only disclosure is consistent with the contracting theory, and shows that market participants value disclosure and recognition differently (or that disclosure is not a substitute for recognition). Requiring companies to disclose only the cost of SBC rather than forcing recognition as was proposed earlier would involve no new information and should not affect security prices, except through the contracting and political cost hypotheses (as future earnings will be affected by recognition, but not by disclosure of SBC costs).

The value relevance of R&D and advertising expenditure of Korean firms was examined by Han and Manry (2004). They commented that the market may accept the information about R&D whether it was capitalised or expensed. Despite this, disclosure is important for value creation. Similarly, Godfrey and Koh (2001) provided evidence that capitalisation of intangible assets, as a whole provides information that is relevant for firm valuation in Australia. Further, they reported that the information is relevant over and above the information provided by other balance sheet items.

Kallapur and Kwan (2004) added to the literature by examining the relevance and reliability of brands recognised on the balance sheet of 33 UK firms beginning in 1995. Brand assets measurement in this sample was subject to managerial discretion, the sample firms acquired brands not in isolation but as part of business acquisitions, and



valued them separately from goodwill. The study found that brand assets are value relevant. However, the market capitalisation rates of brands of firms with low contracting incentives are higher than those of firms with high contracting incentives to capitalise and overstate brand values.

Findings suggest that managers' discretionary valuation of intangible assets recognised in financial statements might not be reliable. However, given the differences in market capitalisation rate, the markets do seem capable of seeing through differences in reliability. Kallapur and Kwan's (2004) findings, therefore, do not suggest that markets are misled by lack of reliability. Their study contributes not only to the literature on value relevance and reliability of intangible assets, and more generally of recognised discretionary amounts, but also to the policy debate on recognition of intangible assets.

The association between management's discretionary R&D accounting choice and the firm's concurrent market values as reflected in its share price was examined by Ahmed and Falk (2006). Sample of the study was limited to the period ending 1999, because the Australian Standards Board restricted the flexibility of capitalisation in 1999. Similar to prior studies in this area, they also adjusted and applied Ohlson's (1995) model to the specific circumstances. The study followed the path paved by Penman and Sougianis (1998) and utilised earnings as a proxy for expected earnings. The results indicate the following:

1. Managerial discretionary accounting practice, capitalising or expensing R&D, demonstrates greater value relevance than accounting figures that are the product of mandatory R&D expensing;

2. Managerial discretionary capitalised R&D accounting figures demonstrate higher association with market share prices than managerial discretionary expensed expenditure;
3. The strength of the association between R&D accounting figures and the firm's market value is higher for firms that are members of the defined industrial group (extractive firms) than for the general population of firms; and
4. R&D capitalised expenditure is positively and significantly associated with the firm's future earnings.

Ahmed and Falk's findings suggest that allowing managers to credibly signal their superior information by either capitalising successful R&D; or expensing unsuccessful R&D would reduce information asymmetry between managers and the firm's contracting parties and is likely to enhance firms' financial statements relevance, capital markets' efficiency and resource allocation. However, this assumes no moral hazards on the part of the reporting managers, and that managers reporting decisions will not be influenced by opportunistic considerations, that result in unreliable or misleading information. Their findings are supportive of that assumption.

The relationship between voluntarily recognised and disclosed identifiable intangible assets, stock prices and future earnings in Australia over the period 1979-1997 were investigated by Ritter and Wells (2006). The context and the time period during which significant development in the accounting practices applied to identifiable intangible assets occurred. This included the issuance of AASB 1013: Accounting for Goodwill, and the increasing frequency of firms voluntarily disclosing identifiable assets (Wyatt et

al., 2001). The objective of the study was to determine whether the discretion afforded to management to recognise these assets results in presentation of value relevant information, with this being evaluated through associations between identifiable intangible assets and both stock prices and future period earnings.

A similar study of Ji and Lu (2010) reported that the adoption of international accounting standards has changed firms' behaviour in reporting intangibles. They examined the impact of reliability of reported intangible assets on the value relevance, in the pre and post-adoption periods of IFRS, using a sample of Australian companies from 2001 to 2008. Results reported that the quality of earnings has improved and the value relevance of intangibles has declined. They conclude that the reliability of the intangible information has significant impact on its value relevance.

Findings indicate that after controlling for income, there is a significant association between voluntarily recognised and disclosed identifiable intangible assets and stock prices. Accordingly, identifiable intangible assets disclosures are value relevant, and although there is an association between these identifiable intangible assets and income they are not substitutes. In addition, that after controlling for current period income, there is a significant positive association between identifiable intangible assets and future period income. This supports the proposition that identifiable intangible assets are relevant to the estimation of future period income, and is suggestive of causality in the above relationship between identifiable intangible assets and stock prices.

Feng and Li (2010) examined whether advertising by pharmaceutical firms is value relevant. The evidence indicated that investors view advertising by pharmaceutical

firms as a source of future economic benefits, where advertising expenditure has a greater association with the firm's stock prices and returns than those of non-pharmaceutical firms. Similarly, a study examining the value relevance of major media advertising expenditure by Shah et al. (2009) suggest that advertising expenditure measures are positively associated with market value in the UK.

Since the findings of most of the above studies provide evidence that capitalisation is more value relevant than disclosure, an issue arises whether the value relevance of accounting information is threatened with the new regulatory reforms, which restrict capitalisation. However, with the evidence that market accepts information whether capitalised or disclosed, (example: Han and Manry (2004) and Ritter and Wells (2006)) determining that investors accept the voluntary, non-financial disclosures.

### **2.2.5 Changes of Value Relevance across time**

The studies testing changes of value relevance across time contribute to understanding whether the existing financial reporting models are adequate to report the company performance in the dynamic technological, socio-economical and regulatory environment. Further, the results may contribute to management of companies to refine the corporate reporting models.

The changes in the value relevance of earnings and book values over the past forty years were investigated by Collins et al. (1997), who found that the combined value relevance of earnings and book values had not declined over the past 40 years and, in fact, had increased slightly. Further, Collins et al. (1997) claims that the value relevance of

‘bottom-line’ earnings had declined over time, being replaced by an increased value-relevance of book values.

Francis and Schipper (1999) addressed the concern that financial statements have lost a significant portion of their relevance to investors. Their paper has implications for those who are concerned about the current financial reporting model. Their goal was to discuss and test some of the empirical implications of the claim that financial statements have lost their relevance over time. Results indicate that for some financial statement metrics there has been a statistically significant decline in value relevance. Francis and Schipper (1999) observed a significant decline in returns to three of the five accounting based hedged portfolios. Results also report that value relevance has decreased.

Further, the results indicate a distinct decrease (increase) in adjusted  $R^2$  from the earnings relation (balance sheet relation) and less obvious upwards trend in the adjusted  $R^2$  from the book value and earnings relation. Findings include declines in the returns to several accounting-based hedge portfolios, a decline in the ability of earnings to explain returns, and increases in the ability of assets and liabilities, and earnings and book values. Further, results suggest that high technology firms have not experienced a greater decline in relevance than low-technology firms. Overall, the results are interpreted as providing mixed evidence on whether financial reports lost relevance over the time period 1952-1994.

Francis and Schipper (1999) considered the ‘market adjusted returns’ rather than share prices or returns to test the value relevance. Firstly, it is interesting to see the results by considering the relationship between stock returns and earnings and/or book values for

the same sample. Secondly, the sample years are from 1952 to 1994. The context of the financial reporting such as market conditions and regulatory requirements may have changed during this long period of time. These changes also have to be taken into account prior to conclude. Thirdly, the number of securities in the annual regressions range from 377 in 1952 to nearly 4500 in 1994. This wide range of sample size may also have an impact on the final results. Results of this research are contradicted by other findings. As such, it is not appropriate to conclude the 'lost of value relevance of financial statements' without implementing further tests by considering those factors.

Findings of Kadri et al. (2009) provide evidence that the adoption of IFRS leads to a decrease in the value relevance in earnings and an increase in the value relevance of book value in Malaysian companies. The study reported that the changes in the financial reporting regime significantly affect the value relevance of book value but not earnings. Further, the findings showed while book value and earnings are value relevant during the MASB (Malaysian Accounting Standards Board) period, only book value is value relevant in IFRS period. However, a study by Kadri et al. (2009) investigated the value relevance of accounting information of the post-IFRS period compared to the pre-IFRS period in the UK, Netherlands, Germany and France. The Findings indicated an overall increase in the value relevance of accounting information in post-IFRS period. However, the study further reported the magnitude of the change is not the same for all countries. Similarly, a study by Lode and Napier (2010) investigated the value relevance of pension accounting disclosures under UK GAAP and IFRS. They found, that the disclosure of aggregated pension cost components and disaggregated pension assets and liabilities are more informative under IFRS than UK GAAP. Further, Tsoligkas and Tsalavoutasb (2010) argued that transition of IFRS have implications on the valuation

of R&D expenditure in the UK. They claimed that the capitalised portion of R&D is significantly and positively related to market values, while R&D is significantly and negatively related to market values under IFRS. This supports the proposition that expensed R&D reflects no future economic benefits and thus they should be expensed.

Goodwin and Ahmad (2006) examined whether the value relevance had declined over time in Australia using a large sample of about 13,000 firm-year observations beginning from 1975. In particular, this study investigated whether or not capitalisation of intangibles such as R&D, deferred costs and other intangibles had an effect on longitudinal value relevance. This was studied under a relatively unregulated reporting regime for intangibles. Under this reporting regime, firms have recognised intangible assets, both acquired and internally generated, at cost or value, and employed different accounting practices after initial recognition.

Results suggest that earnings value relevance (measured by  $R^2$  and ERC) had declined over this period. After removing losses, the evidence on declining earnings value relevance is weak. Results from estimating a level model also provide no evidence that the value relevance of financial statement information has declined. Further examination of intangible capitalising firms reveals that for these firms, earnings value relevance has increased more compared with firms which did not capitalise intangibles. The value relevance of earnings and book value has increased for capitalisers and there is no significant improvement for non-capitalisers. Furthermore, the value relevance of profitable capitalisers has considerably improved over time, while there is evidence of declining value relevance for profitable non-capitalisers. Further specification tests that control for firm size, firm risk and growth option have not altered the above findings

materially. Goodwin and Ahmad (2006) finally report, 'an unresolved question is whether the arrest of declining earnings value relevance is only due to the intangible accounting practised in Australia, since there were groups of non-capitalisers that have little change in earnings value relevance'.

Brimble (2007) examined whether the relevance of conventional (earnings focussed) accounting information for valuation has declined in Australia over a recent period of 28 years, and suggested that any conclusion that conventional accounting earnings have lost their relevance in Australia is premature. The financial world is simply more complex, and the core value-relevance of conventional accounting earnings has not declined over time.

The evidence of declined value relevance of financial information across time, example, Francis and Schipper (1999), Goodwin and Ahmad (2006); suggest that traditional financial statements do not adequately reflect the real value creating activities of companies with technological developments. Further, failure to recognise the vast majority of internally generated intangible assets as well as the adoption of IFRS may cause value relevance to decline. However, the findings of more recent studies, for example, Kontopoulos et al. (2010); Lode and Napier (2010); and Tsoligkas and Tsalavoutasb (2010) provide evidence that the adoption of IFRS does not cause any decline in the value relevance of financial information.



## **2.2.6 Value Relevance of Mandatory and Voluntary Disclosures**

Studies related to value relevance of voluntary disclosures contribute to the literature by examining whether companies, in a setting with a modest level of accounting regulation, ‘fill out the information gap’ through voluntary disclosure thereby improving investor protection.

Whether a higher level of voluntary disclosure in the annual report reduces the information gap (asymmetry) between companies and investors in Denmark, was examined by Banghoj and Plenborg (2008). If Danish companies succeed in reducing the information gap, there is reason to believe that the association between current stock returns and future earnings will improve. Banghoj and Plenborg (2008) documented that the level of disclosure increased by approximately 40 percent during the period 1996-2000. Despite an increased level of voluntary disclosure, the study found that voluntary disclosure from the annual report does not improve the association between current stock returns and future earnings. In fact, in some alternative specifications were found that higher levels of voluntary disclosures in the annual report reduced the association between current returns and future earnings. Furthermore, they report that although the objective of annual report is to provide useful information to stakeholders, investors in Danish companies have not benefited from an improved level of voluntary disclosure. This raises the question of whether value relevant information about future performance is included in voluntary information in the annual report, or if investors are simply not capable of incorporating voluntary information in the firm value estimates.

The value relevance of voluntary and mandatory disclosures, in a market that applies International Accounting Standards with limited penalties for non-compliance, was

examined by Hassan et al. (2009) using panel-data analysis. Their empirical results showed that, after controlling for factors such as asset size and profitability, mandatory disclosures have a highly significant negative relationship with firm value. However, Hassan et al. (2009) comment that although the results seem puzzling from a traditional perspective, it is consistent with the predictions of analytical accounting models which emphasize the complex interplay of factors determining disclosure effects. Further, their results show that voluntary disclosures have a positive but insignificant association with firm value.

Results of the above studies imply that the markets do not react to voluntary disclosures compared to traditional financial statement information. The results contradict Amir and Lev (1996) who reported that the value relevance of non-financial information overwhelms that of traditional financial information in the US. This may be due to the sophisticated nature of the US market. However, a study examined the enhanced voluntary disclosure levels of privatized Jordanian firms for the firm valuation reported different results. Muhammad and Ali (2010) provided evidence that the enhanced voluntary disclosure levels of privatized firms are rewarded with higher valuations by the market of Jordanian listed companies over a 9 year period, 1996-2004.

### **2.2.7 Impact of Value Relevance Literature on Accounting Standards Settings**

The findings of value relevance studies have a particular importance for accounting standard setters since accounting standards form a major part of financial regulatory requirements.

Holthausen and Watts (2001) critically evaluated the standard setting inferences that can be drawn from value relevance research studies that are motivated by standard setting. The study concentrates on theories of accounting, standard setting and valuation that underlie those inferences. They cite a variety of reasons why the value relevance literature has had little impact on standard setting. The major reason is that the literature does not seek to develop a descriptive theory of accounting and standard setting. Without such a theory there can be little assurance that the inferences drawn in the literature are valid. The literature uses equity valuation tests only. Much of the literature is motivated by an assumption that accounting provides inputs to investors' valuations, but the empirical tests amount either to associations with equity value or in many cases to equity valuation per se.

Holthausen and Watts (2001) argue that even if the value-relevance literature's tests effectively informed us about accounting's role in providing inputs to equity investor valuation, those tests ignore the other roles of accounting and other forces that determine accounting standards and practice. To the extent that accounting standards and practice are shaped by other roles and forces that are not perfectly correlated with the valuation role, the value relevance literature misses the key attributes of accounting.

Finally, Holthausen and Watts discuss the weakness of current valuation models used in accounting research. In particular, most of the models estimated assume away the existence of economic rents, and growth and abandonment options. In addition, most of the estimated models are linear, when there is both ample theory and empirical evidence to support the notion that the relationship between the variables in the models and value are non-linear. Thus, the advanced valuation models explicitly considering rents, growth

and abandonment options and the resulting non-linear relations, can be identified as an area of future research.

Barth et al. (2001) offered the view of the relevance of value relevance research for financial accounting standard setting that contrasts with the view offered in Holthausen and Watts (2001). Barth et al.'s (2001) comment is limited in scope to a discussion of the relevance of the value relevance literature for financial accounting standard setting, but does not comprehensively review the value relevance literature.

The key conclusion of Barth et al. (2001) is that the value relevance literature provides fruitful insights for standard setting in the following manner.

1. Value relevance research provides insights into questions of interest to standard setters and other non-academic constituents. Although there is no extant academic theory of accounting or standard setting, the FASB articulates its theory of accounting and standard setting in its concept statements.
2. A primary focus of the FASB and other standard setters is equity investment. Although financial statements have a variety of applications beyond equity investment, the possible contracting uses of financial statements in no way diminish the importance of value relevance research, which focuses on equity investment.
3. Empirical implementations of extant valuation models can be used to address questions of value relevance, despite the simplifying assumptions underlying the models.

4. Value relevance research can accommodate conservatism, and can be used to study the implications for the relation between accounting amounts and equity values.
5. Value relevance studies are designed to assess whether particular accounting amounts reflect information that is used by investors in valuing firms' equity.
6. Econometric techniques can be and are applied to mitigate the effects of common econometric issues arising in value relevance studies.

Barth et al. (2001) comment on Holthausen and Watts's criticism of the models used in value relevance research. Currently, a frequently employed model is that based on Ohlson (1995) and its subsequent refreshments. Ohlson's model represents firm value as a linear function of book value of equity and the present value of future abnormal earnings. The model assumes perfect capital markets for a finite number of periods. With additional assumptions of linear information dynamics, firm value can be re-expressed as a linear function of BV, net income, dividends and other information.

Ohlson's (1996) model and its extensions capture the economic rents (rents in excess of the cost of capital for a finite number of periods) by the persistent parameter on abnormal earnings as well as by other information. Although economic rents can be viewed within Ohlson's framework as being reflected in the presence of abnormal earnings, rents also can be reflected in the model by including the present value of the future cash flows attributable to those rents. In fact, economic rents are attributable to many intangible assets.

Ohlson's model yields a particular form of non-linearity in the valuation equation. However, Ohlson often makes modifications to estimating equation specifications to incorporate potential effects of non-linearities in the particular setting being examined. The presence of abnormal earnings enters into the model's non-linearity. That is, for given levels of equity book value and abnormal earnings, marginal differences in persistence are not associated with constant marginal differences in equity value. Studies that permit valuation coefficients to vary cross-sectionally or across components of equity book value and abnormal earnings are explicit attempts to control for non-linearity. This can be viewed as being implicitly based on the non-linearity in abnormal earnings in Ohlson's model.

### **2.3 Summary and Implications**

Literature related to intangible assets and financial reporting reveals that companies increasingly depend on more supplementary or voluntary disclosures than accounting numbers for reporting intangible assets. Further, there is no consistent or mutually agreed reporting framework for intangible assets. As such, there is a dire need of establishing a uniform methodology for disclosure of intangible assets. Also the review of literature revealed that the adoption of IFRS has a major impact on the financial reporting practices of intangible assets. Furthermore, there are mainly five reasons identified for the measurement of intangible assets: to help organizations formulate their strategy; to assess strategy execution; to assist in diversification and expansion decisions; to use as the basis for the compensation; and to communicate to external stakeholders.

The comparative studies of disclosure practices of intangible assets revealed that there is an insignificant increase in intangible assets reporting in the emerging Sri Lankan market compared to developed market (Australia). But the Singapore market (a moderately developed market) provides evidence that there is a significant increase in the level of disclosure of intangible assets. Further, human capital reporting is recognized as the most popular category of intellectual capital disclosure. Finally, the comparative studies emphasized the challenges faced by researchers, business managers, and government regulatory bodies to develop the reporting practices of intangible assets, which will lead to efficient allocation of resources in financial markets.

Studies related to disclosure practices and company characteristics revealed corporate size and listing status to be significantly associated with disclosure levels. Mixed results have been reported for the association between company characteristics and leverage, profitability and audit firm size. Further, evidence proved that quality of disclosure is positively associated with firm size.

Mixed evidence was found in analysing the studies related to value relevance of accounting information. It is interesting to see that accounting information, both in the income statement and the balance sheet, is consistently perceived as value relevant by investors in China, even though the Chinese market is an emerging market. Although Amir and Lev (1996) reported that the financial information is largely irrelevant for the valuation of high-tech industries such as cellular companies, however, when combined with non-financial information and with information about intangibles, financial information are value relevant. Healy et al. (2002) proved that the adoption of IFRS is a

challenge, as capitalising R&D is highly correlated with economic returns and values than the cash-expense. Additionally, there is evidence that accruals make earnings more timely in reporting 'bad news' but not 'good news'. Further, evidence proved that the value relevance of accounting information is 'context driven' that is, that higher use of accrual accounting lowers the value relevance of accounting performance measures for countries with weak shareholder protection. This suggests that shareholder protection improves the effectiveness of accrual accounting.

The evidence that the market reinterprets the previously released accounting information proves that accounting information leads to an increase in the information asymmetry between managers and investors. It is questionable about the value relevance of accounting information with the evidence that RI (residual income) and EVA (economic value added) have significant and similar explanatory power, compared to 'accounting profit', in terms of evaluating the performance of the information of electronics industry. However, there are still methodological issues such as market efficiency as well as statistical issues of the models applied to test the level of value relevance of information in measuring the value relevance of financial and non-financial information, which will lead come out with to inconsistent results in different contexts.

Brief and Zarowin (1999) question the benefits of accrual accounting in assessing the value relevance by comparison with the dividend valuation model. However, it is premature to question the benefits of accrual accounting only by comparing it with the dividend valuation model. Starting from Ball and Brown (1968), numerous researchers emphasized and proved the benefits of accrual accounting, such as for earnings measurements and testing the value relevance. The testing of value relevance is based



on several assumptions such as efficient markets, linear relationship between returns or share prices with earnings and book value. Hence, the drawbacks of the value relevance models may have an impact on the above results. Therefore, it is necessary to conduct further research in assessing the benefits of accrual accounting before coming to a conclusion. Further, Brief and Zarowin (1999) reinforce the 'context' in assessing value relevance. This is also an area for further research. It may consider factors such as industry, intangible intensity, market, usage of IT, shareholder protections, government intervention prior to arriving at a conclusion about the 'context' of value relevance.

The reviews of the articles related to 'Value Relevance of Capitalisation versus Disclosure' provide evidenced that annual software capitalisation, cumulative software assets, and both upward and downward revaluations are value relevant. However, those decisions may be subject to management discretions. Further, the Korean evidence proved that the market may accept the information about R&D whether capitalised or expensed. In other words, it proves that the disclosure however, is of importance for value creation. Kalapur and Kwan (2004) also prove that brand assets are value relevant. Further, the findings of Ahmad and Falk (2006) suggest that allowing managers to signal their superior information by either capitalising successful R&D or expensing unsuccessful R&D would reduce the information asymmetry in the market. Findings of the above studies encourage companies to capitalise on their internally generated intangible assets such as R&D and brand names. As such, it raises a valid question: whether the adoption of IFRS reduces the value relevance of accounting information in capital markets?

The evidence is mixed for the topic of 'Changes of Value Relevance across Time'. Collins (1997) found that the combined value relevance of earnings and book values has not declined over the past 40 years and, in fact, has increased slightly. Further, the authors claimed that the value relevance of 'bottom-line' earnings has declined over time having been replaced by the increased value relevance of book values. Also Brimble (2007) suggested that any conclusion that conventional accounting earnings have lost their relevance in Australia is premature.

However, Francis and Schipper (1999) addressed the concern that financial statements have lost a significant portion of their relevance to investors. The results indicate that for some financial statement metrics there has been a statistically significant decline in value relevance. Similarly, Goodwin and Ahmad (2006) suggested that both earnings and financial statement information value relevance have declined over this period. However, the exceptions reported for the intangible capitalising firms' earnings, as well as book value's value relevance has increased more compared to firms which did not capitalise intangibles. An unresolved question is whether the arrest of declining earnings value relevance is only due to the intangible accounting practised in Australia, since there were groups of non-capitalisers that had little change in earnings value relevance. This study intends to answer at least a part of this question, as to whether the disclosure of intangible assets, by way of non-financial information, has an impact on deciding share prices in a legal environment where capitalisation is restricted.

Finally, Holthausen and Watts (2001) highlight the drawback of value relevance literature in the context of input to financial accounting standard settings. These comments are very valuable in re-thinking the tests of value relevance of accounting

information, including the models that may be adopted for the same. However, another view is discussed by Barth et al. (2001) addressing the issue raised by Holthausen and Watts (2001).

#### **2.4 Identification of Gaps in the Development of Research Questions**

The above literature review indicates that researchers paid attention to accounting for intangible assets, measurement of intangible assets, the disclosure practices of intangible assets, changes in disclosure practices in different markets and other contexts and similar themes. Under the topic of value relevance, most of the researchers focussed on areas such as value relevance of accounting information (earnings and/or book value), changes in value relevance across time (in macro economic levels) and value relevance of capitalisation versus recognition. There were minor discussions about the value relevance of non-financial, voluntary disclosures. This reveals that there is a vacuum, or gaps, in accounting literature particularly in testing the value relevance of non-financial information disclosures. Further, although prior research has focussed on testing the relationship between mandatory and/or voluntary disclosures and company characteristics, there is a gap in the literature which examines the relationship between company characteristics and value relevance of financial and non-financial information. Based on the above identified gaps, the following themes were considered to develop the main research question and sub-questions for this study in order to provide an original contribution to accounting literature:

1. Value relevance of financial information and non-financial, intangible assets disclosures;
2. Measure the magnitude of non-financial, intangible assets disclosures;

3. Significance of disclosure of each category of non-financial, intangible information, in terms of value relevance; and
4. Factors influencing the value relevance of financial and non-financial information.

Having reviewed the literature related to reporting practices of intangible assets and value relevance of financial and non-financial information and identifying the gaps, the next chapter reviews literature related to methodologies incorporating two phases of the study, content analysis and value relevance.

## **Chapter 3**

### **Review of Literature: Content Analysis Methodology and Models of Examining Value Relevance**

The purpose of this chapter is to investigate the studies applying content analysis methodology and to review the models developed to test value relevance. The chapter commences by introducing content analysis as a qualitative method for addressing content of narratives. This is followed by a review of the application of content analysis methodology in analysing non-financial disclosures of corporate reports, paying particular attention to the forms of application in the studies of corporate reporting. The second part of the chapter reviews the methodology of testing value relevance by defining and interpreting the concept of value relevance.

A detail discussion is provided for Ohlson's contribution to development of models to assess value relevance. In particular the models of Ohlson (1995), Feltham and Ohlson (1995), Feltham and Ohlson (1996) and Ohlson (1999) are addressed followed by a review of Ohlson's models and model implications for price level and returns.

This chapter also addresses the non-linear model for valuing security prices and issues outlined in prior research that have tested value relevance; measuring value relevance in inefficient security markets and statistical issues in measuring value relevance. The chapter concludes by justifying the application of the content analysis method for phase of the study followed by a summary of the models developed to measure value relevance and its implications.

### **3.1 Content Analysis Methodology**

Content analysis can be identified as an approach, a technique and as a process of collecting and analysing data. Bryman and Bell (2006) interpret content analysis as an approach of analysing documents and texts that seek to quantify content in terms of predetermined categories in a systematic and replicable manner. It also can be identified as a technique since it is a method of classifying words of the text into manifest categories. Holsti (1969) offers a broad definition of content analysis as ‘any technique making inferences by objectively and systematically identifying specified characteristics of messages’. Content analysis can also be defined as a systematic technique for compressing many words of text into fewer content categories based on explicit rules of coding (Berelson, 1971; Webber, 1990; Crowley and Delfico, 1996; Krippendorff, 2004).

Further, content analysis is a process of investigating the frequency and intensity with which concepts are addressed in the text. It is by nature, a subjective process which relies on what Kerlinger (1969) refers to as manifest content categories being set up by the researcher and the researcher then counting the number of occurrences of these categories. It is a simple but laborious process of closely examining the transcript for concepts, particularly those which are repeated several times. The establishment of the manifest content categories is one of the main areas of possible subjective bias.

Content analysis was originally used as a method of analysing trends in mass communications. The technique was first used more than 200 years ago to analyse textual material from newspaper and magazine articles, advertisements, political

speeches, hymns, folktales, and riddles. Now it is commonly regarded as a useful method for social science studies, especially in advertising (Harwood and Garry, 2003). Recently, content analysis has been used in accounting research. In particular, accounting researchers such as Guthrie and Parker (1990); Milne and Adler (1999); Zeghal and Ahmad (1990); Abeysekera and Guthrie (2004); Abeysekera (2008) have applied content analysis methodology to examine the decision usefulness of narrative sections of annual reports. Disclosures regarding IC, environmental reporting, management discussion and analysis, footnotes, presidents' letters; news announcements; and auditors' reports are some of the areas researched.

### **3.1.1 Application of Content Analysis Methodology to analyse Non-financial Disclosures of Corporate Reports**

Content analysis method is employed in the area of corporate reporting, particularly to analyse the narratives and quantify the disclosures. The following sections report studies using the content analysis method to collect and analyse data in the area of corporate reporting. The focus is to identify the forms of application of content analysis method, conceptual analysis of narratives, quantification of narrative information, and analyse the location of the narratives and information.

#### **3.1.1.1 Application of Content Analysis for Conceptual Analysis**

The content analysis method is used for conceptual analysis of corporate reports. Conceptual analysis involves choosing certain concepts for examination and analysis and then quantifying and tallying the presence in the chosen text. It requires *a priori* coding method, based on a strong theoretical foundation for the coding categories to code the data. For example, Jose and Shang-Mei (2007) investigated the environmental

management policies and practices of the 200 largest corporations in the world. Based on the content analysis of the environmental reports of Fortune's Global 200 companies, they analysed the content of corporate environmental disclosures with respect to the following areas: environmental planning considerations, top management support to the institutionalisation of environmental concerns, environmental structures and organizing specifics, environmental leadership activities, environmental control, external validation or certification of environmental programs and forums of corporate environmental disclosures.

### **3.1.1.2 Application of Content Analysis to Quantification of Narrative Information**

In addition to analysing the narratives of corporate reports, researchers used content analysis to quantify the narrative information. Abrahamson and Emir (1996) used a computerised content analysis technique to measure the information content of company president letters. The information content was measured by way of bad news, negative words and compared with total number of words in the president's letter, using computer programs.

The content measure was then used to examine the association between the information contained in the president's letter of companies and firm-specific, accounting-based performance measures. Further, they proceed to analyse the cross-sectional association between the information contained in the president's letter and stock returns. These association tests may improve the understanding of the relationship between the information contained in the narrative parts of the annual reports and financial information found in the audited statements. In addition, these tests are important to



understand how investors use narrative information in conjunction with earnings numbers to value firms.

There are studies which have used the content analysis method to analyse and quantify the analyst's reports to assess the relative importance of non-financial disclosures of companies. Breton and Taffler (2001) explored the information set used by sell-side equity analysts in their stock recommendation decisions through content analysis of company reports. Their application of content analysis involves the classification of the information units of sell-side analyst reports into common meaning categories, measuring their importance in terms of their frequency of occurrence in the text, and then exploring the relationship between these relative frequencies and analyst's stock recommendations via multinomial logistic regression. Breton and Taffler (2001) infer that the information categories that best discriminate between buy, hold and sell recommendations are those of most value, implicitly or explicitly, to the financial analysts.

### **3.1.1.3 Application of Content Analysis to identify the Nature and Location of Information**

The non-financial information of companies may be disclosed in different locations of company annual reports. Many studies have applied content analysis methodology to identify the location of such disclosures in addition to identifying the nature of information and quantifying the same. For example, Lajili and Zeghal (2005) examined risk information disclosures in Canadian annual reports using content analysis methodology. They adopted this method because risks, particularly non-financial types are largely disclosed qualitatively where content analysis can capture the extent and

volume of such disclosures. The first step in analysing risk disclosure by Canadian companies is to examine the intensity and nature of risk-related information, as well as the volume and location of such information. The next step is to discover, in greater detail: which industries and companies disclose such information, how much, and where company management choose to report this information. Statistical analyses were then conducted for the results of the content analysis for further analysis of risk information.

The application of the content analysis method in the above studies reveals that it is popular in analysing unaudited, non-financial sections of company annual reports and other reports, such as environmental reports and analyst's reports. This method is particularly useful for researchers to assess the decision usefulness of non-financial information of company annual reports. In most of the studies, the output of the content analysis is inputted for further statistical analyses, to achieve the objectives of the study. Further, the researchers try to minimise the subjective nature of the content analysis method by employing the reliability analysis using independent persons.

## **3.2 Methods of examining Value Relevance**

### **3.2.1 Definitions and Interpretations of Value Relevance**

Since the studies of Ball and Brown (1968), accounting researchers have produced numerous studies documenting the association between accounting earnings and stock returns. More recently, studies about the value relevance of accounting information have been expanded to include both balance sheet measures of assets and liabilities and income statement measures using Ohlson's (1995) model (Chen et al., 2001). Most of the US studies define value relevance as the ability of accounting measures to capture or

summarise information that affects firm value. Using that definition, researchers often measure value relevance as the association between an accounting measure and stock return and operationalise the value relevance in two ways: portfolio returns approach and regression valuations approach (Hung, 2001).

There are various interpretations to value relevance. Francis and Schipper (1999) considered four possible interpretations of the construct value relevance. According to interpretation 1, financial statement information leads stock prices by capturing intrinsic share values towards which stock prices drift. Value relevance would then be measured as the profits generated from implementing accounting-based trading rules. Under interpretation 2, the financial information is value relevant if it contains the variables used in a valuation model or assists in predicting those variables. Thus, the value relevance of earnings for a discounted dividend model, discounted cash flow valuation model, or a discounted residual model, might be measured by the ability of earnings to predict future dividends, future cash flows, future earnings, or future book value.

Interpretations 3 and 4 are based on the value relevance as indicated by a statistical association between financial information and prices or returns. Interpretation 3 measures the statistical association, whether investors actually use the information in question in setting prices, so value relevance would be measured by the ability of the financial statement information to change the total mix of information in the market-place. The interpretation implies that value relevance is measured in terms of 'news', and that value relevant information changes stock prices because it causes investors to revise their expectations. This interpretation, in an empirical setting requires taking account of the linked concepts of timeliness and expectations formation. For instance,

the earnings announcements do not move stock prices very much. This might be possible because the earnings are almost fully anticipated by investors in the sense that nearly all the information they contain has been impounded in stock prices before the earnings are released.

Earnings can be predicted by using many sources such as past financial information, various disclosures by managers, financial analysts, and government agencies. As such, Francis and Schipper (1999) argue that many of these disclosures would cease if financial statements were issued more frequently. To put this another way, the perceived importance to investors of financial information drives at least some portion of the disclosure activity that anticipates disclosures of financial information itself. To the extent that earnings predictions become more sophisticated and accurate over time, the news contents of the earnings announcement *per se* would be reduced. This does not imply, however, that investors are not interested in earnings; they may be so interested that they have developed complex and highly accurate mechanisms for predicting them or have succeeded in inducing managers and others to issue more timely earnings information to improve these predictions.

Under interpretation 4, the value relevance is measured by the ability of financial statement information to capture or summarise information, regardless of source, that affects share values. This interpretation does not require that financial statements be the earliest source of information. It is consistent with the value relevance of financial reports stemming from the content of the financial statements themselves, or a setting-up role in which the audited financial statements discipline other more timely information disclosures such as management earnings forecasts.

### **3.2.2 Ohlson's Contributions to Measure the Value Relevance**

James A. Ohlson made a remarkable contribution to measure the value relevance of information by developing a rigorous valuation model and refining the same in many stages. There is evidence that the value relevance studies were expanded, both in the US as well as in other markets, with the models developed by Ohlson (Chen et al., 2001). The following sections briefly describe the value relevance models of Ohlson (1995); Feltham and Ohlson (1995); Feltham and Ohlson (1996) and Ohlson (1999), followed by the review of models developed by Ohlson.

#### **3.2.2.1 Clean Surplus Relation**

The basis for the development of the first valuation model by Ohlson is the clean surplus relationship. Ohlson (1995) argued that changes in equity statement include the bottom-line items in the balance sheet and the income statement, book value and earnings, and its format requires the change in book value equal earnings minus dividends (net of capital contributions). He referred to this as the *clean surplus relation* because, as articulated, all changes in assets and liabilities unrelated to dividends must pass through the income statement. Accounting theory generally embraces this scheme without connecting it to a user's perspective on accounting data. Yet the underlying idea is that (net) stocks of value reconcile with the creation and distribution of value. This raises a basic question in an equity valuation context, that is, one can devise a cohesive theory of a firm's value that relies on the clean surplus relation to identify a distinct role for each of the three variables: earnings, book value, and dividends. Contrast to clean surplus relations, dirty surplus items occur when some items are adjusted from shareholder's equity without passing through the income statement.

Ohlson (1995) developed and analysed a model of a firm's market value as it relates to contemporaneous and future earnings, book values and dividends. The owners' equity accounting constructs underpinning the model is the clean surplus relation applies and dividends which reduce current book value but do not affect current earnings. Further, Ohlson stated that this model satisfies many appealing properties and provides a useful benchmark when one conceptualises how market value relates to accounting data and other information.

### **Ohlson's Value Relevance Model (1995)**

$$P_{it+1} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \alpha_3 V_t$$

$\alpha_0$  : Intercept

$P_{it+1}$  : Market value of firm i equity, at date later than t

$E_{it}$  : Earnings for the period ending date t, of firm i

$BV_{it}$  : Book value of net assets of firm i at date t

$V_t$  : Other information at date t

The above model has a particular significance for the current study, since phase 2 of the study applies the model with a certain modification.

#### **3.2.2.2 Clean Surplus Accounting for Operating and Financial Activities**

The basis for the Feltham and Ohlson (1995) model is how a firm's market value relates to accounting data that discloses results from both operating and financial activities. Each of the two activities raises two distinct accounting issues, which, in turn, influence the analysis of a firm's market value as a function of the financial statement component. Financial activities involve assets and liabilities for which there are relatively perfect

markets. Therefore it can be inferred the book value equals market value of financial assets and liabilities. In contrast, accounting for operating assets precipitates more intricate concerns because these assets are typically not individually traded in perfect markets. Thus, measurements of operating accounting earnings focus on cash flows adjusted for accruals, and the use of accounting conventions for accruals generally leads to differences between a firm's market and book values. Hence, in broad terms, they analyse how accrual accounting relates to the valuation of a firm's equity and goodwill. The model started from the assumption that the value of the firm's equity equals the net present value of the expected dividends. The second set of analyses explored the relationship between value and current accounting numbers. The dichotomy between unbiased versus conservatism accounting is defined in terms of how the market value differs, on average, from book value. On average, unbiased (conservative) accounting obtains a market value which equals (exceeds) the book value.

The third set of analyses examined expectations with respect to the asymptotic relationship of market value and changes in market value to contemporaneous earnings, and the relationship of book value to subsequent earnings. The results of unbiased accounting are straightforward. The fourth set of analyses examined how conservative accounting influences the response of value to increments in various components of earnings and assets.

Results show that an incremental dollar of cash earnings is worth less than an incremental dollar of non-cash earnings only if the accounting is conservative. Thus, cash earnings are of a 'lower quality' than accrual earnings given conservative accounting measurements. A parallel result applies with respect to next-period expected

earnings, i.e., incremental dollar of non-cash earnings has a more favourable effect on expected next-period earnings as compared to an incremental dollar of cash earnings.

Implications of Feltham and Ohlson (1995) are consistent with the findings of Ball and Brown (1968), assessing more value for the accrual accounting, compared to cash accounting. However, the validity of this model depends on the level of efficiency of the market (semi-strong form).

### **3.2.2.3 Influence of Depreciation Policy**

Feltham and Ohlson (1996) developed a model for the relationship between accounting data, reflected from operating and finance activities with market values. They examined how the firm's depreciation policy influences the relationship between the resulting accounting numbers and the market value of a firm's equity. Traditional accounting theory conceptualises depreciation measurement as a 'cost allocation' procedure that matches an investment's cost with the flow of benefits it produces. As has been long recognised, in a setting with certain future cash flows and zero net present value investments, investment costs can be allocated using standard present value techniques to yield, where, at each date, book values equal to market values and accounting earnings equal to economic earnings.

The resulting book value and accounting earnings numbers are such that, for all periods, the book rate of return equals the cost of capital, that is, the firm reports 'normal' profits for all periods. If these classical equivalency conditions are 'desirable', then standard present value techniques provide 'desirable' depreciation measurements under certainty and zero net present value investments.



More generally, Feltham and Ohlson's (1996) analysis suggested why historical-cost-based financial statements can provide value relevant information. Critiques of historical cost tend to emphasize its 'backward-looking' feature, which would appear inconsistent with financial statements supplying 'updated' information about firm's prospects. One further allegation is that neither book value nor earnings, taken individually, facilitate value inferences. In particular, the core of the valuation functions considered in this model consists of book value plus adjustment for abnormal earnings.

#### **3.2.2.4 Impact of Transitory Earnings**

Traditional accounting theory and practical financial statement analysis recognise that some earnings sources can be characterised as transitory. It is well established that such earnings need to be separated, if not, completely eliminated from the income statement. Ohlson (1999) discussed the impact of transitory earnings over value relevance. Key parts of the analysis validate the idea that the information inherent in transitory earnings has much in common with dividends.

A key finding of Ohlson (1999) is two-fold. First, any two of the following three attributes of transitory earnings imply the third:

- i. forecasting irrelevance with respect to next period aggregate earnings;
- ii. value irrelevance; and
- iii. unpredictability

Second, with only one property, one cannot infer anything about the other two properties. In particular, lack of predictability in and of itself does not imply valuation irrelevancy. In broad terms, the analysis showed that transitory earnings are incentive irrelevant if they are not only uninformative with respect to the agent's effort, but also

uninformative with respect to subsequent transitory and other sources of earnings. However, the conclusions depend on the similarity between the dividends and transitory earnings in the sense that they provide no information beyond what is inherent in book values and core earnings.

With respect to empirical research, a large number of studies specify (cross-sectional) valuation models in terms of earnings and book value. Usually these studies do not add back dirty surplus items to net income, and most eliminate at least some non-recurring items. This approach justifies the results of the analysis of Ohlson (1999).

#### **3.2.2.5 Review of Models Developed by Ohlson**

With research related to value relevance increasing by using the models developed by Ohlson, many authors have provided critiques of features of Ohlson's models. Dahmash (2007) stated that the Feltham and Ohlson (1995) framework represents a rigorous valuation model with strong theoretical and empirical implications suitable to the analysis of firm value. Further, the author emphasised that this view was supported by Dechow et al.(1999) argued that the Feltham and Ohlson (1996), Feltham and Ohlson (1995) and Ohlson (1995) provide a unifying framework for assessing the models used in empirical studies. Dechow et al. (1999) highlighted the fact that most studies completed prior to Ohlson (1995) have been conducted without any clearly supporting theory underlying the analysis.

Barth, Beaver et al. (2001) stated that the Ohlson (1995) model represents firm value as a linear function of book value of equity and the present value of expected future abnormal earnings. The model assumes perfect capital markets but permits imperfect

product markets for a finite number of periods. With additional assumptions of linear information dynamics, firm value can be re-expressed as a linear function of equity book value, net income, dividends and other information. Ohlson (1995) showed that balance sheet-based and earnings-based valuation models represent the two extreme cases resulting from limiting assumptions regarding the persistence of abnormal earnings. The Ohlson model does not depend on a concept of permanent earnings or asset and liability values; instead it is expressed in terms of accounting earnings and equity book value.

A key feature of the Ohlson's model and its extensions is that economic rents, i.e., returns in excess of the cost of capital for a finite number of periods, are captured by the persistence parameter on abnormal earnings as well as by other information. Economic rents can be viewed within the Ohlson's framework as the presence of abnormal earnings. In fact, economic rents are attributable to many intangible assets, example, customer lists, brand names, core deposit intangibles, and research and development.

Although Ohlson's model represents firm value as a linear function of equity book value and abnormal earnings, the presence of abnormal earnings enters non-linearity into the model. That is, given the levels of equity book value and abnormal earnings, marginal differences in persistence are not associated with constant marginal differences in equity value. However, because perfect and complete capital markets and the discounted cash flow model are assumed, the resulting valuation relation is linear in discounted cash flows. There is no well accepted model of equity valuation in imperfect and incomplete markets. Thus, the value relevance literature uses perfect and complete market models.

Another criticism is that value relevance research assumes assets of the firm are additively separable and scalable but this may not be the case with market incompleteness. Lack of separability is likely to be particularly true for assets for which active markets do not exist. However, an active market does not exist for many intangible assets and, hence, intangible assets may not be additively separable from other assets or separable from the firm and saleable. Lack of separability and salability for a particular asset in no way implies it is not an asset of the firm and, thus, does not pose any particular problems for value relevance research.

An implicit assumption of models developed by Ohlson is that markets are efficient. Since Ohlson's (1995) model applies for phase 2 of the current study to assess the value relevance of financial and non-financial information, it is important to review the literature related to market efficiency in Australia.

Groenewold and Kang (1993) tested the weak and semi-strong forms of the Efficient Markets Hypothesis (EMH) using data on the Australian share market. The tests are based on aggregate share price indexes and the semi-strong efficiency tests using macroeconomic data. Results support market efficiency, consistent with the EMH.

Groenewold (1997) reported the results of various tests of the EMH using daily observations of the markets of Australia and New Zealand. The weak form of the efficiency was examined by testing the log of the price for each country for stationarity and by examining the autocorrelation structure of returns. The results are consistent with the weak form of the EMH. Semi strong form efficiency was addressed by testing for co-integration between Australia and New Zealand share prices and for Granger

causality between the two countries' rates of return. Findings were consistent with market efficiency.

Gan et al. (2005) re-examined the market efficiencies in the New Zealand stock exchange (NZSE) and the Australian Stock Exchange (ASX) stock indices to investigate whether Groenewold's findings still hold for the period after financial liberalisation. Prior to financial liberalisation in the 1980s both for New Zealand and Australia, there were significant barriers to international capital flow and trade (Gan et al., 2005). Similar to Groenewold's (1997) findings, Gan et al. (2005) found evidence of a weak form of efficiency for NZSE and ASX stock indices.

The evidence of Groenewold (1993,1997) as well as Gan et al. (2005) reveals that the Australian stock market is an efficient market and satisfies Ohlson's assumption of market efficiency in application of value relevance models.

### **3.2.2.6 Model Implications for Price Levels and Returns**

The key distinction between value relevance studies examining price levels and those examining price changes, or returns, is that the former are interested in determining what is reflected in firm value and the latter are interested in determining what is reflected in changes in value over a specific period of time. The price level and price change approaches address related but different questions. Failure to recognise these differences could result in drawing incorrect inferences.

Ohlson (1995) initially introduced, and subsequently refined, a rigorous valuation methodology with strong theoretical and empirical implications suitable to analyse firm

value. Ohlson's (1995) model specifies that a firm's market value relates to contemporaneous and future earnings, book value and dividends, by analysing the clean surplus relationship. Later, Feltham and Ohlson (1995) modified the same model by introducing unrecorded goodwill. Their model equated the value of a firm to its book value of equity plus unrecorded goodwill. The following year, Feltham and Ohlson (1996) examined how the firm's depreciation policy influences the relationship between the resulting accounting numbers and the market value of firm's equity, while Ohlson (1999) discussed the impact of transitory earnings for value relevance. Although abnormal earnings of Olson's model enter non-linearity into the model, the models still represent firm value as a linear function of equity, book value and other information. The following section outlines the literature related to non-linear models of valuing security prices.

### **3.2.3 Non-linear Models of Valuing Security Prices**

The value relevance models developed by Ohlson, discussed in previous sections, are all linear models. Given the dynamic nature of the market, some researchers feel that the complex relationships between earnings and stock returns could be better explained by non-linear models. Accordingly, Freeman and Tse (1992) developed a non-linear model to value security prices that described a non-linear relation on the premise that the absolute value of unexpected earnings is negatively correlated with earnings persistence.

Most previous studies assume a linear relationship between unexpected returns (UR) and unexpected earnings (UE). The constant marginal response of prices to earnings in

linear models is typically referred to as the earnings response coefficient (ERC) and estimated as the slope coefficient from simple linear regression of UR and UE.

Freeman and Tse (1992) assumed that analysts and investors were relatively uninterested in transitory earnings because the trading profit that could be earned from private foreknowledge of dollar of transitory earnings were smaller than the profit from foreknowledge of dollar of permanent earnings. Therefore, the ratios of transitory to permanent components increase as the forecast error increase. If permanent earnings were more accurately forecast than transitory earnings, transitory earnings surprise would be concentrated in the tail of UE distribution, and the UR-UE relationship would be non-linear. Specifically, Freeman and Tse predicted that the earnings-return relationship was S-shaped: convex for bad news and concave for good news. They also hypothesised that the explanatory power of the linear model was less than that of the non-linear model.

Cross-sectional regressions were run to see the relationship between UE (dependent variable) and the analyst forecast error as a fraction of price per share (independent variable). The tests were initiated by selecting long windows (quarterly data) and replicated all tests with unexpected returns for the four-day period to ensure that the S-curve was also descriptive of short-window returns.

The time-series estimates of average earnings persistence, average earnings predictability, and systematic risk were found to have very weak associations with earnings response coefficients. Additionally, a positive relationship between ERC and market-to-book of common equity were found in the tests. In contrast, marginal price

responses remained highly sensitive to forecast error magnitude after controlling for other potential determinants of ERC.

The development of the non-linear model by Freeman and Tse can be identified as an important contribution to the accounting literature in predicting share prices in this complex information environment.

### **3.2.4 Measuring Value Relevance in (possibly) Inefficient Markets**

Most of the studies of value relevance are silent on market efficiency and appear to make inferences based on the implicit assumption that the stock market is efficient in the semi-strong form. However, substantial empirical evidence exists to suggest that the market may not be completely efficient in the processing of public information. In particular, associations have been found between publicly available accounting information and future abnormal returns. As such, the models developed to measure the value relevance of inefficient markets provide a valuable contribution to accounting literature.

Aboody et al. (2002) discussed measuring value relevance in (possibly) inefficient markets. Aboody et al. (2002) defined value relevance as the mapping from accounting information to 'intrinsic value', i.e., the present value of expected future dividends, conditional on all available information. The market is considered inefficient if the stock price measures the intrinsic value with error. Violation of the semi-strong form market efficiency in this context equates to a correlation between this measurement error in the stock price and the publicly disclosed accounting variables of interest. Assuming that market inefficiencies become resolved over time, information in future



price changes can be exploited to estimate the measurement error in current stock prices (weak assumption).

In order to show how information about the measurement error can be extracted from future price changes, the present value of future price changes unrelated to systematic risk factors were added to the current price to obtain unbiased coefficients for the mapping from accounting information intrinsic value. Again, the idea is that these coefficient estimates more fully reflect the value relevance of that information. The next step was to extend the price level model to a return model by using lagged stock price to deflate both sides of the valuation equation. This adjustment procedure was empirically applied to three types of studies that have served as benchmarks for many further studies. They are:

- i. the value relevance of earnings and book values;
- ii. the value relevance of residual income value estimates; and
- iii. the value relevance of accruals and cash flows

In the case of earnings and book values, Aboody et al. (2002) found statistically significant mean and median increases in both the level and returns regression coefficient estimates. These findings were consistent with the existing literature that suggests that the market under-reacts to information contained in earnings and book values. However, since the coefficient estimates are small in magnitude these differences are unlikely to affect results of conventional value relevance studies in a qualitative sense. However, the interpretation of the increase in coefficients is hindered by the difficulty of establishing a prediction on the benchmark coefficients for earnings and book values without simultaneously considering 'other information'.

The mean and median increases in coefficients were found for residual income, similar to the case employing earnings and book values. Thus, with the direction of the predicted coefficient approaching one, Aboody et al. (2002) concluded that the correction of market inefficiencies provide a meaningful reduction of bias in the value relevance coefficients. Finally, in applying the same adjustments for the cash flows and accruals, Aboody et al. (2002) found that cash flows had significantly higher average value relevance coefficients than accruals. However, the coefficients were statistically indistinguishable from each other when only contemporaneous stock returns were used. This result confirms Pfeiffer and Elger's (1999) findings.

### **3.2.5 Impact of Scale Effect in Measuring Value Relevance**

Although the value relevance models seem theoretically perfect, issues arise when applying the models in real-world stock market conditions. Brown et al. (1999) analysed whether  $R^2$ , coefficient of determination (which measures the proportion of the variance of the dependent variable about its mean that is explained by the independent variables (Hair et al., 2006)) indeed captures the intuitive notion of value relevance sought by the researchers. Frequently, the studies operationalise value relevance as the  $R^2$  from regressions of stock prices on per share values of accounting earnings and book values of equity. Inter-temporal or cross-sample differences in  $R^2$  are used as indicators that value relevance of accounting disclosures has changed over time or that value relevance differs across disclosure regimes. Brown et al. (1999) argue that there will be a scale effect of an inconsistent scale on  $R^2$ . Consequently relying on the  $R^2$  criterion, a researcher would conclude that the value relevance of earnings has increased over time, whereas, in fact, it did not. While arbitrary stock splits are an obvious cause for scale effects, the same problem also arises from cross-sectional differences in returns on

equity and dividend payout ratios, for example. That is, over time, share sizes can increase with good performances and decrease with dividend payments. This analysis suggests that some (if not all) of the differences between the ‘too low’  $R^2$  in returns regressions and the (higher)  $R^2$  in level regression are caused by the scale effect. For example, using per share values implicitly compares an investment in one share of Berkshire Hathaway with an investment in one share of IBM. But Berkshire Hathaway’s share price was around \$45,000 while IBM’s was approximately \$100 in the fourth quarter of 1997. Thus, analysis at the per share level also use data that differ in initial scale.

Brown et al. (1999) model the effect of scale formally and showed that scale induces two related problems of interpretation. They are:

- i. The  $R^2$  from a scale-affected regression will, under fairly general conditions, be higher than the  $R^2$  from the same regression without scale effect.
- ii. When comparing  $R^2$  between samples with different scale effects.

Specifically Brown et al. (1999) showed that  $R^2$  increases the coefficient of variation (CV) of the scale factor. In other words, their model predicts that, holding value relevance constant, the  $R^2$  of the estimated model will be higher in samples in which the cross sectional distribution of the scale factor has a large variance relative to mean.

Collins et al. (1997) and Francis and Schipper (1999) examined  $R^2$  over the last 4 decades and concluded that value relevance has increased. By replicating Collins et al. (1997), Brown et al. (1999) showed that conclusions result from the impact of changes

in scale on the regression  $R^2$ . Two modified research approaches were applied to measure whether there has been a change in value relevance as measured by  $R^2$ , each controls for changes in scale effects. The purpose of each of these approaches is to separate changes in  $R^2$  that are caused by scale effects from changes in underlying relations.

- i. First, the proxies were estimated for the CV of the scale factor in each of the sample periods. Then analysed differences in the  $R^2$  across samples, after controlling for the CV of the scale factor.
- ii. The scale effects were removed from each sample by deflating all observations by proxies for the scale factor.

Scale is a multiplicative factor that affects the observed dependent and independent variables. When scale effects are large (small), *ceteris paribus*, one can expect the  $R^2$  to be higher (lower), because the scale factor contributes more (less) variation to the observed variables relative to the amount contributed by the variables of interest.

Consistent with the predictions of the model, Brown et al. (1999) show that the  $R^2$  in regressions of price on EPS and BVPS is positively correlated with the cross sectional CV of the scale factor. Moreover, the CV of the scale factor was found to increase considerably over the last four decades. Since there is a relationship between  $R^2$  and CV of the scale factor, if the latter increases, then an increase in  $R^2$  is induced, even when there may have been no change or possibly decreases in value relevance. Therefore, Brown et al. (1999) conclude, after controlling for scale effects, that value relevance has declined significantly according to the  $R^2$  metric. Also, this analysis shows that the patterns of increasing  $R^2$ s found in Collins et al. (1997) and Francis and Schipper (1999)

are largely attributable to the increase in the scale effect having more than offset a decline in the explanatory power of the underlying relation.

Finally, Brown et al. (1999) reported the implications for both accounting researchers and practitioners. First, researchers performing analysis using per share or firm level data should be cautious in interpreting the levels of  $R^2$  because they are generally higher when scale effects are present. Second, researchers should not compare  $R^2$ s from different samples using per-share data, or firm level data, unless they are confident that the scale factors' coefficients of variation are constant across samples. Third, researchers should control for differences of scale effects between samples by including a proxy for the CV, or by deflating individual observations by a proxy for scales. Finally, for practitioners who accept that the  $R^2$  from a linear regression of market value on accounting variables is a valid indication of value relevance, the findings of Brown et al. (1999) suggest that claims of declining value relevance may be well founded.

The issue related to scale effect is relevant for the current study. Although the top companies are selected as the sample from each industry sector, the sample consists of companies of different size. However in the present study, value relevance was tested in firm-level aggregate measure in addition to per share basis measure, as a remedy for the scale effect. Examination of value relevance using above measures are discussed in Chapter 4 and Chapter 5.

### **3.3 Summary**

This chapter reviewed the prior studies related to content analysis and models developed to measure the value relevance. Studies related to content analysis reveal that this methodology is widely used in analysing the non-financial disclosures of company annual reports. The forms of application of content analysis method are identified as: conceptual analysis of narratives; quantification of narrative information; and analysing the location of the narratives and information. Content analysis is a popular method to analyse the sources of descriptive information in the market such as non-financial sections of company annual reports and financial analysts' reports. As such, it is justifiable that the content analysis methodology is particularly suitable for phase 1 of the study, which consists of the identification and measurement of intangible assets disclosures in the form of non-financial information. Further, the characteristics of this methodology such as unobtrusive nature and ability to measure the importance of the text analysis will lead to increase the quality of the findings of this study.

Value relevance can be interpreted as the ability of financial statement information to reflect the share prices or returns. This can be measured by the statistical association between financial information and prices or returns. Ohlson (1995) initially introduced and subsequently refined (for example: Feltham and Ohlson, 1995; Feltham and Ohlson, 1996; Ohlson, 1999; and Ohlson 2000) a rigorous valuation methodology with strong theoretical and empirical implications suitable to analyse firm value. Ohlson (1995) developed a model of a firm's market value as it relates to contemporaneous and future earnings, book value and dividends via the analysis of the clean surplus relationship (i.e. the change in book value of equity is equal to net income minus dividends). Later, Feltham and Ohlson (1995) modified the same model by introducing unrecorded goodwill, which asserted that the value of a firm is equal to its book value of equity plus

unrecorded goodwill. Feltham and Ohlson (1996) examined how the firm's depreciation policy influences the relationship between the resulting accounting numbers and the market value of firm's equity, while Ohlson (1999) discussed the impact of transitory earnings for value relevance. A key feature of Ohlson's model and its extensions is economic rents (Barth et al., 2001), which are the returns in excess of the cost of capital for a finite number of periods. These are captured by the persistence parameter on abnormal earnings as well as by other information. Additionally, they argued that the presence of abnormal earnings from the Ohlson's model introduces non-linearity into the model.

Freeman and Tse (1992) presented evidence that the marginal response of stock price to unexpected earnings declines as the absolute magnitude of unexpected earnings increases (a non-linear relationship). Development of this non-linear model can be identified as an important contribution for the accounting literature in predicting share prices in this complex information environment. Value relevant studies normally assume that the markets are efficient in a semi-strong form. However, Brown et al. (1999) implied that market inefficiency considerations will play a more important role in capital market research. As such, it is very important to assess the level of efficiency of the markets rather than presuming the semi-strong form efficiency. There is evidence to support the view that the Australian market is efficient in a semi-strong form (Groenewold and Kang, 1993; Groenewold, 1997; Gan et al., 2005).

Having reviewed the literature related to content analysis methodology and models examining value relevance, the next chapter focuses on the application of the same methodologies for the data collection, data analysis and the design of the research for this study.

## **Chapter 4: Design of the Research**

The research methods for the data collection and data analysis are discussed in this chapter, including the research design for the main phases of the research. Phase 1 of the research discusses how intangible assets disclosures are quantified by way of word count using NVivo 8, a qualitative software package. The development of the intangible assets index and coding of unaudited, non-financial sections of company annual reports to obtain the word count of non-financial IA disclosures is also discussed under Phase 1. Phase 2 introduces the method of testing value relevance of information. Ohlson's (1995) model is discussed with special emphasis on modification to the model by including the word count of intangible assets disclosures. The three industry sectors selected for the analysis are introduced in the section on population and sample. The final section of this chapter outlines the development of hypotheses and regression models, including the predicted behavior of dependent and independent variables and the method of analysis of data, followed by the chapter summary.

### **4.1 Main Phases of the Study**

There are two main phases in this study:

- i. identification and quantification of intangible asset disclosures in the form of non-financial information; and
- ii. examination of value relevance of financial information and intangible asset disclosures in high-tech industries in Australia.

Two different research methods are applied for the above two phases. Content analysis is employed for the identification and measurement of IA disclosures in the form of non-financial information. As discussed in Chapter 3, the content analysis technique



was first used more than 200 years ago to analyse textual material from newspaper and magazine articles, advertisements, political speeches, hymns, folktales, and riddles (Harwood and Garry, 2003). It has been used in accounting research in the recent past. In particular, Helen (2006), Guthrie et al. (1999), Breton and Taffler (2001), Abesekara and Guthrie (2004) and Abeysekera (2008) applied content analysis in similar research contexts. The most common notion in content analysis is doing a word-frequency count. The assumption made is that the words that are mentioned most often are the words that reflect the greatest concerns. Breton and Taffler (2001) identified content analysis as an unobtrusive method of data analysis. They also emphasized that it has the ability to measure the implicit importance of the content. However, inability to capture the hidden feelings of the narratives and the quality of the disclosures are limitations of the content analysis methodology.

The Ohlson (1995) valuation model is explicitly applied in the second phase of the study to examine the value relevance of information. This model represents the firm's value as a linear function of earnings, book value and other information disclosures. The 'other information' phase of the model is particularly significant in this study, since the main research problem is to examine the value relevance of financial information and intangible asset disclosures in high-tech industries in Australia. The original Ohlson model (1995) is modified to enable the inclusion of the impact of IA disclosures in the form of non-financial information on the value of the firm. In particular, the quantified intangible assets disclosures variable is introduced as the third variable to the original model. The quantification of IA disclosures is discussed in detail in section 4.2. This modification can be considered as an original contribution to accounting literature.

## **4.2. Quantification of Intangible Assets Disclosures in the Form of Non-Financial Information**

### **4.2.1 Identification of Themes for Intangible Assets Disclosures**

Sveiby (1997) developed 'the Intangible Assets Monitor' which suggested that individuals in organisations create external and internal structures to express themselves. Indicators can be created to monitor internal structure (organization), external structure (customers and suppliers) and people's competence. The indicators can be incorporated into a management information system.

**Internal structure:** consists of patents, concepts, models and computer and administration systems. In view of the intangible assets monitor, these are created by employees and are, therefore, 'owned' by organisations.

**External Structure:** consists of relationships with customers and suppliers, brand names, trademarks and reputation or image. The intangible assets monitor views all these elements as people orientated. Some intangible assets might be considered as legal property but investment in these may be doubtful as they may not belong solely to the organization.

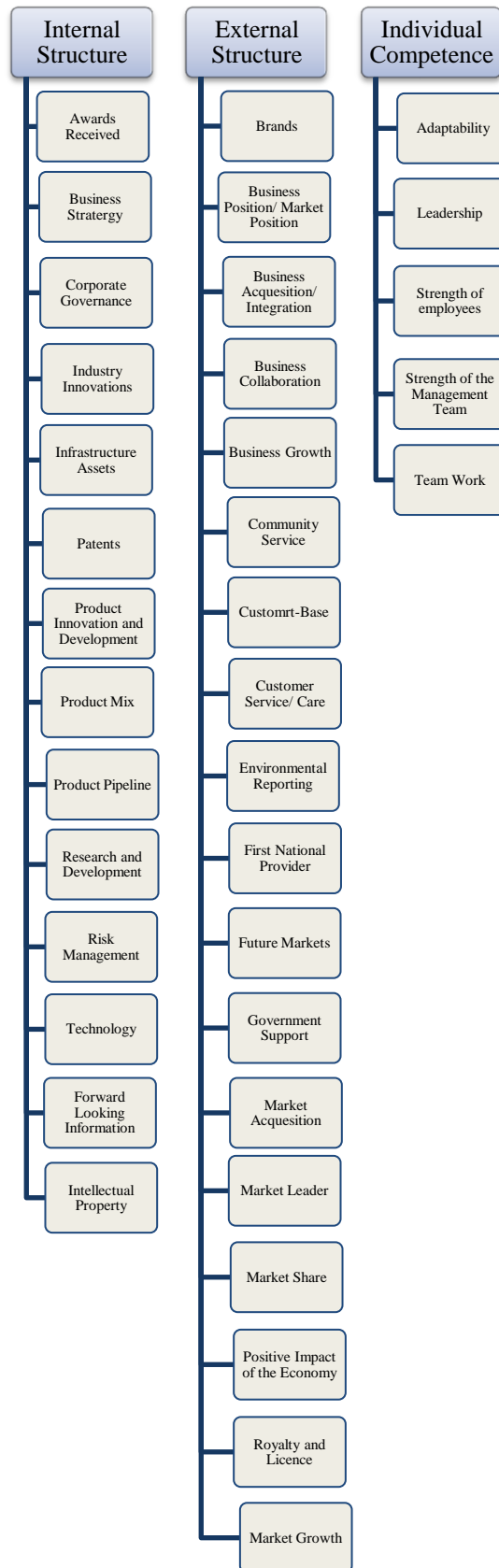
**Individual Competence:** refers to people's ability to act in various situations. It includes skill, education, experience, values and social skills. It cannot be owned by the organisation, only by the person who possesses it. The intangible assets monitor argues for including competence in the balance sheet because it is impossible to conceive of an organisation without people.

#### **4.2.2 Development of Intangible Assets Index**

Basically, the above indicators are used to develop an ‘intangible assets index’ for the analysis of the unaudited, non-financial sections of annual reports. Initially, the top 100 companies from three industry sectors of the ASX were selected as the sample of the study. They are: Pharmaceuticals, Biotechnology, and Life Science (Sector 1); Technology, Hardware and Equipment (Sector 2); and Telecommunication Services (Sector 3). These three industry sectors can be considered high-tech industries. The reason for their inclusion in this study is the intangible intensity is generally high compared to other industry sectors.

After collecting the 2008 annual reports of the top 100 companies from the three industry sectors under consideration, the non-financial disclosures of some of the companies, selected cross sectionally, were carefully read. Numerous intangible assets disclosures were identified in the form of non-financial information. Based on Sveiby’s (1997) intangible assets monitor, the identified intangible assets were categorised into three indicators: internal structure, external structure and individual competence, as shown in Figure 4.1.

**Figure 4.1: Intangible Assets Index**



The above intangible assets index is used to develop ‘nodes’ and to implement ‘coding’ using NVivo 8. The term ‘node’ refers to the place where the software stores a category. A node is a terminal of a branch or an interconnection of two or more branches. By placing a node in a hierarchy it denotes and stores information about the particular node’s relation to other nodes. Items in a node can easily be moved, combined and re-sorted by recording the data coded in them (Richards, 2009).

The essence of qualitative coding is data retention. Specifically, the goal of coding is to learn from the data and to keep revisiting data extracts until patterns and explanations can be understood. Coding is not merely used to label all parts of the documents about a topic, rather it is employed to review and develop key aspects of the topic (Richards, 2009).

NVivo is a software designed for decision makers and researchers in many fields such as: academic, humanities, sociology, marketing, customer care and tourism. It has the ability to handle very rich information by providing a deep level of analysis where both small and large volumes of data are required. Further, it removes many of the manual tasks associated with analysis, like classifying, sorting and arranging information, so researchers have more time to explore trends, build and test theories and ultimately arrive at answers to questions (QSR International, 2008).

Initially, the annual reports were converted into Word, from the PDF form, using PDF-Word convertor. Then the converted reports were imported to the NVivo 8 software package and the intangible assets disclosures were coded to each of the intangible asset categories by reading all un-audited sections of the annual reports. The ‘word count’ of

the intangible assets disclosure was obtained using the facility of ‘matrix coding queries’ of NVivo 8. However, several problems were encountered in the coding process. Fatigue in reading is one of the major difficulties since the coding process of NVivo 8 requires reading the whole document. The technical language used by the companies in the Pharmaceuticals, Biotechnology, and Life Sciences industry sector was another issue while reading. Repetition of facts was another problem with the same fact communicated in many places of the annual report, such as in the ‘overview of company’ and in the ‘directors report’. Further, the incapability of recognising the significance of facts communicated by special fonts, pictures and images represents a further limitation to the analysis.

Several steps were taken to address the above issues. For example; the particular intangible asset in the Pharmaceuticals, Biotechnology, and Life Sciences sector was evaluated by examining the headings of the phases. Repeated facts were coded assuming that more significant facts were repeated in the annual report. The quantified non-financial intangibles assets, in terms of word count, was applied to test the value relevance of information (phase 2 of the study).

### **4.3 Testing the Value Relevance of Accounting Information and Intangible Asset Disclosures**

The main issue of the study is to test the value relevance of information in high-tech industries in Australia. The value relevance is tested by applying the value relevance model developed by Ohlson (1995). As discussed in Chapter 3, Ohlson made a remarkable contribution to accounting literature by introducing several models to measure the value relevance. Of the two types of valuation models in the literature,

return models and price models, the price model was employed. Although return models are heavily reliant on market-based accounting research, price models persist in the literature (Landsman, 1986; Barth, 1991; Eccher et al., 1996; Burgstahler and Dichev, 1997; Collins et al., 1997; Bao and Chow, 1999; Chen et al., 2001).

Chen et al. (2001) describe the advantages of price models over the return models. First, if stock markets anticipate components of accounting earnings and incorporate the anticipation in the beginning stock price (i.e. price leading earnings) return models will bias earnings coefficients towards zero. In contrast, price models yield unbiased earnings coefficients because stock prices reflect the cumulative effect of earnings information (Kothari and Zimmerman, 1995). In other words, accounting information can be value relevant if it is related to stock prices even though it does not provide new information to affect stock returns. Second, return models only allow assessment of value relevance of accounting earnings, whereas price models based on Ohlson (1995) show how market value is related to both book value of equity and accounting earnings.

Following the methodology of studies in the value relevance literature, Ohlson's (1995) model is modified for this study. Particularly, Ohlson's model is modified by including the word count of intangible assets disclosures in the form of non-financial information as a variable to the multiple regression model, in addition to earnings and book value, the original variables in the model. After the modification, the model is as follows.

## **Ohlson's (1995) Equity Valuation Model Modified for the Intangible Assets Disclosures**

$$P_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \alpha_3 IA_{it} + \epsilon$$

$\alpha_0$  : Intercept

$P_{it}$  : Price of a share of firm i, at time t

$E_{it}$  : Earnings per share of firm i at time t

$BV_{it}$ : Book value per share of firm i at time t

$IA_{it}$ : Word-count of intangible assets disclosures in the form of non-financial information, for firm i at time t

$\epsilon$ : Independently and identically disturbed error term

Data analysis to test the value relevance of financial and non-financial information was achieved using two main measures: per share basis and firm-level aggregates. Firm-level aggregates were considered particularly as a remedy for the scale effect, if any. Accordingly, the per share basis variables of Ohlson's (1995) model were replaced with firm-level aggregate variables: price per share with market capitalisation; earnings per share with net profit after tax and book value per share with book value of equity. Hence, two regression models were developed and tested: per share basis measure and firm-level aggregates, to examine the value relevance of financial and non-financial information. The impact of the scale effect is further discussed in Chapter 5.

Following the literature, for example; Basu (1997), Chen et al. (2001) and Liang (2005), this study assesses both the regression slope coefficient and adjusted  $R^2$  to evaluate and compare the value relevance of financial information and intangible assets disclosures.



Although the two phases are discussed in the sequence of collection of data and analysis, the results are discussed in reverse order in the next three chapters, initially, by addressing the main research question followed by the sub-questions.

#### 4.4 Population, Sample and Data

The sample for the study is selected from the companies listed under three industry sectors of the ASX: Pharmaceuticals, Biotechnology, and Life Sciences; Technology, Hardware and Equipment; and Telecommunication Services. The number of companies in the population and the sample (under each of the industry sectors) are listed in Table 4.1.

**Table 4.1: Population and Sample**

Industry Sector	Population (Number of companies listed, June 2008)	Sample (Number of Companies)
Pharmaceuticals, Biotechnology, and Life Sciences	91	46
Technology, Hardware and Equipment	35	21
Telecommunication Services	34	24
Total	160	91

Large companies were selected based on market capitalisation as the sample for the analysis using stratified sampling. The data were gathered from both the company web sites, the ASX web site and by analysing the annual reports (2007/08) of the selected companies. Basically, the database was developed by collecting the following data for each of the companies.

- i Issue date of the annual report (2007/08)
- ii Share Price (Closing) at the issue date of annual report
- iii Basic Earnings per Share (EPS)
- iv Book Value per Share (BV)
- v Word count of non-financial, intangible assets disclosures for each intangible assets and the total word count
- vi Industry Type (product oriented or not)
- vii Ownership Concentration
- viii Age of the company, since the company was listed at ASX
- ix Net Profit after Tax
- x Market Capitalisation at the balance sheet date
- xi Value of Equity

A sample of raw data is presented in Table 4.2 and the full database is provided in Appendix A and Appendix B.

**Table 4.2: Sample of Raw Data**

	ASX code	Company Name	Share Price	Book Value per Share (BV)	Earnings per Share (EPS)	Word Count of IA (total)	Industry Type	Ownership Concentration (%)	Age (Years)	Net Profit after Tax (\$)	Market Capitalisation (\$)	Equity (\$)
Sector 1: Pharmaceutical, Biotechnology, and Life Sciences	ACR	Acrux Limited	0.730	0.242	-0.030	7440	1	42.870	3.750	-5,026,000	114811337	38,109,000
	ACL	Alchemia Limited	0.220	0.203	-0.069	12553	1	40.790	4.500	-10,943,000	35143491	32,520,000
	BDM	Biodiem Limited	0.060	0.081	-0.067	6836	1	31.420	4.420	-4,470,506	4010430	5,425,190
	BPO	Bioprospect Limited	0.020	0.012	-0.010	7627	1	4.120	7.420	-4,657,171	9051102	5,675,610
	BTA	Biota Holdings Limited	0.720	0.346	-0.035	7178	1	61.460	22.500	-6,489,000	13170662	63,300,000
	BTC	Biotech Capital Limited	0.160	0.334	-0.086	5021	1	54.940	7.830	-7,386,000	13446320	28,061,000
Sector 2: Technology, Hardware and Equipment	AAT	Autron Corporation Limited	0.030	0.034	0.012	6680	0	59.830	21.420	11,496,000	20824856	23,730,000
	ETT	ETT Limited	0.010	0.007	-0.008	4518	0	37.850	8.330	-7,088,133	8420344	5,718,088
	INT	Intermoco Limited	0.010	0.006	-0.012	2457	0	65.800	11.250	-13,431,980	11302900	6,780,541
	KYC	Key Corp Limited	0.210	0.313	-0.001	6007	0	31.840	20.920	-102,000	17300823	25,758,000
	KLM	KLM Group Ltd.	0.310	0.238	0.037	5882	0	37.020	8.580	2,181,000	18544510	14,195,000
	MIK	Mikoh Corporation Limited	0.140	0.014	-0.023	5857	0	65.500	15.330	-4,909,314	25306906	2,528,916
Sector 3: Telecommunication Services	AMM	Amcom Telecommunications Limited	0.170	0.198	0.0197	4437	1	44.360	13.920	10,143,000	87427802	101,844,000
	BGL	Bigair Group Limited	0.040	0.049	-0.027	4136	1	22.890	2.170	-2,353,564	3451389	4,193,649
	BRO	Broad Investments Limited	0.010	0.002	-0.002	4697	1	70.890	8.580	-4,265,757	25764462	5,059,534
	CVA	Clever Communications Australia Limited	0.050	0.075	-0.034	3165	1	29.300	3.580	-3,488,440	5185094	7,746,641
	EFT	EFTel Limited	0.060	0.100	0.0017	3075	1	32.390	11.580	270,000	9470280	15,851,000
	ETC	Entertainment Media & Telecoms Corporation Limited	0.330	0.031	0.0081	7235	1	25.740	8.170	11,431,000	474545006	44,782,000

According to Table 4.2, most of the companies in all three sectors reported negative earnings in 2008, indicated by Earnings per Share (EPS) and Net Profit after Tax. The negative earnings reported by companies are higher in sector 1 (Pharmaceutical, Biotechnology, and Life Sciences) compared to the other two sectors. Although the highest market capitalisation (\$474 m) reported by Entertainment Media & Telecoms Corporation Limited (ETC) in sector 3, the average share prices and market capitalisation appears to be the highest in sector 1. The reported positive book value of equity, indicated by Book Value per Share (BV) and Equity of all three sectors show the long-term financial stability of companies. Further, the word count of intangible assets indicates that the tendency of voluntary disclosures of intangible assets is higher in sector 1.

#### **4.5 Development of Hypotheses and Regression Models**

Twelve hypotheses and twenty three regression models were systematically developed to address the main research question and sub-questions in order to achieve the set aim and objectives of the study.

##### **4.5.1 Value Relevance of Financial and Non-financial information, Main**

##### **Research Question**

The first hypothesis addresses the main issue or main research question.

**H<sub>1</sub>:** There is a value relevance of financial information and IA disclosures in the form of non-financial information.

Initially the Ohlson (1995) value relevance model is applied to the main regression model to address the principal issue of this research. The ‘other information’ phase of the original model is considered as IA disclosures (quantified by word count) in the form of non-financial information. Two regression models were developed to test H<sub>1</sub>: per share basis measure (R<sub>1</sub>) and firm-level aggregates (R<sub>2</sub>). R<sub>2</sub> was developed by replacing the variables of R<sub>1</sub>, share price with market capitalisation, earnings per share with net profit after tax and book value per share with the total value of equity.

$$\mathbf{R}_1: \quad P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \epsilon$$

$\alpha_0$  : Intercept

$P_{it}$  : Price of a share of firm i, at the date on which the annual report is issued

$E_i$  : Earnings per share of firm i

$BV_i$ : Book value per share of firm i

$IA_i$ : Result of the word count of intangible assets disclosures in the form of non-financial information, for firm i

$\epsilon$ : Independently and identically disturbed error term

$$\mathbf{R}_2: \quad MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \epsilon$$

$\alpha_0$  : Intercept

$MC_{it}$  : Market Capitalisation of firm i, at the date on which the annual report is issued

$NPAT_i$ : Net Profit after Tax of firm i

$EQ_i$ : Book Value of Equity, firm i

$IA_i$ : Result of the word count of intangible assets disclosures in the form of non-financial information, for firm i

$\epsilon$ : Independently and identically disturbed error term

#### **4.5.2 Factors Influencing Value Relevance of Financial and Non-financial information, Sub-question 3**

Since the level of value relevance may vary with the impact of several factors, the next set of the development of hypotheses and regression models involved the identification of the factors influencing value relevance of financial and non-financial information (sub-question 3). Hypotheses for the factors influencing value relevance are developed by considering factors that are widely used in the literature. The following factors are incorporated to develop hypotheses:

- i. Size of the Company;
- ii. Profitability ;
- iii. Industry Type;
- iv. Age of the Company; and
- v. Ownership Concentration

The hypotheses and regression models related to factors influencing value relevance are outlined below.

#### 4.5.2.1 Size of the Company

Six regression models are developed to test the influence of the size of the company for value relevance ( $H_2$ ). The first three regression models are for the per share basis measure while the second three models are for the firm-level aggregate measure.

**H<sub>2</sub>:** There is a positive association between the size of the company and value relevance of financial and non-financial information.

##### Regression Models for Per Share Basis Measure

$$\mathbf{R_{3(a)}}: P_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 Dsize_i * E_i + \varepsilon_i$$

$$\mathbf{R_{3(b)}}: P_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 Dsize_i * BV_i + \varepsilon_i$$

$$\mathbf{R_{3(c)}}: P_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 Dsize_i * IA_i + \varepsilon_i$$

##### Regression Models for Firm-Level Aggregate Measure

$$\mathbf{R_{4(a)}}: MC_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 Dsize_i * NPAT_i + \varepsilon_i$$

$$\mathbf{R_{4(b)}}: MC_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 Dsize_i * EQ_i + \varepsilon_i$$

$$\mathbf{R_{4(c)}}: MC_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 Dsize_i * IA_i + \varepsilon_i$$

DSize<sub>i</sub>: Dummy variable with value 1 for companies with market capitalisation greater than median market capitalisation, 0 otherwise.

#### 4.5.2.2 Profitability of the Company

Six regression models are developed to test the influence of the profitability of the company for value relevance (H<sub>3</sub>). The first three regression models are for the per share basis measure while the second three models are for the firm-level aggregate measure.

**H<sub>3</sub>:** There is a positive association between profitability and value relevance of financial and non-financial information.

##### Regression Models for Per Share Basis Measure

$$\mathbf{R}_{5(a)}: P_{it} = \alpha_0 + \alpha_1 DPr of_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DPr of_i * E_i + \varepsilon_i$$

$$\mathbf{R}_{5(b)}: P_{it} = \alpha_0 + \alpha_1 DPr of_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DPr of_i * BV_i + \varepsilon_i$$

$$\mathbf{R}_{5(c)}: P_{it} = \alpha_0 + \alpha_1 DPr of_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DPr of_i * IA_i + \varepsilon_i$$

##### Regression Models for Firm-Level Aggregate Measure

$$\mathbf{R}_{6(a)}: MC_{it} = \alpha_0 + \alpha_1 DPr of_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DPr of_i * NPAT_i + \varepsilon_i$$

$$\mathbf{R}_{6(b)}: MC_{it} = \alpha_0 + \alpha_1 DPr of_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DPr of_i * EQ_i + \varepsilon_i$$

$$\mathbf{R}_{6(c)}: MC_{it} = \alpha_0 + \alpha_1 DPr of_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DPr of_i * IA_i + \varepsilon_i$$

DProf<sub>i</sub>: Dummy variable with value 1 for companies reported profits, 0 otherwise.



### 4.5.2.3 Industry Type

Six regression models are developed to test the influence of industry type of the company for value relevance (H<sub>4</sub>). The first three regression models are for the per share basis measure while the second three models are for the firm-level aggregate measure.

**H<sub>4</sub>:** There is a positive association between product orientation and value relevance of financial and non-financial information.

#### Regression Models for Per Share Basis Measure

$$\mathbf{R}_{7(a)}: P_{it} = \alpha_0 + DInd_i + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + DInd_i * E_i + \varepsilon_i$$

$$\mathbf{R}_{7(b)}: P_{it} = \alpha_0 + DInd_i + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + DInd_i * BV_i + \varepsilon_i$$

$$\mathbf{R}_{7(c)}: P_{it} = \alpha_0 + DInd_i + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + DInd_i * IA_i + \varepsilon_i$$

#### Regression Models for Firm-Level Aggregate Measure

$$\mathbf{R}_{8(a)}: MC_{it} = \alpha_0 + \alpha_1 DInd_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DInd_i * NPAT_i + \varepsilon_i$$

$$\mathbf{R}_{8(b)}: MC_{it} = \alpha_0 + \alpha_1 DInd_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DInd_i * EQ_i + \varepsilon_i$$

$$\mathbf{R}_{8(c)}: MC_{it} = \alpha_0 + \alpha_1 DInd_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DInd_i * IA_i + \varepsilon_i$$

DInd<sub>i</sub>: Dummy variable with value 1 for product orientated companies, 0 otherwise.

#### 4.5.2.4 Age of the Company

Six regression models are developed to test the influence of the age of the company for value relevance (H<sub>5</sub>). The first three regression models are for the per share basis measure while the second three models are for the firm-level aggregate measure.

**H<sub>5</sub>:** There is a positive association between the age of the company and value relevance of financial and non-financial information.

##### Regression Models for Per Share Basis Measure

$$\mathbf{R}_{9(a)}: P_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DAge_i * E_i + \varepsilon_i$$

$$\mathbf{R}_{9(b)}: P_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DAge_i * BV_i + \varepsilon_i$$

$$\mathbf{R}_{9(c)}: P_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DAge_i * IA_i + \varepsilon_i$$

##### Regression Models for Firm-Level Aggregate Measure

$$\mathbf{R}_{10(a)}: MC_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DAge_i * NPAT_i + \varepsilon_i$$

$$\mathbf{R}_{10(b)}: MC_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DAge_i * EQ_i + \varepsilon_i$$

$$\mathbf{R}_{10(c)}: MC_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DAge_i * IA_i + \varepsilon_i$$

DAge<sub>i</sub>: Dummy variable with value 1 for old companies, 0 for young companies

#### 4.5.2.5 Ownership Concentration of the Company

Six regression models are developed to test the influence of the ownership concentration of the company for value relevance ( $H_6$ ). The first three regression models are for the per share basis measure while the second three models are for the firm-level aggregate measure.

**H<sub>6</sub>:** There is a negative association between the ownership concentration and value relevance of financial and non-financial information.

##### Regression Models for Per Share Basis Measure

$$\mathbf{R}_{11(a)}: P_{it} = \alpha_0 + \alpha_1 DOWn_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i - \alpha_5 DOWn_i * E_i + \varepsilon_i$$

$$\mathbf{R}_{11(b)}: P_{it} = \alpha_0 + \alpha_1 DOWn_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i - \alpha_5 DOWn_i * BV_i + \varepsilon_i$$

$$\mathbf{R}_{11(c)}: P_{it} = \alpha_0 + \alpha_1 DOWn_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i - \alpha_5 DOWn_i * IA_i + \varepsilon_i$$

##### Regression Models for Firm-Level Aggregate Measure

$$\mathbf{R}_{12(a)}: MC_{it} = \alpha_0 + \alpha_1 DOWn_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i - \alpha_5 DOWn_i * NPAT_i + \varepsilon_i$$

$$\mathbf{R}_{12(b)}: MC_{it} = \alpha_0 + \alpha_1 DOWn_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i - \alpha_5 DOWn_i * EQ_i + \varepsilon_i$$

$$\mathbf{R}_{12(c)}: MC_{it} = \alpha_0 + \alpha_1 DOWn_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i - \alpha_5 DOWn_i * IA_i + \varepsilon_i$$

$DOWn_i$ : Dummy variable with value 1 for high ownership concentrated companies, 0 for low ownership concentrated companies.

#### **4.5.2.6 Method of Data Analysis**

In order to assess the factors influencing the value relevance of information, the sample companies are divided into two dichotomous groups based on the five factors (for example, large companies and small companies; profit reported companies and loss reported companies). A dummy variable is then employed to denote a firm's membership in each group. Further, a dummy interaction variable is created by multiplying the dummy variable by each of the independent variables in the original value relevance model introduced in section 4.5.1.

Initially, the data analysis tests the value relevance in each of the groups separately, using  $R_1$  and  $R_2$  (introduced in section 4.5.1). Additional regressions were then run by incorporating each of the dummy-interaction variables. The significance level of dummy-interaction variable, measured by the p value, represents the difference of the coefficients between the reference group and comparison group (Stevens, 1992; UCLA Academic Technology Service, 2010). The significance level of dummy-interaction variable is then applied to compare the coefficients between groups, to identify the influence of each of the factors for the value relevance. The method of data analysis and interpretation of results are further discussed in Chapter 6.

### 4.5.3 Interaction Effect of IA Disclosures and Factors Influencing Value

#### Relevance

The interaction effect of IA disclosures and factors influencing the value relevance of financial and non-financial information are tested to understand how size of the company, profitability, industry type, age of the company, and ownership concentration interact with IA disclosures to affect share prices. Further, the interaction effect is tested by per share basis measure as well as firm-level aggregate measure. Following are the hypotheses and regression models developed to measure the interaction effects.

**H<sub>7</sub>:** There is a positive association between the interaction effect of size of the company with IA disclosure and share prices.

$$\mathbf{R}_{13}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Firm_i * IA_i + \epsilon \quad (\text{per share basis})$$

Firm<sub>i</sub>\*IA: interaction term for size of the firm with IA disclosures

**H<sub>8</sub>:** There is a positive association between the interaction effect of profitability with IA disclosure and share prices.

$$\mathbf{R}_{14}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Pro_i * IA_i + \epsilon \quad (\text{per share basis})$$

$$\mathbf{R}_{15}: MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \alpha_4 Pro_i * IA_i + \epsilon \quad (\text{Firm-level aggregate})$$

Pro<sub>i</sub>\*IA<sub>i</sub>: Interaction term for profitability with IA disclosures

**H<sub>9</sub>:** There is a positive association between the interaction effect of product orientation with IA disclosure and share prices.

$$\mathbf{R}_{16}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Ind_i * IA_i + \epsilon \quad (\text{per share basis})$$

$$\mathbf{R}_{17}: MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \alpha_4 Ind_i * IA_i + \epsilon \quad (\text{Firm-level aggregate})$$

$\text{Ind}_i * \text{IA}_i$  : Interaction term for industry type with IA disclosures

**H<sub>10</sub>**: There is a positive association between the interaction effect of age of the company with IA disclosure and share prices.

$$\mathbf{R}_{18}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 \text{IA}_i + \alpha_4 \text{Age}_i * \text{IA}_i + \epsilon \quad (\text{per share basis})$$

$$\mathbf{R}_{19}: \text{MC}_{it} = \alpha_0 + \alpha_1 \text{NPAT}_i + \alpha_2 \text{EQ}_i + \alpha_3 \text{IA}_i + \alpha_4 \text{Age}_i * \text{IA}_i + \epsilon \quad (\text{Firm-level aggregate})$$

$\text{Age}_i * \text{IA}_i$ : Interaction term for age of the company with IA disclosures

**H<sub>11</sub>**: There is a negative association between the interaction effect of ownership concentration with IA disclosure and share prices.

$$\mathbf{R}_{20}: P_i = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 \text{IA}_i - \alpha_4 \text{Own}_i * \text{IA}_i + \epsilon \quad (\text{per share basis})$$

$$\mathbf{R}_{21}: \text{MC} = \alpha_0 + \alpha_1 \text{NPAT}_i + \alpha_2 \text{EQ}_i + \alpha_3 \text{IA}_i - \alpha_4 \text{Own}_i * \text{IA}_i + \epsilon \quad (\text{Firm-level aggregate})$$

$\text{Own}_i * \text{IA}_i$ : Interaction term for ownership concentration with IA disclosures

#### **4.5.4 Value Relevance of particular Intangible Asset Disclosures, Sub-question 2**

Sub-question 2 of the study is designed to identify the significance of each category of intangible asset disclosures in terms of value relevance. Hence, the value relevance of each intangible asset disclosure is to be examined considering the word count of each IA disclosure. The hypotheses related to value relevance of each intangible asset are tested in the two measures discussed earlier: per share basis and firm-level aggregates. The hypothesis and regression models developed to test the value relevance of each IA are as follows.

**H<sub>12</sub>:** There is a positive association between market value of shares and disclosure of non-financial information of IA.

$$\mathbf{R}_{22}: P_i = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \epsilon \quad (\text{Per share basis measure})$$

$$\mathbf{R}_{23}: MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \epsilon \quad (\text{Firm-level aggregate})$$

IA<sub>i</sub>: word count of each IA disclosure

#### 4.6 Summary

The method of the data collection and data analysis formed the basis of this chapter. There are two main phases in the study: identification and measurement of intangible asset disclosures in the form of non-financial information (phase 1) and examination of the value relevance of accounting information and intangible assets disclosures (phase 2). The top 91 companies (based on market capitalisation) from three industry sectors of the ASX: Pharmaceuticals, Biotechnology, and Life Science (Sector 1); Technology, Hardware and Equipment (Sector 2); and Telecommunication Services (Sector 3) were selected as the sample of the study. In order to address phase 1 of the study, IA disclosures in the form of non-financial information were coded by reading all un-audited, non-financial sections of the annual reports and determined the word count using NVivo 8.

For phase 2 of the research, Ohlson's (1995) equity valuation model is explicitly applied. The original model is modified by introducing quantified IA disclosures in the form of non-financial information as an additional variable. This modification can be considered as an original contribution to accounting literature. The value relevance of financial and non-financial information is tested by two measures: per share basis and firm-level aggregates. Finally, this chapter outlined the hypotheses and corresponding regression

models developed to address the main research question and sub questions 2 and 3 of the study.

Having presented the design of the research as well as the method of collection and analysis of data to address the main research question and sub-questions, the next chapters build on the results of the analysis of data and discussion of results. Chapter 5 presents and discusses the results of the main research question: the value relevance of financial and non-financial information.



## **Chapter 5**

### **Analysis of Data and Discussion of Results:**

#### **Value Relevance of Financial and Non-Financial Information**

In this chapter, the findings of the data analysis carried out in order to examine the main research question of the study and the results of the tests of the main hypothesis ( $H_1$ ) developed in Chapter 4 are discussed. The descriptive statistics are provided for the independent and dependent variables as well as an overview of the data. The results include tests of the main assumptions of regression to test the suitability of data for a linear regression analysis. Further, the results of the analysis of correlations between independent variables are outlined in terms of checks for multicollinearity. The results of the assessment of value relevance of financial and non-financial information, the main research question of the study, are presented together with the outcome of each of the models developed to assess the value relevance. Finally, the results are discussed with reference to the prior literature followed by conclusions from the analysis.

#### **5.1 Preliminary Analysis**

##### **5.1.1 Descriptive Statistics**

Descriptive statistics were calculated for the dependent and independent variables in order to obtain an overview of the nature of data to be analysed. Results are presented in Table 5.1. The descriptive statistics and further analysis of data was performed on six data sets: Full Sample (data set 1); Sector 1: Pharmaceuticals, Bio Technology and Life Sciences (data sets 2 and 3); Sector 2: Hardware, Technology and Equipment (data set 4); Sector 3: Telecommunication Services (data set 5); and sectors 2 and 3 combined (data set 6). Since the majority of companies (38 out of 46, 82%) in Sector 1 reported negative earnings in 2008, the data analysis was performed in two stages for this sector (data sets 2 and 3) with data set 2 for all companies and data set 3 for companies reporting negative earnings.

The outliers were eliminated in calculating descriptive statistics. An outlier is an observation that lies an abnormal distance from other values in a random sample from a population which will distort statistics. Although outliers are often bad points, they should be investigated carefully (Tabachnick and Fidell, 2007). The reason for the outliers in this study is the existence of more extreme values than a normal distribution, due to issues such as the scale of operations and the performance of the company. Since the analysis was done on six sets of data, outliers were identified and removed in each of the data sets separately. They were: one company from the full sample; one company from Sector 1 (companies reported negative earnings) one company from Sector 2; one company from Sector 3 and five companies from Sector 2 and 3 combined. Further, the size of the sample is smaller in two sectors (sectors 2 and sector 3) due to both the smaller number of companies listed in these sectors (population), as well as the filtering for outliers (Data set 4 and 5).

According to Table 5.1, the average share price of the full sample is \$ 0.37. The highest average share price reported in Sector 1 (all companies) at \$0.47, while the lowest is in Sector 2 at \$ 0.13. The average in Sector 3 is \$ 0.38 and \$0.35 in Sector 1 for companies that reported negative earnings. It is interesting that Sector 1 (companies reporting negative earnings) reported an average higher share price in 2008 compared to Sector 2, which is the only sector that reported positive average Earnings per Share (EPS) \$ 0.002. The average EPS of the other two sectors are \$ -0.23 in Sector 1 (all companies) and \$ -0.0024 in Sector 3. The highest average Book Value per Share (BVPS) is reported in Sector 3 at \$0.34 and the lowest occurs in Sector 2 at \$0.15.

The frequency of intangible assets disclosure is higher in Sector 1, compared to other two sectors as measured by word count. It is 7368 words for Sector 1 (all companies), 4760 words for Sector 2, and 4732 words for Sector 3. The largest average size of the companies (measure by market capitalisation) reported in Sector 1 is \$56.98m, while the Sector 2 it is \$ 15.55m and \$ 53.57m for Sector 3.

**Table 5.1: Descriptive Statistics of Dependent and Independent Variables**

Data Set	Variable	N	Min	Max	Mean	SD	Skewness	Kurtosis
1. Full Sample	Share Price (\$)	90	0.01	3.51	0.370	0.613	2.799	8.926
	Earnings per Share (\$)		-8.90	3.00	-0.118	1.016	-7.133	65.069
	Book Value per Share (\$)		-0.01	2.10	0.260	0.407	2.439	6.067
	IA (number of words)		961.00	23999	6005	3170	2.265	10.676
	Market Capitalisation (\$ Mn)		0.204	475.000	45.823	77.485	3.519	15.170
	Net Profit After Tax (\$ Mn)		-99.044	20.077	-5.135	13.618	-3.934	25.283
	Book Value of Equity (\$ Mn)		-11.711	307.000	28.286	50.970	4.114	19.257
2. Sector 1: All Companies	Share Price (\$)	46	0.02	2.24	0.472	0.620	1.828	2.470
	Earnings per Share (\$)		-8.90	3.00	-0.231	1.418	-5.059	32.975
	Book Value per Share (\$)		0.00	1.29	0.257	0.341	2.023	3.466
	IA (number of words)		986	23999	7368	3555	2.341	9.804
	Market Capitalisation (\$ Mn)		2.204	417.000	56.968	75.040	2.875	11.071
	Net Profit After Tax (\$ Mn)		-36.093	7.110	-6.171	8.000	-1.729	4.303
	Book Value of Equity (\$ Mn)		0.073	304.000	29.968	47.993	4.461	24.201
3. Sector 1: Companies reported negative Earnings	Share Price (\$)	37	0.02	2.20	0.358	0.460	2.362	6.740
	Earnings per Share (\$)		-1.74	-0.01	-0.149	0.319	-4.083	18.173
	Book Value per Share (\$)		0.00	1.29	0.231	0.344	2.40	5.127
	IA (number of words)		2832	23999	7869	3585	2.692	10.716
	Market Capitalisation (\$ Mn)		2.204	417.000	53.881	78.579	3.104	12.232
	Net Profit After Tax (\$ Mn)		-26.148	-1.429	-7.094	6.075	-1.876	3.329
	Book Value of Equity (\$ Mn)		0.073	304.000	29.710	52.461	4.320	21.618

contd.

Table 5.1 contd.

Data Set	Variable	N	Min	Max	Mean	SD	Skewness	Kurtosis
4. Sector 2	Share Price (\$)	20	0.01	0.71	0.131	0.188	2.003	3.921
	Earnings per Share (\$)		-0.12	0.20	0.002	0.065	1.339	4.245
	Book Value per Share (\$)		-0.01	0.75	0.157	0.223	1.633	1.848
	IA (number of words)		961	9231	4760	2221	0.164	-0.728
	Market Capitalisation (\$ Mn)		1.306	115.000	15.554	24.484	3.867	16.200
	Net Profit After Tax (\$ Mn)		-99.044	11.496	-7.934	23.246	-3.532	13.674
	Book Value of Equity (\$ Mn)		-11.711	62.044	14.637	17.724	1.375	1.891
5. Sector 3	Share Price (\$)	23	0.01	3.51	0.3896	0.79279	3.186	11.246
	Earnings per Share (\$)		-0.22	0.22	-0.0024	0.08008	0.353	4.276
	Book Value per Share (\$)		-0.01	2.10	0.3402	0.60611	2.009	2.849
	IA (number of words)		2398	8614	4732	1838	0.552	-0.670
	Market Capitalisation (\$ Mn)		0.204	475.000	53.576	106.050	3.208	11.628
	Net Profit After Tax (\$ Mn)		-27.102	20.077	-0.035	10.360	-0.385	1.901
	Book Value of Equity (\$ Mn)		3.830	187.000	27.056	43.134	2.761	8.541
6. Sector 2 and 3 combined	Share Price (\$)	40	0.01	1.44	0.194	0.337	2.683	7.249
	Earnings per Share (\$)		-0.22	0.22	0.005	0.072	0.578	3.996
	Book Value per Share (\$)		-0.01	1.46	0.178	0.283	2.878	10.170
	IA (number of words)		961	9231	4661	1930	0.436	-0.368
	Market Capitalisation (\$ Mn)		0.204271	185.000	23.998	39.188	2.776	7.860
	Net Profit After Tax (\$ Mn)		-33.940	20.077	-2.367	10.164	-0.768	2.678
	Book Value of Equity (\$ Mn)		-3.830	307.000	26.140	56.465	3.968	17.064

### **5.1.2 Assumptions of Multiple Regression Analysis**

There are four principal assumptions which justify the use of linear regression models for the purpose of predictions and validity of any conclusions reached. Only three assumptions are applicable for the data analysis of this research: linearity; normality; and equal variance (homoscedasticity). The assumption of independence is not applicable since the data set is not time series rather cross-sectional (Berenson et al., 2005). The following section discusses the tests carried out to assess the assumptions and the inferences obtained (results of the analysis to test the assumptions and inferences are presented in Appendix D). Further, one of the important problems in the application of multiple regression analysis, the possible multicollinearity of the independent variables is discussed.

### **5.1.2.1 Linearity**

The linearity of a bivariate relationship is easily examined through residual plots. The points should be symmetrically distributed around a diagonal line (Hair et al., 2006). In order to test the linearity of the regression equations that are developed in this study, a graphical method, a normal P-P plot of regression standardised residuals using SPSS (version 17) was employed. The symmetrical distribution around a diagonal line was then carefully observed. No observations were found contrary to the linearity assumption.

### **5.1.2.2 Normality**

Normality requires that the errors be normally distributed at each value of X (Berenson et al., 2005). The normal distribution makes a straight diagonal line and the plotted residuals are compared with the diagonal. If the distribution is normal, the residual line closely follows the diagonal (Hair et al., 2006). Further, there are statistical tests (such as Kolmogorov-Smirnov, Anderson-Darling test and Shapiro-Wilk test) available to check the normality of errors of the sample. Both the graphical and statistical methods to test the normality of the regression models have been used in this study. Some of the regression models failed the normality tests of Kolmogorov-Smirnov reporting significant p values (less than 0.05). However, no contrary evidence for the normality was found either in Normal Q-Q plots or frequency histograms.

Snow (2007) argues that the normality tests are not particularly useful because of the following potential problems.

- i. Small samples almost always pass the normality test.

- ii. With large samples, minor deviation from normality may be flagged as statistically significant, even though small deviations from a normal distribution will not affect the results of a t test or ANOVA.
- iii. Decisions about when to use parametric versus non-parametric tests should usually be made to cover an entire series of analysis. It is rarely appropriate to make a decision based on a normality test of the data set.

Further, many parametric tests such as t-tests and ANOVA use the mean of the sample so some non-normality can be tolerated due to the Central Limit Theorem (Motulsky, 2002). In accordance with the above arguments, it can be concluded that the data set of this study is not disqualified for linear regression analysis due to deviations from the assumption of normality.

### **5.1.2.3 Equal Variance (Homoscedasticity)**

Violation of homoscedasticity, which is known as heteroscedasticity, means a situation in which the variance of the dependent variable varies across the data. Putting the studentized residuals against the predicted dependent values and comparing them to null plots shows a consistent pattern if the variance is not constant (Hair et al., 2006). Both scatter plots of standardised residuals and normal Q-Q plot of unstandardized residuals have been applied to test the homoscedasticity of each of the regression models. No evidence was found for heteroscedasticity in any of the models.

#### 5.1.2.4 Multicollinearity

Multicollinearity exists when two or more of the independent variables are correlated. The consequence is that the individual p values of variables can be misleading, leading to high p-values even though the variable is significant. In order to detect any multicollinearity problems, the correlation-coefficients of X variables are calculated and their significance studied before modelling the multiple regression equations.

Tables 5.2 and 5.3 present the correlation-coefficients and their significance calculated for each of the data sets separately for each of the measures: per share basis (Table 5.2); and firm-level aggregates (Table 5.3). A number of independent variables are significantly correlated (identified by p values). As a result, the multicollinearity problem exists in two sets of data of per share basis measure and five sets of data in firm-level aggregates measure. In Table 5.2, on a per share basis measure, Sector 1 (companies reported negative earnings), EPS and BV (-.491); Sector 2 and 3 together, EPS and BV (.317) were identified as significantly correlated independent variables. In Table 5.3, firm-level aggregate measure, Full sample, book value of equity and IA (.210); sector 1 (all companies) net profit and IA (-.315), book value of equity and IA (.331); Sector 1 (companies reported negative earnings), book value of equity and IA (.365); and Sector 3 net profit and book value of equity (.576) were identified as significantly correlated independent variables.



**Table 5.2: Pearson Correlation between Independent Variables,  
Per Share Basis Measure**

Data Set	Variable	Correlations of Variables			N
		Earnings per Share	Book Value per Share	IA (word-count)	
Full sample	Earnings per Share	1	.011	-.090	90
	Significance		.921	.401	
	Book Value per Share		1	.087	
	Significance			.417	
Sector 1, all companies	Earnings per Share	1	.010	-.051	46
	Significance		.948	.735	
	Book Value per Share		1	.162	
	Significance			.282	
Sector 1 Companies reported negative EPS	Earnings per Share	1	-.491**	-.059	37
	Significance		.002	.728	
	Book Value per Share		1	.230	
	Significance			.170	
Sector 2	Earnings per Share	1	.111	.075	20
	Significance		.642	.753	
	Book Value per Share		1	-.256	
	Significance			.277	
Sector 3	Earnings per Share	1	.108	0.76	23
	Significance		.625	.731	
	Book Value per Share		1	.216	
	Significance			.321	
Sector 2 and 3	Earnings per Share	1	.317*	.038	40
	Significance		.046	.815	
	Book Value per Share		1	.096	
	Significance			.555	

\*Correlation is significant at 0.05 level (2-tailed)

\*\*Correlation is significant at 0.01 level (2-tailed)

**Table 5.3: Pearson Correlation between Independent Variables,  
Firm-Level Aggregate Measure**

Data Set	Variable	Correlations of Variables			N
		Net Profit	Book Value of Equity	IA (word- count)	
Full sample	Net Profit after Tax	1	.034	-.048	90
	Significance		.748	.652	
	Book Value of Equity		1	.210*	
	Significance			.047	
Sector 1, all companies	Net Profit after Tax	1	-.190	-.315*	46
	Significance		.206	.033	
	Book Value of Equity		1	.331*	
	Significance			.025	
Sector 1 Companies reported negative EPS	Net Profit after Tax	1	-.240	-.307	37
	Significance		.152	.065	
	Book Value of Equity		1	.365*	
	Significance			.026	
Sector 2	Net Profit after Tax	1	.432	.324	20
	Significance		.057	.164	
	Book Value of Equity		1	.140	
	Significance			.555	
Sector 3	Net Profit after Tax	1	.576**	.102	23
	Significance		.004	.645	
	Book Value of Equity		1	.411	
	Significance			.051	
Sector 2 and 3	Net Profit after Tax	1	.057	.151	40
	Significance		.727	.354	
	Book Value of Equity		1	.085	
	Significance			.602	

\*Correlation is significant at 0.05 level (2-tailed)

\*\*Correlation is significant at 0.01 level (2-tailed)

There are several remedies for the multicollinearity problem. The best solution is to understand the cause of multicollinearity and remove it. Multicollinearity occurs because two (or more) variables measuring essentially the same thing are related. If one of the variables does not seem logically essential to the model, removing it may reduce or eliminate multicollinearity (Motulsky, 2002). Another way of reducing the impact of multicollinearity is to increase the sample size. If there is reason to believe that the collinear relationships do not remain stable over time, a more sophisticated method of analysis such as Bayesian regression may be used (or special case-ridge regression) (Hair et al., 2006). In accordance with the first solution, the significantly correlated variables have been removed when modelling equations.

## **5.2 Assessment of Value Relevance of Financial and Non-Financial Information**

The main objective of this study is to test the value relevance of financial information and non-financial, IA disclosures. The value relevance is tested by applying the value relevance model developed by Ohlson (1995), modified to capture the impact of intangible asset disclosures. Of the two types of valuation models in the literature, earnings model and price model, the price model is employed in this study.

### 5.2.1 Ohlson's (1995) Equity Valuation Model

Below is Ohlson's (1995) equity valuation model modified for the intangible assets disclosures.

$$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \epsilon$$

$\alpha_0$  : Intercept

$P_{it}$  : Price of a share of firm i, at the date on which the annual report is issued

$E_i$  : Earnings per share of firm i

$BV_i$ : Book value per share of firm i

$IA_i$ : Result of the word count of intangible assets disclosures in the form of non-financial information, for firm i

$\epsilon$ : Independently and identically disturbed error term

Following are the hypotheses and regression models developed to address the main issue of the research.

**H<sub>1</sub>:** There is a value relevance of financial information and IA disclosures in the form of non-financial information.

**R<sub>1</sub>:**  $P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \epsilon_i$

### 5.2.2 Impact of Scale Effect

The scale effect is referred to as the overwhelming influence of large firms over the regressions (Easton and Sommers, 2003). Scale effect has an impact on the  $R^2$ . Brown et al. (1999) suggest that some of the differences between 'too low'  $R^2$  in return regressions and higher  $R^2$  in level regressions are caused by scale effect. Also they found that the  $R^2$  in regression of price on earnings per share and book value per share is positively correlated with covariance (CV) of the scale factor. There are two main

remedies discussed in the literature to overcome or mitigate the scale effect of capital market research. They are: deflation by a scale proxy; and inclusion of scale proxy as an additional independent variable (Barth and Kallapur, 1996).

Since the sample of this study is cross sectional it is possible to have the scale effect on the regressions run on a per share basis measure. In order to control for the cross-sectional scale differences (scale effect), more regressions were run by considering firm level aggregate variables to replace the share price, earnings and book values of the original regression model. Accordingly, the following alternative regression model is developed to test the same hypothesis ( $H_1$ ).

$$R_2: \quad MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \epsilon$$

$\alpha_0$ :	Intercept
$MC_{it}$ :	Market Capitalisation of firm i, at the date on which the annual report is issued
$NPAT_i$ :	Net Profit after Tax, firm i
$EQ_i$ :	Book Value of Equity, firm i
$IA_i$ :	Result of the word count of intangible assets disclosures in the form of non-financial information, firm i
$\epsilon$ :	Independently and identically disturbed error term

Sixteen multiple regressions models were developed to test  $H_1$ . The first seven regression models were to test the value relevance of information on a per share basis measure ( $R_1$ ), while the other nine models were for the firm-level aggregate measure ( $R_2$ ). Both sets of models were developed initially for the full sample (all industry sectors together), then for each of the industry sectors, as well as for industry sectors 2 and 3 combined. Slope coefficients of each of the independent variables and their

significance; F-statistic and its significance; and the value of  $R^2_{adj}$  are taken into account to assess the value relevance of each variable; significance of the overall model; and explanatory power of the model; respectively. Further, some of the independent variables are removed by considering the correlation coefficients when modelling equations. Accordingly, Panel A, model 3(a) BV, and 3(b) EPS; Panel B, models 2(a) IA, 2(b) EQ, 3(a) IA, 3(b) EQ, 5(a) EQ and 5(b) NPAT were deleted in order to avoid the multicollinearity problem. Results of the regressions are presented in Table 5.4 (Panel A and Panel B) and discussed in the following sections.

**Table 5.4: Assessment of Value Relevance: Per Share Basis**

**Panel A**

Model	Data Set	Intercept	EPS	BV	IA (100's words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	-0.014	0.025	0.815	0.0029	30.8%	14.199	90
	Significance	0.909	0.638	0.000**	0.094		0.000**	
2	Sector 1, All companies	0.044	0.028	0.875	0.0028	23.7%	5.648	46
	Significance	0.816	0.630	0.001**	0.225		0.002**	
3(a)	Sector 1, Companies reported negative earnings	-0.230	-0.180		0.0071	29.3%	8.470	37
	Significance	0.152	0.380		0.000**		0.001**	
3(b)	Sector 1, Companies reported negative earnings	-0.244		0.592	0.0059	47.4%	17.204	37
	Significance	0.078		0.001**	0.001**		0.000**	
4	Sector 2	-0.145	0.129	0.683	0.0035	60.6%	10.761	20
	Significance	0.066	0.763	0.000**	0.013**		0.000**	
5	Sector 3	0.602	3.372	0.824	0.0001	46.5%	7.378	23
	Significance	0.094	0.043*	0.001**	0.154		0.002**	
6	Sector 2 and 3 combined	-0.046	2.074	0.625	0.0025	63.8%	23.900	40
	Significance	0.598	0.000**	0.000**	0.141		0.000**	

**Table 5.4: Assessment of Value Relevance: Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	NPAT	EQ	IA (words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	-18070000	0.584	0.560	8500	29.7%	13.510	90
	Significance	0.229	0.252	0.000**	0.000**		0.000**	
2(a)	Sector 1, All companies	23280000	-1.401	0.836		30.7%	10.990	46
	Significance	0.070	0.244	0.001**			0.000**	
2(b)	Sector 1, All companies	-25100000	-0.901		10383	24.8%	8.405	46
	Significance	0.267	0.485		0.001**		0.001**	
3(a)	Sector 1, Companies reported negative Earnings	-3198466	-4.67	0.806		48.5%	17.928	37
	Significance	0.828	0.006**	0.000**			0.000**	
3 (b)	Sector 1, Companies reported negative Earnings	-73720000	-4.067		12547	51%	19.738	37
	Significance	0.002	0.015**		0.000**		0.000**	
4	Sector 2	-27010000	-0.366	1.062	5067	63.0%	11.771	20
	Significance	0.013	0.048*	0.000**	0.007**		0.000**	
5(a)	Sector 3	-21190000	5.393		15838	32.1%	6.192	23
	Significance	0.685	0.007**		0.136		0.008**	
5(b)	Sector 3	-7550000		0.991	9361	16.7%	3.206	23
	Significance	0.764		0.073	0.456		0.062	
6	Sector 2 and 3 combined	-4266754	1.656	0.389	4725	60.1%	20.582	40
	Significance	0.692	0.000**	0.000**	0.029*		0.000**	

\*\* Significant at 1% level

\* Significant at 5% level

Variable Definitions: Sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication Services; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count



### 5.2.3 Full Sample

Following are the multiple regression equations estimated for the full sample.

$$\text{Panel A, Model 1: } P_{it} = -0.014 + 0.025E_i + 0.815BV_i + 0.0029IA_i + \varepsilon_i$$

(0.909)            (0.638)            (0.000)            (0.094)

$$\text{Panel B, Model 1: } MC_{it} = -18070000 + 0.584NPAT_i + 0.560EQ_i + 8500IA_i + \varepsilon_i$$

(0.229)            (0.252)            (0.000)            (0.000)

Panel A, Model 1 is estimated for the per share basis ( $R_1$ ) and Panel B, Model 1 is for the firm-level aggregates ( $R_2$ ). The F-statistic used to test the overall fit of the above models are 14.199 and 13.510 respectively, which are highly statistically significant with p-value at 1%. The coefficients of all independent variables have the expected signs, indicating they are positively correlated with share prices. The coefficient of only BV is statistically significant (1%) in Panel A, Model 1 and EQ and IA are statistically significant (1%) in Panel B, Model 1. This indicates that only book value and IA disclosures are value relevant in Australian High-Tech industries and earnings are not value relevant. Further, reasonable explanatory powers (30.8% and 29.7%) are reported in these models measured by adjusted  $R^2$ .

## 5.2.4 Sector 1: Pharmaceuticals, Bio Technology and Life Sciences, All

### Companies

Following are the multiple regression equations estimated for sector 1: Pharmaceuticals, Bio Technology and Life Sciences (all companies).

$$\text{Panel A, Model 2: } P_{it} = 0.044 + 0.028E_i + 0.875BV_i + 0.0028IA_i + \varepsilon_i$$

(0.816)            (0.630)            (0.001)            (0.225)

$$\text{Panel B, Model 2(a): } MC_{it} = 23280000 - 1.401NPAT_i + 0.836EQ_i + \varepsilon_i$$

(0.070)            (0.244)            (0.001)

$$\text{Panel B, Model 2(b): } MC_{it} = -25100000 - 0.901NPAT_i + 10383IA_i + \varepsilon_i$$

(0.267)            (0.485)            (0.001)

Value relevance of sector 1: Pharmaceuticals, Bio Technology and Life Sciences (all companies) were tested in three models. Panel A, Model 2 is for the per share basis ( $R_1$ ) and Panel B, models 2(a) and 2(b) are for the firm-level aggregates ( $R_2$ ). Firm-level aggregates are tested in two models as a remedy for the multicollinearity problem. The F-statistic used to test the overall fit of the above models are 5.648, 10.990 and 8.405 respectively, which are highly statistically significant with p-value, at 1%. The coefficients of independent variables, other than NPAT in Panel B, models 2(a) and 2(b) have the expected signs indicating they are positively correlated with share prices. The coefficient of only BV is statistically significant at 1% level in Panel A, Model 2. However, the coefficients of EQ and IA are statistically significant at 1% level in Panel B, models 2(a) and 2(b) respectively. This indicates book value and IA disclosures are value relevant in Sector 1: Pharmaceuticals, Bio Technology and Life Sciences and earnings are not value relevant. Further, reasonable explanatory powers (23.7%, 30.7% and 24.8%) were reported in these models measured by adjusted  $R^2$ .

The majority of companies in sector 1 reported negative earnings in 2008. Therefore, separate regression models were estimated for companies reporting negative earnings in this sector, in order to obtain a clear view of value relevance of negative earnings.

### 5.2.5 Sector 1: Pharmaceuticals, Bio Technology and Life Sciences, Companies Reported Negative Earnings

Following are the multiple regression equations estimated for Sector 1: Pharmaceuticals, Bio Technology and Life Sciences, companies reported negative earnings.

$$\text{Panel A, Model 3(a): } P_{it} = -0.230 - 0.180E_i + 0.0071IA_i + \varepsilon_i$$

(0.152)                      (0.380)                      (0.000)

$$\text{Panel A, Model 3(b): } P_{it} = -0.244 + 0.592BV_i + 0.0059IA_i + \varepsilon_i$$

(0.078)                      (0.001)                      (0.001)

$$\text{Panel B, Model 3(a): } MC_{it} = -3198466 - 4.67NPAT_i + 0.806EQ_i + \varepsilon_i$$

(0.828)                      (0.006)                      (0.000)

$$\text{Panel B, Model 3(b): } MC_{it} = -73720000 - 4.067NPAT_i + 12547IA_i + \varepsilon_i$$

(0.002)                      (0.015)                      (0.000)

Value relevance of sector 1: Pharmaceuticals, Bio Technology and Life Sciences, companies that reported negative earnings were tested in four models Panel A, Models 3(a) and 3(b) for the per share basis ( $R_1$ ) and Panel B, Model 3(a) and 3(b) for the firm-level aggregates ( $R_2$ ). Both measures are tested in two models as a remedy for the multicollinearity problem. The F-statistic used to test the overall fit of the above models are 8.470, 17.204, 17.928 and 19.738 respectively, which are highly statistically significant with p-value, at 1%. The coefficients of all independent variables have the expected signs, indicating that negative earnings are negatively

correlated with share prices and that book value and IA are positively correlated with share prices. The coefficients of only BV and IA are statistically significant at 1% level in Panel A, Models 3(a) and 3(b) (per share basis) and NPAT, EQ and IA are statistically significant at 1% level in Panel B, Model 3(a) and 3(b) (firm-level aggregates). This indicates that negative earnings, book value and IA disclosures are value relevant in sector 1: Pharmaceuticals, Bio Technology and Life Sciences. Further, reasonable explanatory powers (29.3%, 47.4%, 48.5% and 51%) were reported in these models as measured by adjusted R<sup>2</sup>.

### 5.2.6 Sector 2: Hardware, Technology and Equipment

The multiple regression equations estimated for Sector 2: Hardware, Technology and Equipment are as follows.

$$\text{Panel A, Model 4: } P_{it} = -0.145_{(0.066)} + 0.129E_i_{(0.763)} + 0.683BV_i_{(0.000)} + 0.0035IA_i_{(0.013)} + \varepsilon_i$$

$$\text{Panel B, Model 4: } MC_{it} = -27010000_{(0.013)} - 0.366NPAT_i_{(0.048)} + 1.062EQ_i_{(0.000)} + 5067IA_i_{(0.007)} + \varepsilon_i$$

Panel A, Model 4 is estimated for the per share basis (R<sub>1</sub>) and Panel B, Model 4 is for the firm-level aggregates (R<sub>2</sub>). The F-statistic used to test the overall fit of the above models are 10.761 and 11.771 respectively, which are highly statistically significant with p-value, at 1%. The coefficients of independent variables, other than NPAT have the expected signs indicating they are positively correlated with share prices. The coefficients of only two variables, book value and IA are statistically significant (at 1% level) in both models. The significant coefficient (at 5%) with negative correlation reported for earnings (NPAT) in Panel B, Model 4 is an ambiguous result. Results

indicate only book value and IA disclosures are value relevant in Sector 2: Hardware, Technology and Equipment. Further, considerable explanatory powers (60.6% and 63.0%) were reported in these models as measured by adjusted  $R^2$ . However, the small sample size of this sector limits the strength of the above results.

### 5.2.7 Sector 3: Telecommunication Services

Following are the multiple regression equations estimated for Sector 3: Telecommunication Services.

$$\text{Panel A, Model 5: } P_{it} = 0.602 + 3.372E_i + 0.824BV_i + 0.0001IA_i + \varepsilon_i$$

(0.094)                      (0.043)                      (0.001)                      (0.154)

$$\text{Panel B, Model 5(a): } MC_{it} = -21190000 + 5.393NPAT_i + 15838IA_i + \varepsilon_i$$

(0.685)                      (0.007)                      (0.136)

$$\text{Panel B, Model 5(b): } MC_{it} = -7550000 + 0.991EQ_i + 9361IA_i + \varepsilon_i$$

(0.764)                      (0.073)                      (0.456)

Panel A, Model 5 is estimated for the per share basis ( $R_1$ ) and Panel B, Model 5(a) and 5(b) for the firm-level aggregates ( $R_2$ ). The F-statistic used to test the overall fit of the above models are 7.378, 6.192 and 3.206 respectively. F statistics are significant with p-value at 1% only for first two models. The coefficients of all independent variables have the expected signs indicating they are positively correlated with share prices. The coefficients of two variables, earnings and book value are statistically significant at 5% and 1% levels respectively in per share basis measure and coefficient of NPAT is statistically significant at 1% level in firm level aggregate measure. This indicates earnings and book values are value relevant in Sector 3: Telecommunications. However, the statistical significance level of earnings increased from 4% to 1% and decreased for

book value from 1% to 7% in the measure of firm-level aggregates (Panel B) compared to per share basis (Panel A). Further, reasonable explanatory powers (46.5% and 32.5%) were reported in first two models as measured by adjusted R<sup>2</sup>.

### 5.2.8 Sectors 2 and 3 Combined

Separate regressions were run by taking sectors 2 and 3 together in order to obtain a clear view of the value relevance of earnings, since the majority of companies in sector 1 reported negative earnings. Following are the multiple regression equations estimated for Sectors 2 and 3 combined.

$$\text{Panel A, Model 6: } P_{it} = -0.046 + 2.074E_i + 0.625BV_i + 0.0025IA_i + \varepsilon_i$$

(0.598)
(0.000)
(0.000)
(0.141)

$$\text{Panel B, Model 6: } MC_{it} = -4266754 + 1.656NPAT_i + 0.389EQ_i + 4725IA_i + \varepsilon_i$$

(0.692)
(0.000)
(0.000)
(0.029)

Panel A, Model 6 is estimated for the per share basis (R<sub>1</sub>) and Panel B, Model 6 is for the firm-level aggregates (R<sub>2</sub>). The F-statistic used to test the overall fit of the above models are 23.9 and 20.582 respectively, which are statistically significant with p-value at 1%. The coefficients of all independent variables have the expected signs indicating they are positively correlated with share prices. The coefficients of only two variables, earnings and book value are statistically significant (at 1% level) in the per share basis measure (Panel A). However, all three independent variables were reported as statistically significant (NPAT and EQ at 1% level and IA at 5% level) in firm-level aggregate measure (Panel B). This indicates earnings and book values as well as IA are value relevant when sectors 2 and 3 are combined together. Further, considerable

explanatory powers (63.8% and 60.1%) were reported in these models as measured by the Adjusted R<sup>2</sup>.

The above results revealed that book value is highly value relevant in all three industry sectors. The statistical significances, as shown by p-values, were at 1% in eleven out of twelve models that tested book values. Earnings are reported as value relevant in more models in the measure of firm-level aggregates (four out of six models), compared to per share basis measure (two out of six models). The finding of high value relevance of book value and less value relevance of earnings provides support for Francis and Schipper's (1999) study, that earnings value relevance has declined but increased in balance sheet relations (book value). Further, the results of the analysis proved that non-financial, intangible assets disclosures are value relevant in high-tech industries in Australia. Significant results were found to support the value relevance of non-financial, intangible assets disclosures in all sectors other than sector 3, Telecommunications. This finding provides support for the previous US and Australian studies, supporting the conclusion that investors would probably increasingly rely upon alternative information sources (Collins et al., 1997; Brown et al., 1999; Francis and Schipper, 1999; Lev, 1999; Brimble and Hodgson, 2007).

### **5.3 Discussion of Results of Value Relevance of Financial and Non-financial Information**

The outcome of the analysis of value relevance of financial and non-financial, intangible assets disclosures are consistent with prior studies in Australia as well as overseas. For example, the findings are consistent with Amir and Lev's (1996) study demonstrating the complementarities between financial and non-financial information.

Additionally, the high value relevance of IA compared to earnings of the current study is also consistent with Amir and Lev's study, which showed that the value relevance of non-financial information overwhelms that of traditional financial indicators. Further, the results are consistent with Han and Manry (2004), who commented that the market may accept the information about R&D whether capitalised or expensed, making disclosure is important for value creation. The high value relevance of IA disclosures reported in sector 1: Pharmaceuticals, Bio Technology and Life Sciences (majority of companies reported negative earnings) are consistent with Franzen and Radhakrishnan (2009) and Wu et al. (2010), who reported R&D expense is positively (negatively) associated with stock prices for loss (profit) firms.

The findings also support the results of Ritter and Wells (2006) and Dahmash et al. (2009). Ritter and Wells (2006) indicated that there was a significant association between voluntarily recognised and disclosed identifiable intangible assets and stock prices in an Australian study between 1979-1997. Dahmash et al. (2009) demonstrated the information provided with respect to intangible assets (goodwill and identifiable intangible assets) in Australia for the ten year period (1994-2003) are value relevant. Further, the finding of very high value relevance of book value and less value relevance of earnings are particularly consistent with Collins et al. (1997) and Francis and Schipper (1999). The previous findings have shown that value relevance of 'bottom-line' earnings have declined over time, having been replaced by an increased value-relevance of book values. Also, the results confirm the argument of Godfrey et al. (2006) that there is a significant statistical association between Australian firms' market value of equity and book value. Finally, it is of interest to note that the results are comparable with the Chinese market, where Chen et al. (2001) report that accounting



information is value relevant to Chinese investors despite the relative immaturity of the market.

In some instances however, the results of this study contradict comparative prior literature. For instance, the findings are not consistent with the argument of Amir and Lev (1996), that on a stand-alone basis financial information is largely irrelevant for the valuation of cellular companies. Also, the results are inconsistent with Godfrey et al.'s (2006) study in relation to inferences that investors do not obtain information about levels of expenditure on intangible assets. Godfrey et al. (2006) argued that probable success from sources other than capitalised balances on balance sheets, then the market value of Australian firms' equity is likely to fall due to the regulatory reforms of the accounting for intangible assets. This argument is inconsistent with the current findings of value relevance of voluntary disclosures of IA on the Australian market. Finally, Banghoj and Plenborg (2008), report that in Danish companies, although the objective of annual reports are to provide useful information to stakeholders, investors have not benefited from an improved level of voluntary disclosure. The present study provides clear evidence that voluntary disclosures are considered in determining share prices of Australian market for the sample industries.

Overall, the findings of this study contribute to improving the financial reporting models of the market. Ritter and Wells (2006) stated that the recognition and disclosure of identifiable IA by Australian firms will cease, because of regulatory reforms, as a part of international convergence. As a result, company management may shift to voluntary disclosure of intangibles. The findings of this study provide evidence that the voluntary disclosures of IA are meaningful under new regulations (for example,

recognition and measurement of intangible assets are more restrictive under AASB 138: Intangible Assets, compared to previous Australian GAAP). Kohlbeck and Warfield (2007) argue that intangible asset measures or factors that are indicative of intangible assets should be considered when assessing value. Results of the current study strengthen the above argument with the finding that there is considerable IA disclosures in the form of non-financial information in company annual reports and that these IA disclosures are value relevant for the market. Further, this study contributes to the suggestion of Garcia-Ayuso (2003), that researchers should attempt to establish empirical relationships between current intangible investments and future value creation in companies so as to provide guidance for the fair value of intangibles.

#### **5.4 Summary**

This chapter has provided analysis and discussion of value relevance of financial and non-financial information. The main issue addressed in this chapter was whether financial information and intangible assets disclosures in the form of non-financial information is value relevant in high-tech industries in Australia. In other words, whether financial and non-financial, intangible assets disclosures are significantly expressed in share prices of respective companies. In the empirical analysis, the widely used Ohlson (1995) model was applied. This model was modified to suit the purpose of this study by including the word count of intangible asset disclosures in the form of non-financial information as an additional variable in the Ohlson's (1995) model. The value relevance of information was tested by two main measures; per share basis and firm-level aggregates.

The overall results provided evidence that book value is the most significant factor while earnings is the least significant factor in determining the share prices of companies in high-tech industries in Australia, of the three factors considered: earnings, book value and IA disclosures. This provides support for the findings of Francis and Schipper (1999) and Collins et al. (1997), earnings value relevance has declined but increased in balance sheet relations (book value). Further, the hypotheses tests indicate that the voluntary disclosures of intangible assets in annual reports of high-tech industries in Australia are also value relevant, at a high level of statistical significance. This finding provides support for previous US and Australian studies and the conclusion that investors probably increasingly rely upon alternative information sources for investment decision making.

The next chapter builds on the findings and provides the results of the analysis of factors influencing value relevance of financial and non-financial information: size of the company, profitability, age of the company, industry type and ownership concentration.

## **Chapter 6**

### **Analysis of Data and Discussion of Results: Factors Influencing Value Relevance of Financial and Non-Financial Information**

In this chapter findings of the analysis of factors influencing value relevance of financial and non-financial information, sub-question 3 of the study, are addressed. Background of the selection of factors, rationale for each of the hypotheses developed and method of examining the value relevance are provided by referencing prior literature. The results of a regression analysis to test the factors influencing value relevance are provided, highlighting clearly how each of the selected factors influences the value relevance of earnings, book value and non-financial, intangible asset disclosures. Further, the results of analysis of an interaction effect to understand how the selected factors interact with non-financial, IA disclosure affect share prices are provided. Finally, the results are discussed referring to the findings of chapter 5 of the study and to prior literature, followed by the summary of the chapter.

#### **6.1 Factors Influencing Value Relevance of Financial and Non-financial Information**

Since the level of value relevance may vary with the influence of industry specific or company specific factors, a number of factors are selected to examine the impact on the value relevance of financial and non-financial information. The selected factors are

based on prior literature related to capital market research. For example, Ho et al. (1997) considered profitability and sales growth to examine the association between the market response to open-market stock repurchase announcements and prior accounting information. Ahmed and Courtis (1999) examined the association between corporate characteristics and disclosure level of annual reports. They considered corporate size, listing status, leverage, profitability and audit-firm size as corporate characteristics. Further, Akhtaruddin (2005) considered size, age, industry type and profitability of the company to investigate the association between company-specific characteristics and mandatory disclosures. Accordingly; size of the company, profitability, industry type, age of the company and ownership concentration are considered in this study to examine the influence of financial and non-financial information on value relevance.

### **6.1.1 Method of Examining Factors Influencing Value Relevance**

As discussed in Chapter 4: Design of the Research, the sample companies were divided into two dichotomous groups based on each of the five factors: large companies and small companies, profit reported companies and loss reported companies, product orientated companies and service orientated companies, old companies and young companies and, high ownership concentrated companies and low ownership concentrated companies. Following Chen et al. (2001) a dummy variable was employed to denote a firm's membership in each group. A dummy interaction variable was created by multiplying the dummy variable by each of the independent variables in the original value relevance model, introduced in Chapter 4 and tested in Chapter 5. The analysis commenced by testing the value relevance of each of the two groups of firms separately. In order to compare the regression coefficients of independent variables between groups, separate regressions were run for the full sample by incorporating each of the

dummy-interaction variables. The significant level of dummy-interaction variable, measured by the p value, represents the difference of the coefficients between the reference group and comparison group (Stevens, 1992; UCLA Academic Technology Service, 2010). As such, the significance level of the dummy-interaction variable is applied to compare the coefficients between groups to identify the influence of each of the factors.

Factors influencing value relevance were tested in both models; per share basis and firm-level aggregates. Results of the regressions to test the influence of each of the factors for the value relevance are presented in the following five sections.

### **6.1.2 Influence of Size of the Company for Value Relevance**

Size of the company is typically one of the main determinants of the financial growth of a company followed by share price. Akhtaruddin (2005) hypothesised that there is a significant positive association between company size and the extent of the disclosure. The following hypothesis ( $H_2$ ) is developed to test the influence of size of the company for the value relevance of information (as discussed in Chapter 4: Design of the Research,  $H_1$  was tested in Chapter 5).

$H_2$ : There is a positive association between size of the company and value relevance of financial and non-financial information.

The market capitalisation at the end of the financial year 2008 was considered to decide the size of the company. A median split of the sample companies was performed resulting in two dichotomous groups, based on the market capitalisation and thus the determination of large companies and small companies. A dummy variable with the

value 1 was introduced for companies with market capitalisation greater than the median market capitalisation (large companies), 0 otherwise (small companies). Ten multiple regressions were run to test H<sub>2</sub>, the influence of the size of the company for the value relevance with five regressions for per share basis and another five regressions for firm-level aggregates. Initially, the value relevance was tested separately for each group (large companies and small companies) with R<sub>1</sub>, and R<sub>2</sub> used to test the value relevance in Chapter 5. Then, each of the dummy-interaction variables was separately introduced to the original regression equations to test the influence of size of the company for the value relevance of each variable. Accordingly, the following regression equations are estimated and tested.

Per Share Basis	<b>R<sub>1</sub></b> : Large Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>1</sub></b> : Small Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>2</sub></b> : Large Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>2</sub></b> : Small Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
Per Share Basis	<b>R<sub>3(a)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 Dsize_i * E_i + \varepsilon_i$
	<b>R<sub>3(b)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 Dsize_i * BV_i + \varepsilon_i$
	<b>R<sub>3(c)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 Dsize_i * IA_i + \varepsilon_i$

Firm-Level Aggregates	<b>R<sub>4(a)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 Dsize_i * NPAT_i + \varepsilon_i$
	<b>R<sub>4(b)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 Dsize_i * EQ_i + \varepsilon_i$
	<b>R<sub>4(c)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DSize_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 Dsize_i * IA_i + \varepsilon_i$

#### Variable Definitions

- $\alpha_0$  : Intercept
- $P_{it}$  : Price of a share of firm i, at the date on which the annual report is issued
- $E_i$  : Earnings per share of firm i
- $BV_i$ : Book value per share of firm i
- $IA_i$ : Result of the word count of intangible asset disclosures in the form of non-financial information, for firm i
- $MC_{it}$ : Market Capitalisation of firm i, at the date on which the annual report is issued
- $NPAT_i$ : Net Profit after Tax of firm i
- $EQ_i$ : Book Value of Equity, firm i
- $DSize_i$ : Dummy variable with value 1 for companies with market capitalisation greater than median market capitalisation, 0 otherwise.
- $\varepsilon$ : Independently and identically disturbed error term

The significance (measured by p-value) of the above dummy-interaction variables are considered to decide the influence of the size of the company for the value relevance.

Results of the analysis are presented in Table 6.1.



**Table 6.1: Factors Influencing Value Relevance of Financial and Non-Financial Information: Size of the Company, Per Share Basis**

**Panel A**

Model	Data Set	Intercept	DSize	E	BV	IA	DSize*E	DSize*BV	DSize*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Large Companies	0.162		0.034	0.993	0.001				28.1%	46
	t value	0.747		0.509	4.432***	0.719					
2	Small Companies	0.072		0.217	0.252	-0.001				45.9%	46
	t value	1.928		0.932	6.224***	0.715					
3(a)	Full Sample	-0.073	0.388	0.507	0.691	0.001	-0.470			39.1%	92
t value		-0.629	3.340***	0.439	5.322***	0.753	-0.407				
3(b)	Full Sample	-0.021	0.225	0.033	0.247	0.001		0.746		44.7%	92
	t value	-0.189	1.861*	0.698	1.279	0.781		2.969***			
3(c)	Full Sample	0.016	0.260	0.039	0.689	-0.001			0.001	39.3%	92
	t value	0.086	1.079	0.780	5.326***	-0.223			0.672		

**Table 6.1: Factors Influencing Value Relevance of Financial and Non-Financial Information: Firm Size, Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	DSize	NPAT	EQ	IA	DSize*NPAT	DSize*EQ	DSize*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Large Companies	-3547067		2.044	0.418	10754				22.1%	46
	t value	-0.130		1.700*	2.184**	3.024***					
2	Small Companies	6762923		-0.021	0.083	-223				0.00%	46
	t value	4.114		-0.588	1.437	-0.836					
3(a)	Full Sample	-38970000	53750000	-0.279	0.428	7887	2.021			38.6%	92
	t value	-2.550	3.640***	-0.477	3.103***	3.546***	1.912**				
3(b)	Full Sample	-23220000	41460000	0.451	-0.179	6786		0.600		36.2%	92
	t value	-1.371	2.373**	0.890	-0.191	3.104***		0.634			
3(c)	Full Sample	12090000	-10330000	0.575	0.389	-980			10432	39.1%	92
	t value	0.498	-0.330	1.180	2.835	-0.228			2.075**		

\*\*\* Significant at 1% level    \*\* Significant at 5% level    \* Significant at 10% level

DSize: Dummy variable with value 1 for companies with market capitalisation greater than median market capitalisation, 0 otherwise; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count

According to Table 6.1, Panel A (per share basis), models 1 and 2 indicate the Book Value per share (BV) is value relevant in large companies (at 1% significance level) and small companies (at 1% significance level), measured by the coefficients of BV. Further, model 3(b) indicates the difference of coefficients of BV between large companies and small companies (models 1 and 2) is significant (t value 2.969 at 1% level), measured by the coefficient of  $Dsize \cdot BV$ .

Panel B, model 1 indicates, Net Profit after Tax (NPAT), Equity (EQ) and Word Count of Intangible Assets (IA) are value relevant in large companies (at all measured levels of significance). However, model 2 indicates that none of the above variables are significant in small companies. Further, Panel B models 3(a) and 3(c) indicate that the difference of coefficients between large companies and small companies of NPAT (t value 1.912 at 5% level) and IA (t value 2.075 at 5% level) are significant. Panel B model 3(b) indicates that the difference of coefficients of EQ is not significant, measured by the coefficient of  $Dsize \cdot EQ$ .

The above findings indicate that size of the company positively influences the value relevance of earnings, book value, as well as the non-financial, IA disclosures. In other words, the expressions of earnings, book value, as well as non-financial, intangible assets disclosure on share prices are higher in large companies than in small companies.

### **6.1.3 Influence of Profitability for Value Relevance**

Profitability of a company can be considered as one of the key firm-specific determinants of market price of its shares. Ahmed and Courtis (1999) hypothesised profitability to be positively associated with disclosure level since the higher profitability motivates management to provide greater information as it increases investors' confidence. As such, it can be argued that there is a positive association between profitability and value relevance of financial and non-financial information. The following hypothesis is developed to test the influence of profitability for value relevance.

H<sub>3</sub>: There is a positive association between profitability and value relevance of financial and non-financial information

In order to test the influence of profitability for the value relevance, the sample companies are divided into two dichotomous groups: profit reported companies and loss reported companies. A dummy variable with value 1 was introduced for companies reporting a profit, 0 otherwise. Ten multiple regressions were run to test H<sub>3</sub>, the influence of profitability for the value relevance, with five regressions for per share basis and another five regressions for firm-level aggregates. Initially, the value relevance was tested separately in each group (profit reported companies and loss reported companies) considering R<sub>1</sub>, and R<sub>2</sub> developed to test the value relevance in Chapter 5. Each of the dummy-interaction variables was then separately introduced to the original regression equations to test the influence of profitability of the firm for the value relevance of each variable. Accordingly, the following regression equations are estimated and tested.

Per Share Basis	<b>R<sub>1</sub></b> : Profit reported Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>1</sub></b> : Loss reported Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>2</sub></b> : Profit reported Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>2</sub></b> : Loss reported Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
Per Share Basis	<b>R<sub>5(a)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DProf_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DProf_i * E_i + \varepsilon_i$
	<b>R<sub>5(b)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DProf_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DProf_i * BV_i + \varepsilon_i$
	<b>R<sub>5(c)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DProf_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DProf_i * IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>6(a)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DProf_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DProf_i * NPAT_i + \varepsilon_i$
	<b>R<sub>6(b)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DProf_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DProf_i * EQ_i + \varepsilon_i$
	<b>R<sub>6(c)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DProf_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DProf_i * IA_i + \varepsilon_i$

DProf<sub>i</sub>: Dummy variable with value 1 for companies reported profits, 0 otherwise.

The significance (measured by p-value) of the above dummy-interaction variables are considered to decide the influence of the profitability for the value relevance. Results are presented in Table 6.2.

**Table 6.2: Factors Influencing Value Relevance of Financial and Non-Financial Information: Profitability, Per Share Basis  
Panel A**

Model	Data Set	Intercept	DProf	E	BV	IA	DProf*E	DProf*BV	DProf*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Profit reported Companies	0.303		-0.274	1.538	-0.001				43.2%	23
	t value	0.859		-1.108	4.359***	0.272					
2	Loss Reported Companies	-0.224		0.012	0.395	0.001				46.2%	67
	t value	-2.966***		0.394	4.501***	5.637***					
3(a)	Full Sample	-0.225	0.526	0.016	0.722	0.001	-0.241			41.9%	90
	t value	-1.864*	4.247***	0.305	5.778***	2.909***	-1.413				
3(b)	Full Sample	-0.162	0.150	-0.017	0.403	0.001		1.035		50.6%	90
	t value	-1.441	1.083	-0.365	2.941***	3.153***		4.146***			
3(c)	Full Sample	-0.264	0.710	-0.005	0.718	0.001			-0.001	41.1%	90
	t value	-2.053**	2.715***	-0.105	5.707***	3.008***			-0.947		

**Table 6.2: Factors Influencing Value Relevance of Financial and Non-Financial Information: Profitability, Firm-Level Aggregates  
Panel B**

Model	Data Set	Intercept	DProf	NPAT	EQ	IA	DProf*NPAT	DProf*EQ	DProf*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Profit reported Companies	-4965463		8.337	0.039	7268				16.6%	23
	t value	-0.104		1.798*	0.059	0.716					
2	Loss Reported Companies	-51390000		-0.601	0.454	10827				57.6%	67
	t value	-4.427***		-1.640	4.776***	6.992***					
3(a)	Full Sample	-47150000	26190000	-0.606	0.408	10352	6.898			42.2%	90
	t value	-2.932***	1.326	-1.139	3.128***	4.905***	2.977***				
3(b)	Full Sample	-46990000	49900000	-0.286	0.463	10537		0.249		36.5%	90
	t value	-2.779***	2.439***	-0.521	3.208***	4.763***		0.712			
3(c)	Full Sample	-47690000	56070000	-0.226	0.504	10564			282	36.1%	90
	t value	-2.696***	1.605	-0.415	3.774***	4.486***			0.045		

\*\*\* Significant at 1% level \*\* Significant at 5% level \* Significant at 10% level

DProf: Dummy variable with value 1 for companies reported profit, 0 for companies reported losses; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count

According to Table 6.2, Panel A (per share basis), models 1 and 2 indicate the BV is value relevant in profit reported companies (at 1% significance level) and loss reported companies (at 1% significance level), and that IA is value relevant only in loss reported companies (at 1% significance level) as measured by the coefficients of BV and IA respectively. Further, model 3(b) indicates the difference of coefficients of BV between profit reported companies and loss reported companies is significant (t value 4.146 at 1% significance) as measured by the coefficient of  $DProf*BV$ .

Panel B, model 1 indicates that NPAT is value relevant in profit reported companies (at 10% significance level) and model 2 indicates that EQ and IA are value relevant (at 1% significance levels) in loss reported companies. Further, Panel B, model 3(a) indicates the difference of coefficients of NPAT between profit reported companies and loss reported companies is significant (t value 2.977 at 1% level) as measured by the coefficient of  $DProf*NPAT$ .

The above findings indicate that for companies in this study, profitability of a company positively influences the value relevance of earnings and book value. In other words, the expressions of earnings and book value on share prices are higher in profit reported companies than in loss reported companies.

#### **6.1.4 Influence of Industry Type for Value Relevance**

The type of industry in which the company is operating is another important factor that determines the business risk and share price of a firm. Akhtaruddin (2005) argues that a particular type of company discloses different amounts of information than that of other types of companies. The following hypothesis is developed to test the influence of industry type for the value relevance of financial and non-financial information.

H<sub>4</sub>: There is a positive association between product orientation and value relevance of financial and non-financial information

In order to test the influence of the industry type for the value relevance, the sample companies were divided into two dichotomous groups, product orientated companies (companies of sector 1: Pharmaceuticals, Bio Technology and Life Sciences and Sector 2: Hardware, Technology and Equipment) and service orientated companies (Sector 3: Telecommunication). A dummy variable with value 1 was introduced for product orientated companies, 0 otherwise. Ten multiple regressions were run to test H<sub>4</sub>, influence of industry type for the value relevance with five regressions for per share basis and another five regressions for firm-level aggregates. Initially, the value relevance was tested in each group (product orientated companies and service orientated companies) separately, considering R<sub>1</sub>, and R<sub>2</sub> developed to test the value relevance in Chapter 5. Each of the dummy-interaction variables was then separately introduced to the original regression equations to test the influence of industry type for the value relevance of each variable. Accordingly, the following regression equations are estimated and tested.

Per Share Basis	<b>R<sub>1</sub></b> : Product Orientated Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>1</sub></b> : Service Orientated Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>2</sub></b> : Product Orientated Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>2</sub></b> : Service Orientated Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
Per Share Basis	<b>R<sub>7(a)</sub></b> : Full Sample	$P_{it} = \alpha_0 + DInd_i + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + DInd_i * E_i + \varepsilon_i$
	<b>R<sub>7(b)</sub></b> : Full Sample	$P_{it} = \alpha_0 + DInd_i + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + DInd_i * BV_i + \varepsilon_i$
	<b>R<sub>7(c)</sub></b> : Full Sample	$P_{it} = \alpha_0 + DInd_i + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + DInd_i * IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>8(a)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DInd_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DInd_i * NPAT_i + \varepsilon_i$
	<b>R<sub>8(b)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DInd_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DInd_i * EQ_i + \varepsilon_i$
	<b>R<sub>8(c)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DInd_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DInd_i * IA_i + \varepsilon_i$

DInd: Dummy variable with value 1 for product orientated companies, 0 otherwise.

The significance (as measured by p-value) of the above dummy-interaction variables are considered to decide the influence of the industry type for the value relevance. Results are presented in Table 6.3.



**Table 6.3: Factors Influencing Value Relevance of Financial and Non-Financial Information: Industry Type, Per Share Basis**

**Panel A**

Model	Data Set	Intercept	DInd	EPS	BV	IA	DInd*EPS	DInd*BV	DInd*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Product Orientated Companies	-0.071		0.023	0.875	0.001				30.2%	66
	t value	-0.567		0.487	4.767***	2.227**					
2	Service Orientated Companies	0.540		3.497	0.798	-0.001				45.1%	24
	t value	1.629		2.274**	3.870***	-1.362					
3(a)	Full Sample	-0.014	0.031	3.248	0.801	0.001	-3.227			33.9%	90
	t value	-0.105	0.250	2.450***	6.052***	1.520	-2.433***				
3(b)	Full Sample	-0.019	0.013	0.026	0.772	0.001		0.118		29.4%	90
	t value	-0.129	0.089	0.483	4.268***	1.496		0.433			
3(c)	Full Sample	0.461	-0.528	0.029	0.853	-0.001			0.001	32.4%	90
	t value	1.595	-1.658	0.545	6.350***	-1.401			1.963**		

**Table 6.3: Factors Influencing Value Relevance of Financial and Non-Financial Information:  
Industry Type, Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	DInd	NPAT	EQ	IA	DInd*NPAT	DInd*E Q	DInd*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Product Orientated Companies	-27230000		-0.352	0.708	7761				46.1%	66
	t value	-2.068**		-0.832	4.579***	4.139***					
2	Service Orientated Companies	-15550000		4.486	0.374	12583				29.4%	24
	t value	-0.306		2.645***	1.450	1.240					
3(a)	Full Sample	-3879320	-25740000	4.548	0.528	8814	-4.894			39.5%	90
	t value	-0.243	-1.658	3.921***	4.049***	4.090***	-3.843***				
3(b)	Full Sample	-1854819	-25070000	0.491	0.405	8686		0.276		29.7%	90
	t value	-0.099	-1.372	0.952	2.122**	3.654***		0.990			
3(c)	Full Sample	-38860000	16170000	0.456	0.533	15544			-6986	29.6%	90
	t value	-1.040	0.393	0.882	3.784***	2.079**			-0.894		

\*\*\* Significant at 1% level  
 \*\* Significant at 5% level  
 \* Significant at 10% level

DInd: Dummy variable with value 1 for product orientated companies, 0 for service orientated companies; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count

According to Table 6.3, Panel A (per share basis), model 1 indicates that BV and IA are value relevant (at 1% and 5% significance levels respectively) in product orientated companies and model 2 indicates the earnings and BV are value relevant (at 5% and 1% significance levels respectively) in service orientated companies. Further, models 3(a) and 3(c) indicate the differences of coefficients of earnings and IA between product orientated companies and service orientated companies are significant (t value -2.433 at 1% level for earnings and t value 1.963 at 5% level for IA) as measured by the coefficients of  $DInd*EPS$  and  $DInd*IA$  respectively.

Panel B (firm-level aggregates), model 1 indicates the EQ and IA are value relevant (at 1% significance level) in product orientated companies and model 2 indicates the NPAT is value relevant (at 1% significance level) in service orientated companies. Further, model 3(a) indicates the difference of coefficients of NPAT between product orientated companies and service orientated companies is significant (t value -3.843 at 1% level) as measured by the coefficient of  $DInd*NPAT$ .

The above findings indicate that product orientation negatively influences the value relevance of earnings while positively influencing the value relevance of IA disclosures. In other words, the expressions of earnings on share prices are higher in service orientated companies than in product orientated companies and the expressions of non-financial, intangible assets disclosure on share prices are higher in product orientated companies than in service orientated companies.

### **6.1.5 Influence of Age of the Company for Value Relevance**

Age of the company, which to some extent, measures the maturity of the firm, has a significant influence for the share price of the firm. Akhtaruddin (2005) infers a positive association between the age of the company and the level of mandatory and voluntary disclosure. The following hypothesis is developed to test the influence of the age of the company for the value relevance of financial and non-financial information.

H<sub>5</sub>: There is a positive association between the company age and value relevance of financial and non-financial information

In order to test the influence of age of the company for value relevance, a median split of the sample companies was performed and divided into two dichotomous groups (old companies and young companies), based on the years (age), since listed in ASX. A dummy variable with value 1 was introduced for companies with age greater than median age (old companies), 0 otherwise (young companies). Median age represents the middle value of the age of sample companies, measured in number of years and months since it was listed in ASX. Ten multiple regressions were run to test H<sub>5</sub>, the influence of age of the company for the value relevance, with five regressions for per share basis and another five regressions for firm-level aggregates. Initially, the value relevance was tested in each group (old companies and young companies) separately, considering R<sub>1</sub> and R<sub>2</sub> developed to test the value relevance in Chapter 5. Each of the dummy-interaction variables was then separately introduced to the original regression equations to test the influence of age of the company for the value relevance of each variable. Accordingly, the following regression equations are estimated and tested.

Per Share Basis	<b>R<sub>1</sub></b> : Old Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>1</sub></b> : Young Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>2</sub></b> : Old Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
	<b>R<sub>2</sub></b> : Young Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
Per Share Basis	<b>R<sub>9(a)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DAge_i * E_i + \varepsilon_i$
	<b>R<sub>9(b)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DAge_i * BV_i + \varepsilon_i$
	<b>R<sub>9(c)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i + \alpha_5 DAge_i * IA_i + \varepsilon_i$
Firm-Level Aggregates	<b>R<sub>10(a)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DAge_i * NPAT_i + \varepsilon_i$
	<b>R<sub>10(b)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DAge_i * EQ_i + \varepsilon_i$
	<b>R<sub>10(c)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DAge_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i + \alpha_5 DAge_i * IA_i + \varepsilon_i$

DInd: Dummy variable with value 1 for old companies, 0 for young companies

The significance (as measured by p-value) of the above dummy-interaction variables are considered to decide the influence of the age of the company for the value relevance.

Results are presented in Table 6.4.

**Table 6.4: Factors Influencing Value Relevance of Financial and Non-Financial Information: Age of the Company, Per Share Basis**

**Panel A**

Model	Data Set	Intercept	DAge	EPS	BV	IA	DAge*EPS	DAge*BV	DAge*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Old Companies	-0.121		-0.002	1.745	0.001				50.2%	45
	t value	-0.746		-0.035	6.619***	1.481					
2	Young Companies	0.091		0.086	0.547	0.001				30.2%	45
	t value	0.585		0.442	4.518***	0.237					
3(a)	Full Sample	-0.094	0.202	0.255	0.876	0.001	-0.238			33.1%	90
	t value	-0.760	1.830	1.022	6.479***	1.409	-0.932				
3(b)	Full Sample	-0.002	-0.079	0.002	0.517	0.001		1.230		46.0%	90
	t value	-0.014	-0.677	0.046	3.719***	1.554		4.594***			
3(c)	Full Sample	0.087	-0.035	0.026	0.872	-0.001			0.001	33.4%	90
	t value	0.431	-0.139	0.499	6.541***	-0.335			1.122		

**Table 6.4: Factors Influencing Value Relevance of Financial and Non-Financial Information:**

**Age of the Company, Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	DAge	NPAT	EQ	IA	DAge*NPAT	DAge*EQ	DAge*IA	R <sup>2</sup> <sub>Adj</sub>	N
1	Old Companies	-40260000		5.007	0.762	14569				35.9%	45
	t value	-1.682		3.196***	3.004***	4.334***					
2	Young Companies	9773712		-0.078	0.725	445				57.2%	45
	t value	0.680		-0.259	7.215***	0.179					
3(a)	Full Sample	-46940000	30560000	-0.358	0.659	10852	4.438			37.3%	90
	t value	-2.854***	2.173**	-0.653	4.927***	4.722***	3.344***				
3(b)	Full Sample	-23410000	15020000	0.516	0.571	8050		-0.009		28.9%	90
	t value	-1.440	0.913	0.975	3.001***	3.528***		-0.032			
3(c)	Full Sample	22940000	-48610000	0.823	0.621	-338			10943	32.2%	90
	t value	0.835	-1.427	1.574	4.483***	-0.072			2.033**		

\*\*\* Significant at 1% level

\*\* Significant at 5% level

\* Significant at 10% level

DSize: Dummy variable with value 1 for companies with age greater than median age, 0 otherwise; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count

According to Table 6.4, Panel A (per share basis), models 1 and 2 indicate the BV is value relevant in old companies (at 1% significance level) and young companies (at 1% significance level) as measured by the coefficients of BV. Further, model 3(b) indicates the difference of coefficients of BV between old companies and young companies is significant (t value 4.594 at 1% level) as measured by the coefficient of  $D_{age} * BV$ .

Panel B, model 1 indicates that NPAT, EQ and IA are value relevant in old companies (at 1% significance level) and model 2 indicates only EQ is value relevant in young companies (at 1% significance level). Further, Panel B, models 3(a) and 3(c) indicate that the difference of coefficients between old companies and young companies of NPAT (t value 3.334 at 1% level) and IA (t value 2.033 at 5% level) are significant as measured by the coefficients of  $D_{age} * NPAT$  and  $D_{age} * IA$  respectively.

The above findings indicate that age of the company positively influences the value relevance of earnings, book value and IA disclosures. In other words, the expressions of earnings, book value and non-financial, intangible assets disclosure on share prices are higher in old companies than in young companies.



### **6.1.6 Influence of Ownership Concentration for Value Relevance**

Ownership concentration of a company can be considered as an important factor that determines the risk of the company and share prices. The following hypothesis is developed to test the influence of the ownership concentration for the value relevance of financial and non-financial information.

H<sub>6</sub>: There is a negative association between the ownership concentration and value relevance of financial and non-financial information

In order to test the influence of the ownership concentration for the value relevance, a median split of the sample companies was performed and divided into two dichotomous groups (high ownership concentrated companies and low ownership concentrated companies). The split was based on the percentage of ordinary shares held by the largest 20 shareholders. A dummy variable with value 1 was introduced for companies with high ownership concentration than median ownership concentration (high ownership concentrated companies), 0 otherwise (low ownership concentrated companies). Ten multiple regressions were run to test H<sub>6</sub>, the influence of ownership concentration of a company for value relevance, with five regressions for per share basis and another five regressions for firm-level aggregates. Initially, the value relevance was tested in each group (high ownership concentrated companies and low ownership concentrated companies) separately, considering R<sub>1</sub> and R<sub>2</sub> developed to test the value relevance in Chapter 5. Each of the dummy-interaction variables was then separately introduced to the original regression equations to test the influence of ownership concentration of the firm for the value relevance of each variable. Accordingly, the following regression equations are estimated and tested.

Per Share	<b>R<sub>1</sub></b> : High ownership concentrated Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
Basis	<b>R<sub>1</sub></b> : Low ownership concentrated Companies	$P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$
Firm-Level	<b>R<sub>2</sub></b> : High ownership concentrated Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
Aggregates	<b>R<sub>2</sub></b> : Low ownership concentrated Companies	$MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$
Per Share	<b>R<sub>11(a)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DOwn_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i - \alpha_5 DOwn_i * E_i + \varepsilon_i$
Basis	<b>R<sub>11(b)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DOwn_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i - \alpha_5 DOwn_i * BV_i + \varepsilon_i$
	<b>R<sub>11(c)</sub></b> : Full Sample	$P_{it} = \alpha_0 + \alpha_1 DOwn_i + \alpha_2 E_i + \alpha_3 BV_i + \alpha_4 IA_i - \alpha_5 DOwn_i * IA_i + \varepsilon_i$
Firm-Level	<b>R<sub>12(a)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DOwn_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i - \alpha_5 DOwn_i * NPAT_i + \varepsilon_i$
Aggregates	<b>R<sub>12(b)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DOwn_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i - \alpha_5 DOwn_i * EQ_i + \varepsilon_i$
	<b>R<sub>12(c)</sub></b> : Full Sample	$MC_{it} = \alpha_0 + \alpha_1 DOwn_i + \alpha_2 NPAT_i + \alpha_3 EQ_i + \alpha_4 IA_i - \alpha_5 DOwn_i * IA_i + \varepsilon_i$

DOWn: Dummy variable with value 1 for high ownership concentrated companies, 0 for low ownership concentrated companies

The significance as (measured by p-value) of the above dummy-interaction variables are considered to decide the influence of the ownership concentration of the company for the value relevance. Results are presented in Table 6.5.

**Table 6.5: Factors Influencing Value Relevance of Financial and Non-Financial Information:  
Ownership Concentration, Per Share Basis**

<b>Panel A</b>											
Model	Data Set	Intercept	D <sub>Own</sub>	EPS	BV	IA	D <sub>Own</sub> *EPS	D <sub>Own</sub> *BV	D <sub>Own</sub> *IA	R <sup>2</sup> <sub>Adj</sub>	N
1	High Ownership Concentrated Companies	0.023		-0.092	0.792	0.001				24.3%	45
	t value	0.103		-0.480	4.101***	0.778					
2	Low Ownership Concentrated Companies	-0.031		0.038	0.869	0.001				35.1%	45
	t value	-0.224		0.765	4.329***	1.504					
3(a)	Full Sample	-0.021	0.021	-0.093	0.821	0.001	0.131			29.6%	90
	t value	-0.153	0.192	-0.558	6.055***	1.663	0.740				
3(b)	Full Sample	-0.031	0.041	0.024	0.782	0.001		0.086		29.2%	90
	t value	-0.224	0.311	0.445	4.628***	1.587		0.300			
3(c)	Full Sample	-0.029	0.030	0.024	0.812	0.001			0.001	29.2%	90
	t value	-0.185	0.122	0.433	5.924***	0.949			0.044		

**Table 6.5: Factors Influencing Value Relevance of Financial and Non-Financial Information:**

**Ownership Concentration, Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	D <sub>Own</sub>	NPAT	EQ	IA	D <sub>Own</sub> *NPAT	D <sub>Own</sub> *EQ	D <sub>Own</sub> *IA	R <sup>2</sup> <sub>Adj</sub>	N
1	High Ownership Concentrated Companies	-2808946		2.796	0.452	8082				16.7%	45
	t value	-0.102		2.180**	2.095**	1.853					
2	Low Ownership Concentrated Companies	-31190000		-0.109	0.676	8595				51.9%	45
	t value	-1.939**		-0.238	4.009***	3.695***					
3(a)	Full Sample	-29730000	19380000	2.805	0.555	8905	-2.898			32.8%	90
	t value	-1.712*	1.335	2.581***	4.102***	4.048***	-2.363**				
3(b)	Full Sample	-23960000	14270000	0.516	0.459	8204		0.219		28.8%	90
	t value	-1.355	0.891	0.995	2.436***	3.496***		0.777			
3(c)	Full Sample	-27530000	19030000	0.525	0.547	7539			1793	28.4%	90
	t value	-1.341	0.604	1.009	3.840***	1.979**			0.376		

\*\*\* Significant at 1% level

\*\* Significant at 5% level

\* Significant at 10% level

D<sub>Own</sub>: Dummy variable with value 1 for companies with ownership concentration greater than median ownership concentration, 0 otherwise; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count

According to Table 6.5, Panel A (per share basis), models 1 and 2 indicate the BV is value relevant in high ownership concentrated companies (at 1% significance level) and low ownership concentrated companies (at 1% significance level) as measured by the coefficients of BV. However, model 3(b) indicates the difference of coefficients of BV between high ownership concentrated companies and low ownership concentrated companies is not significant as measured by the coefficient of  $D_{Own} * BV$ .

Panel B, model 1 indicates, NPAT, EQ and IA are value relevant in high ownership concentrated companies (at 5% and 10% levels of significance) and model 2 indicates EQ and IA are value relevant in low ownership concentrated companies (at 1% significance level). Further, Panel B, models 3(a) indicates that the difference of coefficients of NPAT, between high ownership concentrated companies and low ownership concentrated companies is significant (t value -2.898 at 5% level) as measured by the coefficients of  $D_{Age} * NPAT$ .

The above findings indicate that ownership concentration of the company negatively influences the value relevance of earnings. In other words, the expression of earnings on share prices is higher in low ownership concentrated companies than in high ownership concentrated companies.

Thus the main findings of the above analysis are; size of a company positively influences the value relevance of earnings, book value and non-financial IA disclosures. Profitability of a company positively influences the value relevance of earnings and book value. Product orientated type of an industry negatively influences the value relevance of earnings and positively influences the value relevance of IA disclosures.

Age of a company positively influences the value relevance of earnings, book value and non-financial IA disclosures; and ownership concentration of a company negatively influences the value relevance of earnings in high-tech industries in Australia.

## **6.2 Assessment of Interaction Effect of Factors influencing Value Relevance of Financial and Non-Financial Information**

Interaction occurs if the effect of an independent variable on the dependent variable is influenced by the value of a second independent variable (Berenson et al., 2005). Two independent variables interact if the effect of one of the variables differs depending on the level of the other variable. Since the presence of interaction limits the generalisability of main effects, it is important to assess the interaction effect by introducing an interaction term to the regression model (Hair et al., 2006).

There is a possibility to interact non-financial, IA disclosures and factors influencing value relevance and affect on share prices. The product of IA disclosures and each of the factors influencing value relevance (size of the company, profitability, industry type, age of the company and ownership concentration) was introduced to assess the interaction effect and to understand how the factors interact with IA disclosures to affect share prices. The following four sections describe the hypotheses and the results of the regression analysis of interaction effect.

### 6.2.1 Interaction Effect of Size of the Company with IA

Since the size of a company affects the value relevance of financial and non-financial information, it is important to assess whether the size of the company interacts with non-financial intangible assets disclosures and affects the share price. The following hypothesis and the regression model are developed to test the interaction effect of size of the company with IA to share prices.

H<sub>7</sub>: There is a positive association between the interaction effect of size of the company with IA disclosure and share prices.

$$R_{13}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Firm_i * IA_i + \epsilon$$

Firm<sub>i</sub>\*IA: Product of size of the company and IA Disclosures

The size of the company is measured by the market capitalisation at the balance sheet date. The product of the size of the company and IA disclosures (Firm<sub>i</sub>\*IA<sub>i</sub>) is introduced as an interaction term to test the effect of the two variables on share prices. The interaction effect is tested only for the per-share basis measure, since the regression for the firm level aggregates measure is developed by considering the size of the firm. Initially, six multiple regressions were run to test H<sub>7</sub> for the full sample (all industry sectors together), then for each of the industry sectors separately, followed by industry sectors 2 and 3 together. The correlation coefficients are taken into account when modelling equations to avoid the multicollinearity problem. Accordingly, the independent variable of word count of intangible assets was dropped from all models since it was significantly correlated with the interaction term Firm<sub>i</sub>\*IA<sub>i</sub>. The results are presented in Table 6.6.

**Table 6.6: Assessment of Value Relevance of Interaction: Firm-Size and IA; Per-Share Basis**

Model	Data Set	Intercept	EPS	BV	Firm*IA	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	0.110	0.025	0.736	0.001	41.1%	21.660	90
	Significance	0.073	0.610	0.000**	0.000**		0.000**	
2	Sector 1, All companies	0.195	0.029	0.713	0.001	39.3%	10.722	46
	Significance	0.039	0.574	0.002**	0.001**		0.000**	
3	Sector 1, Companies reported negative earnings	0.143	0.168	0.538	0.001	71.5%	31.068	37
	Significance	0.007	0.262	0.001**	0.000**		0.000**	
4	Sector 2	0.007	0.215	0.473	0.001	84.5%	35.626	20
	Significance	0.729	0.427	0.000**	0.000**		0.000**	
5	Sector 3	0.117	3.038	0.751	0.001	40.9%	6.076	23
	Significance	0.464	0.090*	0.003**	0.667		0.004**	
6	Sector 2&3 together	0.063	1.696	0.308	0.001	71.9%	34.241	40
	Significance	0.071	0.000**	0.035*	0.001**		0.000**	

\*\* Significant at 1% level

\* Significant at 5% level

Variable Definitions: Sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication; EPS: Earnings per share; BV: Book value per share; IA: Voluntary Disclosure of Intangible Assets quantified by word count; Firm: Value of the firm, measured by the market capitalisation



As reported in Table 6.6, the F-statistics for the above models are highly significant with p-value at 1% level, indicating that the overall fit of the models are good. The coefficients of all interaction terms (firm\*IA) are reported with the appropriate expected sign, indicating they are positively correlated with share prices. Further, the coefficients of interaction terms are highly statistically significant at 1% level in five out of six models. As such, it can be concluded that the size of the firm interacts with IA disclosures and affects the share prices in high-tech industries in Australia.

### 6.2.2 Interaction Effect of Profitability of the firm with IA

Although the profitability of a firm does not significantly affect the value relevance of non-financial, IA disclosures, it is important to assess whether the profitability interacts with non-financial intangible assets disclosures which affects the share price. The following hypothesis and regression model is developed to test the interaction effect of profitability with IA to share prices.

H<sub>8</sub>: There is a positive association between the interaction effect of profitability with IA disclosure and share prices.

$$R_{14}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Pro_i * IA_i + \epsilon$$

$$R_{15}: MC_{it} = \alpha_0 + \alpha_1 NPAT + \alpha_2 EQ_i + \alpha_3 IA_i + \alpha_4 Pro_i * IA_i + \epsilon$$

Pro<sub>i</sub>\*IA: Profitability of the Firm\*IA

The profitability of the firm is measured by the NPAT. The product of NPAT and IA disclosures (Pro<sub>i</sub>\*IA<sub>i</sub>) is introduced as an interaction term to test the interaction effect of profitability and IA disclosures on share prices. The interaction effect is tested in both the per share basis measure and firm-level aggregates. Initially, six multiple regressions

were run for each measure to test  $H_8$  for the full sample (all industry sectors together), then for each of the industry sectors separately, followed by industry sectors 2 and 3 combined together. The correlation coefficients were taken into account when modelling equations to avoid the problem of multicollinearity. Accordingly, the independent variables of word count of IA and EPS of the models of per share basis measure, as well as the word count of IA and NPAT of firm-level aggregate measure were dropped since these variables were significantly correlated with the interaction term  $Pro_i * IA_i$ . The results are presented in Table 6.7.

**Table 6.7: Assessment of Value Relevance of Interaction: Profitability and IA, Per-Share Basis**

**Panel A**

Model	Data Set	Intercept	BV	NPAT*IA	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	0.124	0.846	-0.001	30.2%	20.252	90
	Significance	0.076	0.000**	0.274		0.000**	
2	Sector 1, All companies	0.174	0.884	-0.001	25.8%	8.833	46
	Significance	0.116	0.001**	0.168		0.001**	
3	Sector 1, Companies reported negative earnings	0.026	0.479	-0.003	66%	35.907	37
	Significance	0.659	0.001**	0.000**		0.000**	
4	Sector 2	0.045	0.581	0.001	44.6%	8.647	20
	Significance	0.316	0.001**	0.711		0.003**	
5	Sector 3	0.146	0.701	0.003	37%	7.455	23
	Significance	0.352	0.007**	0.206		0.004**	
6	Sector 2 and 3 together	0.109	0.591	0.002	53.4%	23.390	40
	Significance	0.028**	0.000**	0.008**		0.000**	

**Table 6.7: Assessment of Value Relevance of Interaction: Profitability and IA; Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	EQ	NPAT*IA (words 100')	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	21165000	0.659	0.001	20.8%	12.669	90
	Significance	0.016**	0.000**	0.083		0.000**	
2	Sector 1, All companies	14870000	0.649	0.001	49.9%	23.441	46
	Significance	0.143	0.001**	0.000**		0.000**	
3	Sector 1, Companies reported negative Earnings	-2302000	0.606	-0.001	75.1%	55.168	37
	Significance	0.785	0.000**	0.000**		0.000**	
4	Sector 2	-1739000	1.070	-0.001	43.3%	8.242	20
	Significance	0.795	0.001**	0.369		0.003**	
5	Sector 3	47320000	0.168	0.001	30.8%	5.887	23
	Significance	0.070	0.792	0.041*		0.010**	
6	Sector 2 and 3 together	18290000	0.337	0.001	56.7%	26.561	40
	Significance	0.000**	0.000**	0.000**		0.000**	

\*\* Significant at 1% level

\* Significant at 5% level

Variable Definitions: Sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count

As reported in Table 6.7, the F-statistics for the above models are highly significant with p-values at 1% level, indicating that the overall fit of the models are good. The coefficients of interaction terms,  $Pro_i*IA$  are reported with the appropriate expected signs, except for the Full sample and Sector 1: All companies of panel A and Sector 2 of Panel B. The coefficients of interaction terms are significant at 1% only in two models in panel A, per share basis measure (sector 1: companies reported negative earnings and sector 2 and 3 combined together). It is significant in four models of Panel B, firm-level aggregates at 1% and 5% levels (sector 1: all companies, sector 1: companies reported negative earnings, sector 3 and sector 2 and 3 together). As such, it can be concluded that the profitability of a firm interacts with non-financial, IA disclosures and affects the share prices in sector 1, sector 3 and sectors 2 and 3 combined together.

### **6.2.3 Interaction Effect of Industry Type with IA**

Since the type of the industry (product orientation or service orientation) influences value relevance of non-financial intangible assets disclosures, it is important to assess whether the industry type interacts with non-financial intangible assets disclosures and affect the share price. The following hypothesis and the regression models are developed to test the interaction effect of industry type with IA to share prices.

H<sub>9</sub>: There is a positive association between the interaction effect of product orientation with IA disclosure and share prices.

$$R_{16}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Ind_i * IA_i + \epsilon$$

$$R_{17}: MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \alpha_4 Ind_i * IA_i + \epsilon$$

Ind<sub>i</sub> \*IA<sub>i</sub>: Type of the industry\*IA

Ind<sub>i</sub>: A Dummy variable introduced to identify the industry type of the firm,

Ind<sub>i</sub> = 1 for product orientated firms and Ind<sub>i</sub> = 0 for service orientated firms.

A dummy variable was introduced to the original regression model to identify the industry type of the firm. The product of Ind<sub>i</sub> and IA disclosures (Ind<sub>i</sub>\*IA<sub>i</sub>) was introduced as an interaction term to test the interaction effect of those two variables on share prices. The interaction effect is tested in both the per share basis measure and firm-level aggregates. Only four multiple regressions were run to test H<sub>9</sub> for the full sample (all industry sectors together) and for industry sectors 2 and 3 together. The correlation coefficients were taken into account when modelling equations to avoid the multicollinearity problem. Accordingly, the independent variable, word count of IA was dropped from both measures, since IA is significantly correlated with the interaction term Ind<sub>i</sub>\*IA<sub>i</sub>. The results are presented in Table 6.8.

**Table 6.8: Assessment of Value Relevance of Interaction: Industry Type and IA; Per-Share Basis**

**Panel A**

Model	Data Set	Intercept	EPS	BV	Ind*IA (words 100')	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	0.026	0.028	0.843	2.674	31.76%	14.809	90
	Significance	0.765	0.596	0.000**	0.045*		0.000**	
2	Sector 2&3 together	0.118	2.784	0.715	0.001	44.65%	12.297	40
	Significance	0.252	0.011**	0.000**	0.609		0.000**	

**Table 6.8: Assessment of Value Relevance of Interaction: Industry Type and IA; Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	NPAT	EQ	Ind*IA (words 100')	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	10831076	0.668	0.642	4255	22.84%	9.784	90
	Significance	0.354	0.215	0.000**	0.019**		0.000**	
2	Sector 2and3 together	38374845	1.079	0.395	-4926	13.8%	3.254	40
	Significance	0.025	0.102	0.074	0.283		0.031**	

\*\* Significant at 1% level

\* Significant at 5% level

Variable Definitions: Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication; EPS: Earnings per share; BV: Book value per share; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count; Ind: Type of the industry

As reported in Table 6.8, the F-statistics of the models are highly significant with p-value at 1% level indicating the overall fit of the models are good. The coefficients of the interaction term  $Ind_i * IA$  are reported with the appropriate expected signs except for Panel B, Sector 2 and 3 combined together which indicates that they are positively correlated with share prices. Further, the coefficients of interaction terms are significant in Panel A: Full Sample at 5% level and Panel B, full sample at 1% level. As such, the results prove that non-financial, IA disclosures affect the share prices in product orientated companies.

#### **6.2.4 Interaction Effect of Age of the Company and Ownership Concentration with IA**

The following hypotheses and regression models are developed to test the interaction effect of the age of the company and ownership concentration with IA to share prices.

H<sub>10</sub>: There is a positive association between the interaction effect of age of the company with IA disclosure and share prices.

$$R_{18}: P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \alpha_4 Age_i * IA_i + \epsilon \quad (\text{per share basis})$$

$$R_{19}: MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \alpha_4 Age_i * IA_i + \epsilon \quad (\text{Firm-level aggregate})$$

$Age_i * IA_i$ : Interaction term for age of the company with IA disclosures

H<sub>11</sub>: There is a negative association between the interaction effect of ownership concentration with IA disclosure and share prices.

$$R_{20}: P_i = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i - \alpha_4 Own_i * IA_i + \epsilon \quad (\text{per share basis})$$

$$R_{21}: MC = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i - \alpha_4 Own_i * IA_i + \epsilon \quad (\text{Firm-level aggregate})$$



However, no significant results were found for any of the above four regressions (results reported in Appendix E). As such, it can be concluded that the age of the company and ownership concentration does not appear to interact with IA disclosures to affect share prices for the sample of companies in this study.

The main finding of the interaction effect of factors influencing value relevance of financial and non-financial information is that the size of the company influences share prices by interacting with non-financial IA disclosures at very high levels of significance. The results show that profitability and product orientated industry types also significantly influence share prices by interacting with IA disclosures. Age of the company and ownership concentration do not significantly influence share prices by interacting with IA disclosures.

### **6.3 Discussion of Results**

There is limited prior literature available to compare the findings of factors influencing value relevance of financial and the non-information and the interaction effect of company-specific factors with non-financial information for share prices. This study has attempted to address some aspects of the gaps in the literature.

The positive influence of the size of the company for the value relevance of non-financial IA disclosures and earnings are in line with the findings of Chapter 5 of the study. The following chapter will investigate whether the large companies tend to disclose more information compared to small companies. Chapter 5 reported that non-financial IA disclosures are value relevant. Accordingly, it is justifiable that size of the firm has a positive influence for the value relevance of IA disclosures. Further, the

findings are consistent with Ahmed and Courtis (1999) who concluded that corporate size and listing status were significantly associated with disclosure levels. The findings are also consistent with Ho et al. (1997) who suggest that the market reaction to repurchase announcements is negatively associated with the size of the firm. This suggests that large companies have already conveyed the information, or large companies' financial statement information (financial and non-financial) is value relevant compared to small companies.

The value relevance of IA disclosures of the current study is consistent with Haddad et al. (2009) since there is a positive association between level of voluntary disclosures and stock market liquidity. This result implies that companies with higher voluntary disclosures have higher market liquidity.

However, the finding of a positive influence of the size of the company for the value relevance contradicts some prior studies (for example, Chen et al., 2001; Filip and Raffournier, 2010). Chen et al.'s (2001) study provided strong support for the conclusion that earnings information is more value relevant in smaller firms, since more competing information sources about larger firms are available in the market. Filip and Raffournier (2010) found the association between accounting earnings and stock returns is higher for securities issued by small companies in Bucharest Stock Exchange (BSE), Romania. This difference may be due to the fact that their sample firms in Romania had no counterparts in Western European countries.

This study's finding that the positive influence of the profitability for the value relevance of earnings and book value is consistent with Goodwin and Ahmed (2006) who argued that loss making companies negatively influence the value relevance of earnings. Similarly the results support the findings of Chen et al. (2001) regarding the

fact that the value relevance of earnings of companies with positive earnings are higher than the companies with negative earnings. Further, the finding that there is no influence of company profitability for the value relevance of non-financial, IA disclosures is in line with the findings of Akhtaruddin (2005) which reported that the profitability of a company has no effect for the level of disclosure. However, Ahmed and Courtis (1999) found reported mixed results for the association between disclosure levels and profitability.

The negative influence of the product orientated companies for the value relevance of earnings may be due to the nature of earnings reported in 2008. The majority of companies in the Sector 1, Pharmaceuticals, Bio Technology and Life Sciences reported losses in 2008 (37 out of 46 companies, 78%). The reported negative earnings may have an influence on the above result since this sector dominates the sample of product orientated companies. Similarly, the value relevant intangible asset disclosures such as R&D of the Sector 1, Pharmaceuticals, Bio Technology and Life Sciences may influence the finding of a positive influence of product orientated companies for the value relevance of IA (to be discussed in Chapter 7).

The positive influence of the age of the company for the value relevance of earnings, book value as well as for non-financial, IA disclosures is an interesting finding. Old companies, by nature of their level of maturity, may develop investor confidence compared to younger companies. Hence, prior studies provided mixed results. For example, Akhtaruddin (2005) reported that company age was an insignificant factor for mandatory disclosure in Bangladesh although he hypothesised that old companies tend to disclose information to a greater extent than that of new companies. Brammer and

Pavelin (2006) reported mixed evidence for the relationship between age of the company and disclosure practices of large UK companies.

As predicted, the analysis found a negative influence of ownership concentration for the value relevance of earnings. The result suggests that investors of high ownership concentrated companies may have little interest in the published information compared to companies with a lower ownership concentration. Further, the result is consistent with Chen et al. (2001) who hypothesised that stock price incorporates more accounting information if there are more active investors making buy and sell decisions. Similarly Chen et al. (2001) also found that earnings are significantly more value relevant for high public holding group companies compared to low public holding group companies.

The findings of this study indicate that there is strong evidence for the interaction effect of size of the firm with IA disclosures on share prices. However, there is limited evidence for the interaction effect of the profitability and industry type with IA disclosure on share prices.

#### **6.4 Summary**

The analysis of factors influencing financial and non-financial information and the interaction effect of the company-specific factors with non-financial IA disclosures were tested in this chapter. The size of the company, profitability, industry type, age of the company and ownership concentration were selected to test the influence for the value relevance of financial and non-financial information based on the related prior literature. The interaction effect was then analysed to understand how those factors interact with IA disclosures to affect share prices.

The factors influencing value relevance of information was examined by dividing the sample companies into two dichotomous groups, based on each of the five factors: size of the company, profitability, industry type, age of the company and ownership concentration. A dummy variable was employed to denote a firm's membership in each group and a dummy interaction variable was created by multiplying the dummy variable by each of the independent variables in the original value relevance model (introduced in Chapter 4 and tested in Chapter 5). Initially, value relevance was tested for each of the groups separately and then more regressions were run for the full sample by incorporating each of the dummy-interaction variables, in order to compare the regression coefficients of independent variables between groups. Further, factors influencing value relevance were tested in both models: per share basis and firm-level aggregates.

The findings indicate that the effect of earnings, book value, as well as non-financial, intangible assets disclosures on share prices, are higher in large companies than in small companies. Additionally, the expressions of earnings and book value on share prices are higher in profit reported companies than in loss reported companies. The results of the analysis to find the influence of industry type for the value relevance revealed that the expressions of non-financial, intangible assets disclosures on share prices are higher in product orientated companies than in service orientated companies. The expressions of earnings on share prices were found to be higher in service orientated companies than in product orientated companies. Further, the results revealed that the expressions of earnings, book value and non-financial, intangible assets disclosure on share prices are higher in old companies than in young companies, while the expression of earnings on share prices is higher in low ownership concentrated companies than in high ownership

concentrated companies. The findings of the assessment of interaction effect of factors influencing value relevance of financial and non-financial information revealed that the size of the company is the most influential factor affecting share prices by interacting with non-financial IA disclosures.

Having analysed the factors influencing value relevance of information and discussed the results, the next chapter provides an investigation of reporting practices of intangible assets in the form of non-financial information.

## **Chapter 7**

### **Analysis of Data and Discussion of Results: Reporting Practices of Intangible Assets in the form of Voluntary Disclosures**

This chapter outlines the reporting practices of intangible assets in the form of voluntary disclosures and the results of the data analysis carried out in order to identify the significance of each category of intangible assets, in terms of value relevance (sub-question 2). The inter-industry comparison includes discussion of similarities and differences of reporting practices of intangible assets of the three industry sectors. Intra-industry comparison provides a descriptive analysis of reporting practices of intangible assets of selected top companies of each of the industry sectors. The results of the assessment of value relevance of each intangible asset category is provided by selecting industry-specific intangible assets, based on the results of Chapter 5. Finally, the results are discussed with reference to prior literature, followed by the summary of the chapter.

#### **7.1 Reporting Practices of Intangible Assets**

##### **7.1.1 Quantification of Voluntary Disclosures of Intangible Assets**

The voluntary disclosures of intangible assets of each company were quantified by counting the number of words (word count) of disclosure, in order to address sub-question 1 of the research project; ‘what is the magnitude of intangible asset disclosures in the form of non-financial information in company annual reports?’ The ‘Intangible

Assets Monitor' developed by Sveiby (1997) was applied to categorise intangible assets into three main headings: internal structure, external structure and individual competence. The un-audited, non-financial sections of 2008 annual reports of some companies, selected cross-sectionally, were carefully read in order to identify the list of intangible assets and to develop the intangible assets index, discussed in Chapter 4. The non-financial intangible asset disclosures were analysed using NVivo 8, qualitative data analysis software. The nodes were initially developed for the main categories of internal structure, external structure and individual competence, followed by the sub-categories of the intangible assets index as shown in figure 4.1. The voluntary disclosures of intangible assets were coded by identifying the main category as well as the sub-category.

### **7.1.2 Inter-industry Comparison of Voluntary Disclosures Practices of Intangible Assets**

The average word count of voluntary disclosures of intangible assets as a percentage of total word count for each industry sector, ranked in descending order, is presented in Table 7.1. Similarities, as well as significant differences in the reporting practices of intangible assets are found in the three industry sectors. The most popular IA disclosure based on the number of words of disclosure in annual reports in all three sectors is corporate governance. It is 34.7%, 45.7% and 50.9% in industry sectors 1, 2 and 3 respectively. Strength of management team is another popular intangible asset in all three sectors. Around 20% of intangible assets disclosures are about 'strength of management team' in all three industry sectors. Research and Development is the second leading intangible asset disclosure in sector 1: Pharmaceuticals, Bio Technology and Life Sciences. Research and Development represents 25% of voluntary IA



disclosures in this sector, compared to less than 1% in the other two sectors (a minor asset). There were reasonable disclosures found in the IA of products in sectors 2 (5.9%) and sector 3 (7.4%). Other than the above intangible assets, forward looking information, business acquisition and integration, business collaboration, business strategy, business development and environmental reporting are commonly reported intangible assets in all three sectors.

Disclosure of some intangible assets appears to be specific to industry sectors. For example, assets such as R&D, patents, intellectual property, community services, royalties and licences and technology are significant in industry sector 1: Pharmaceuticals, Bio Technology and Life Sciences. Intangible assets related to customers and markets, such as customer service and care, customer base, market growth, market share and brands appear specific to Sector 3: Telecommunication Services. Similarly, customer service and care, customer base, market growth can be identified as specific assets in Sector 2: Technology, Hardware and Equipment.

**Table 7.1: Disclosure of Intangible Assets (measured by word count) as a Percentage of Total Word Count**

Rank	Sector 1: Pharmaceuticals, Bio Technology and Life Sciences		Sector 2: Technology, Hardware and Equipment		Sector 3: Telecommunication Services	
	Intangible	Percentage	Intangible	Percentage	Intangible	Percentage
1	Corporate Governance	34.76%	Corporate Governance	45.67%	Corporate Governance	50.89%
2	R&D	25.05%	Strength of Management Team	20.28%	Strength of Management Team	19.01%
3	Strength of Management Team	20.63%	Products	5.96%	Products	7.39%
4	Forward Looking Information	2.88%	Business Acquisition and Integration	4.55%	Business Development	3.92%
5	Business Collaboration	1.82%	Forward Looking Information	4.50%	Business Acquisition and Integration	3.50%
6	Patents	1.54%	Business Collaboration	3.58%	Business Collaboration	3.43%
7	Intellectual Property	1.50%	Business Strategy	2.67%	Forward Looking Information	2.32%
8	Community Service	1.44%	Business Development	2.45%	Customer Service/ Care	1.64%
9	Business Acquisition and Integration	1.31%	Customer Service/ Care	1.99%	Business Strategy	1.56%
10	Business Strategy	1.14%	Market Growth	1.66%	Customer Base	1.49%
11	Market Growth	1.11%	Environmental Reporting	1.38%	Market Growth	0.89%
12	Strength of Employees	1.03%	Market Share	1.34%	Team Work	0.61%
13	Environmental Reporting	1.02%	Strength of Employees	0.52%	Environmental Reporting	0.61%
14	Government Support	0.84%	Risk Management	0.44%	Strength of Employees	0.50%
15	Royalty and Licence	0.74%	Customer Base	0.39%	Brands	0.46%
16	Technology	0.67%	Community Service	0.31%	Community Service	0.44%
17	Business Position, Market Position	0.60%	Positive Impact of the Economy	0.30%	Awards Received	0.31%
18	Customer Service/ Care	0.48%	Adaptability	0.29%	Industry Innovation	0.21%
19	Business Development	0.40%	Product Mix	0.28%	Government Support	0.21%
20	Risk Management	0.32%	Technology	0.19%	R&D	0.17%
21	Market Share	0.13%	Royalty and Licence	0.19%	Market Share	0.13%
22	Market Leader	0.10%	Team Work	0.18%	Intellectual Property	0.08%
23	Brands	0.09%	Awards Received	0.16%	Technology	0.07%
24	Awards Received	0.08%	R&D	0.15%	Positive Impact of the Economy	0.07%
25	Product Mix	0.07%	Brands	0.10%	First National Provider	0.03%
26	Team Work	0.06%	First National Provider	0.10%	Future Markets	0.02%
27	Quality	0.05%	Infrastructure Assets	0.10%	Product Mix	0.02%
28	Leadership	0.04%	Industry Innovation	0.08%	Quality	0.01%
29	Industry Innovation	0.03%	Quality	0.08%	Risk Management	0.01%
30	Future Markets	0.02%	Intellectual Property	0.06%		
31	Infrastructure Assets	0.02%	Patents	0.04%		
32	Positive Impact of the Economy	0.01%	Business Position, Market Position	0.01%		
33	First National Provider	0.01%				
34	Customer Base	0.01%				
	Total	100%	Total	100%	Total	100%

## **7.2 Intra-Industry Comparison of Voluntary Disclosures of Intangible Assets**

The following section compares the intangible assets reporting of top companies in each of the industry sectors. Since similarities and significant differences were observed in intangible assets reporting practices among the three industry sectors (discussed in section 7.1), it is important to see whether there are similarities and differences of intangible assets reporting practices of individual companies within each industry sector. Top companies of the industry sectors were selected for the comparison based on the market capitalisation and intensity of intangible assets reporting. Accordingly; in Sector 1, four companies from Pharmaceuticals, Bio Technology and Life Sciences; in Sector 2, five companies from Technology, Hardware and Equipment and in Sector 3, four companies from Telecommunication Services were selected for the comparison.

### **7.2.1 Sector 1: Pharmaceuticals, Bio Technology and Life Sciences**

Pharmaxis Ltd (Pharmaxis), Arana Therapeutics Limited (Arana), Novogen Limited (Novogen), and Chemgenex Pharmaceuticals Ltd. (Chemgenex) were selected for comparison from sector 1 firms based on the market capitalisation and intensity of intangible assets reporting. Pharmaxis Ltd is the largest company in this sector, based on the market capitalisation, as at 16, January 2009. The results of the intangible assets word count are presented in Table 7.2. The total word count of IA disclosure is very high in Pharmaxis Ltd. (23999 words), compared to other three companies (9846 in Arana, 5556 in Novogen and 5582 in Chemgenex). As discussed in the previous section, R&D is the most significant intangible asset in this sector, in terms of the number of words of disclosure. The R&D word count is also significantly higher in Pharmaxis Ltd. (10618 words) compared to the other three companies (3504 in Arana,

1594 in Novogen and 1961 in Chemgenex). Corporate governance and strength of management team can be considered as the next two important intangible assets of these companies. Similarly, intellectual property, forward looking information and environmental reporting are common in all four companies. However, business strategy, strength of employees and business collaboration are reported only in three companies while patents and business acquisition and integration are reported only in two out of four companies.

**Table 7.2: Results of the Intangible Assets Word count****Sector 1: Pharmaceuticals, Bio Technology and Life Sciences**

Intangible Asset	Word Count			
	Pharmaxis	Arana	Novogen	Chemgenex
R&D	10618	3504	1594	1961
Corporate Governance	4339	1810	2368	1397
Strength of Management Team	2920	3294	951	1362
Intellectual Property	817	340	52	41
Forward Looking information	347	76	81	297
Environmental Reporting	86	73	300	70
Business Strategy	608	32		219
Strength of Employees	479	76	14	
Business Collaboration	179	247		65
Patents	965		196	
Government Support	2641			
Technology		346		
Community Service		31		
Business Acquisition, Integration		17		8
Risk Management				162
Total	23999	9846	5556	5582

## **7.2.2 Sector 2: Technology, Hardware and Equipment**

Codan Limited (Codan), Mikoh Corporation Limited (Mikoh), Autron Corporation Limited (Autron), KLM Group Ltd. (KLM) and Keycorp Limited (Keycorp) were selected for the comparison in the sector 2: Technology, Hardware and Equipment, based on the market capitalisation and intensity of intangible assets reporting. Codan Limited is the largest company in this sector based on market capitalisation, as at 16, January 2009. The results of the intangible assets word count are presented in Table 7.3. The total word count of IA is high in Codan Limited (9231 words) compared to the other four companies (5857 in Mikoh, 6680 in Autron, 5882 in KLM and 6007 in Keycorp). Corporate governance seems to be the most frequent IA disclosure in four of these companies in terms of the number of words of disclosure. Out of the four companies, Codan reported a comparatively high number of words (4190) in corporate governance disclosure (2832 in Mikoh, 2351 in Autron and 2301 in Keycorp). The number of words for corporate governance is only 666 in KLM.

The most frequent IA disclosure of KLM is strength of management team (1847 words), which disclosed the highest number of words out of the five companies (1114 in Codan, 1582 in Mikoh, 1001 in Autron and 908 in Keycorp). Other than the above two intangible assets, forward looking information and business collaboration are common to all five companies. However, the word count is relatively small in these intangible assets. Further, business strategy, market growth, business development, customer base, business acquisition and integration, environmental reporting and strength of employees can be identified as the other popular IA in this sector.

**Table 7.3: Results of the Intangible Assets Word count****Sector 2: Technology, Hardware and Equipment**

Intangible Asset	Word Count				
	Codan	Mikoh	Autron	KLM	Keycorp
Corporate Governance	4190	2832	2351	666	2301
Strength of Management Team	1114	1582	1001	1847	908
Forward Looking information	545	93	310	131	553
Business Collaboration	58	314	689	291	711
Business Strategy	630	312	221		367
Market Growth	386	376	123	173	
Business Development		130	27	487	160
Customer Base	54	84	38	79	
Business Acquisition, Integration	513		1895	193	
Environmental Reporting			25	125	76
Strength of Employees	31	62		77	
Technology		72		60	
Product Mix	276				785
Positive impact of the economy	92				37
Market Share	1232				
Industry Innovation	72				
Quality	27				
Bus Position, Market Position	11				
Community Service				165	
Customer Service, Care				1588	
Strength of Employees					67
Leadership					42
<b>Total</b>	<b>9231</b>	<b>5857</b>	<b>6680</b>	<b>5882</b>	<b>6007</b>

### **7.2.3 Sector 3: Telecommunication Services**

Telstra Corporation Limited (Telstra), Entertainment Media & Telecoms Corporation Limited (EMT), Reverse Corporation Limited (Reverse), and Amcom Telecommunications Limited (Amcom) were selected for the comparison in sector 3: Telecommunication Services, based on market capitalisation and intensity of intangible assets reporting. Of these companies, Telstra Corporation Limited is the largest in this sector based on market capitalisation as at 16, January 2009. The results of the intangible assets word count are presented in Table 7.4. The total word count of IA is very high in Telstra (16415) and high in EMT (7235) compared to the other two companies (3042 in Reverse and 4437 in Amcom). Similar to sector 2: Technology, Hardware and Equipment, corporate governance and strength of management team are the most popular two intangible assets in this sector. Telstra reported a high level word count in both corporate governance (7989) and strength of management team (2645). EMT also discloses a relatively high level of words in those two IA (2377 for corporate governance and 1243 for strength of management team), compared to the other two companies. The intangible assets of products can be identified as a unique asset in this sector. All four companies disclose this asset (1629 words in Telstra, 1683 words in EMT, 152 in Reverse and 102 in Amcom).

Other than the above three intangible assets, business development, business acquisition and integration and business collaboration are disclosed by all four companies. Further, strength of employees, business strategy, environmental reporting and forward looking information can be identified as the next popular intangible assets in this sector. Furthermore, intangible assets related to customers and markets are also popular in this sector. Telstra disclosed 920 words, 684 words and 229 words for IA of customer service and care, customer base and for market growth respectively.



**Table 7.4: Results of the Intangible Assets Word Count,  
Sector 3: Telecommunication Services**

Intangible Asset	Word Count			
	Telstra	EMT	Reverse	Amcom
Corporate Governance	7989	2377	1525	1477
Strength of Management Team	2645	1243	951	1082
Products	1629	1683	152	102
Business Development	730	25	91	350
Business Acquisition, Integration	264	75	21	394
Business Collaboration	136	838	69	182
Strength of Employees	289	118	36	
Business Strategy	247	152		36
Environmental Reporting	167	22	26	
Forward Looking information		95	149	169
Customer Service, Care	920			77
Customer Base	684			260
Market Growth	229	144		
Intellectual Property		35		244
Positive impact of the economy			22	64
Industry Innovation	276			
Community Service	117			
Brands	46			
Market Share	24			
Product Mix	23			
Team Work		154		
Awards Received		130		
Technology		90		
future Markets		32		
First National Provider		22		
<b>Total</b>	<b>16415</b>	<b>7235</b>	<b>3042</b>	<b>4437</b>

The above interpretation reveals that there are similarities as well as differences in reporting practices of companies in the same industry sector. There was clear evidence to conclude that non-financial, intangible assets reporting intensity is high in large companies. Particularly, the largest company in each industry sector reported the largest total word count of IA disclosure. There is a tendency of disclosing IA of corporate governance and strength of management team in all selected companies. Companies may wish to obtain investor confidence and competitive advantage via transparent good governance and disclosing more about the strength of the management team respectively.

There were some differences found in reporting practices of intangible assets in the companies of all three sectors. Intangible assets such as patents, technology, and risk management are not popular among all selected companies in Sector 1. Similarly, IA such as quality, community service, customer service and care are not very popular in all companies in Sector 2. This may be due to the fact that direct contacts with consumers are less in Sector 2: Technology, Hardware and Equipment. Further, a disparity was found in reporting intangible assets in Sector 3, particularly for the IA related to markets, technology and intellectual property. The reason for this may be the size differences of the companies in sector 3.

### 7.3 Value Relevance of Voluntary Disclosures of each Category of Intangible Asset

Value relevance of voluntary disclosures of each category of intangible asset is examined applying Ohlson's (1995) model discussed in Chapters 4 and 5. The model was utilised to address sub-question 2 of the research: 'to what extent each category of IA disclosure significant in terms of value relevance?' The following hypothesis ( $H_{12}$ ) and regression models ( $R_{22}$  and  $R_{23}$ ) were developed to address the sub-question 3 (as discussed in Chapter 4: Design of the Research,  $H_1$  was tested in Chapter 5 and  $H_2$  to  $H_{11}$  were tested in Chapter 6).

**$H_{12}$ :** There is a positive association between market value of shares and disclosure of non-financial information of IA.

$$\mathbf{R_{22}:} \quad P_{it} = \alpha_0 + \alpha_1 E_i + \alpha_2 BV_i + \alpha_3 IA_i + \varepsilon_i$$

In order to control for the cross-sectional scale differences (scale effect), the following alternative regression model is developed to test the same hypothesis ( $H_{12}$ ).

$$\mathbf{R_{23}:} \quad MC_{it} = \alpha_0 + \alpha_1 NPAT_i + \alpha_2 EQ_i + \alpha_3 IA_i + \varepsilon_i$$

#### Variable Definitions

- $\alpha_0$  : Intercept
- $P_{it}$  : Price of a share of firm i, at the date on which the annual report is issued
- $E_i$  : Earnings per share of firm i
- $BV_i$  : Book value per share of firm i
- $IA_i$  : Result of the word count of particular intangible assets disclosures in the form of non-financial information, for firm i
- $MC_{it}$  : Market Capitalisation of firm i, at the date on which the annual report is issued

- NPAT<sub>i</sub>: Net Profit after Tax of firm i
- EQ<sub>i</sub>: Book Value of Equity, firm i
- €: Independently and identically disturbed error term

As in Chapter 5, value relevance of each intangible asset was tested separately for each data set: full sample, sector 1 (all companies), sector 1 (companies reporting negative earnings), sector 2 and sector 2 and 3 combined together. Sector 3 was not selected for the test since the findings of Chapter 5 indicated there is no value relevance of non-financial, intangible assets disclosures in that sector. Sector 1 was analysed in two data sets, and sector 2 and 3 were combined together since the majority of companies in sector 1 reported negative earnings. The word count of each IA was carefully studied in order to select the IA to test the value relevance. The slope coefficients of the independent variable of the IA disclosure (and its significance), F-statistic (and its significance), and the value of  $R^2_{adj}$  are taken into account to assess the value relevance of intangible asset disclosure, significance of the overall model, and explanatory power of the model respectively. The significance level considered to reject the null-hypothesis is 10%, since the objective is to test the expression of share prices by voluntary disclosure of each intangible asset. Further, in a similar study of value relevance, Chen et al. (2001) applied the same significance level. The intangible assets selected from each of the data sets to examine the value relevance are outlined below.

- Full Sample: corporate Governance, strength of management team
- Sector 1, Pharmaceuticals, Bio Technology and Life Sciences (all companies): forward looking information, corporate governance, strength of management team, business collaboration, environmental reporting and R&D
- Sector 1, Pharmaceuticals, Bio Technology and Life Sciences (companies reported negative earnings): forward looking information, corporate

governance, strength of management team, business collaboration,  
environmental reporting and R&D

Sector 2, Technology, Hardware and Equipment: forward looking information,  
corporate governance, strength of management team, business development,  
business collaboration and environmental reporting

Sector 2, Technology, Hardware and Equipment and Sector 3,  
Telecommunication Services combined together: corporate governance and  
strength of management team

Fifty two regression models were run to test the significance of IA disclosures in terms of value relevance. However, only fourteen models reported significant results and are presented in Table 7.5 (results of the insignificant models are provided in Appendix F). The significantly correlated independent variables have been dropped in the modelling equations in order to avoid the problem of multicollinearity. Accordingly, in Panel A, BV was deleted from model 2(a), 2(b) and 2(c) and EPS was deleted from model 4. Similarly, in Panel B, EQ was deleted from model 1 and model 2(b).

**Table 7.5: Assessment of Value Relevance of Each Category of Intangible Assets: Per Share Basis**

**Panel A**

Model No.	Data Set	Category of IA	Intercept	EPS	BV	IA (100' words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Sector 1 (All companies)	Research and Development	0.106	0.035	0.902	0.073	26%	6.274	46
		Significance	0.408	0.542	0.000***	0.096*			
2 (a)	Sector 1 (Companies reported negative earnings)	Research and Development	0.048	-0.173		0.100	30.9%	9.052	37
		Significance	0.632	0.392		0.000***			
2(b)		Strength of Management Team	0.072	-0.096		0.100	4.3%	1.812	37
		Significance	0.681	0.700		0.110			
2 (c)		Environmental Reporting	0.201	-0.230		0.200	7.1%	2.370	37
		Significance	0.059	0.327		0.060*			
3(a)	Sector 2	Forward Looking information	-0.045	0.326	0.534	0.100	53.1%	8.162	20
		Significance	0.425	0.488	0.001***	0.065*			
3(b)		Corporate Governance	-0.065	0.264	0.688	0.003	50.6%	7.479	20
		Significance	0.372	0.583	0.000***	0.107*			
4	Sector 2 and 3	Strength of Management Team	-0.071		0.753	0.001	46.1%	17.689	40
		Significance	0.483		0.000***	0.179			

**Table 7.5: Assessment of Value Relevance of Each Category of Intangible Assets: Firm-Level Aggregates**

**Panel B**

Model No.	Data Set	Category of IA	Intercept	NPAT	EQ	Each IA (100 <sup>7</sup> words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Sector 1 (All companies)	Research and Development Significance	2556791 0.832	0.663 0.001***		17939 0.000***	47%	20.990 0.000***	46
2 (a)	Sector 1 (Companies reported negative earnings)	Research and Development Significance	-24210000 0.068	-2.789 0.049**	0.606 0.001***	19148 0.000***	66.0%	24.273 0.000***	37
2 (b)		Strength of Management Team Significance	-38090000 0.183	-6.103 0.002***		28215 0.043**	28.8%	8.289 0.001***	37
2(c)		Environmental Reporting Significance	7369384 0.640	-4.306 0.014***	0.807 0.000***	106612 0.432	47.9%	12.034 0.000***	37
3(a)	Sector 2	Forward Looking information Significance	-8155802 0.292	-0.085 0.693	0.805 0.019***	52866 0.158	47.7%	6.772 0.004***	20
3(b)		Corporate Governance Significance	18960000 0.052	-0.330 0.091*	1.186 0.000***	6452 0.027**	56.5%	9.226 0.001***	20
4	Sector 2 and 3	Strength of Management Team Significance	-3330184 0.749	1.638 0.000***	0.370 0.000***	23170 0.030**	60.1%	20.562 0.000***	40

\*\*\* Significant at 1% level

\*\* Significant at 5% level

\* Significant at 10% level

Variable Definitions: Sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication Services; EPS: Earnings per share; BV: Book value per share; IA: Voluntary Disclosure of particular Intangible Assets quantified by word count; NPAT: Net Profit after Tax; EQ: Book Value of Equity

Results for each of the models are discussed in the following sections.

### 7.3.1 Sector 1: Pharmaceuticals, Bio Technology and Life Sciences, All

#### Companies

##### 7.3.1.1 Research and Development

$$\text{Panel A, Model 1: } P_{it} = 0.106 + 0.035E_i + 0.902BV_i + 0.073IA_i + \varepsilon_i$$

(0.408)
(0.542)
(0.000)
(0.096)

$$\text{Panel B, Model 1: } MC_{it} = 2556791 + 0.663NPAT_i + 17939IA_i + \varepsilon_i$$

(0.832)
(0.001)
(0.000)

Panel A, Model 1 is estimated for the per share basis ( $R_{22}$ ) and Panel B, Model 1 is for the firm-level aggregates ( $R_{23}$ ). The F-statistic used to test the overall fit of the above models are 6.274 and 20.990 respectively, which are highly statistically significant with p-value at 1% level. The coefficients of all independent variables have the appropriate expected signs indicating they are positively correlated with share prices. The coefficient of R&D is statistically significant in both models (at 10% in panel A, model 1 and at 1% in Panel B, model 1). This indicates that R&D disclosures of a non-financial nature are value relevant in Sector 1: Pharmaceuticals, Bio technology and Life Sciences. Further, reasonable explanatory powers (26% and 47%) were reported in these models as measured by adjusted  $R^2$ .



## 7.3.2 Sector 1: Pharmaceuticals, Bio Technology and Life Sciences, Companies Reported Negative Earnings

### 7.3.2.1 Research and Development

$$\text{Panel A, Model 2(a): } P_{it} = 0.048 - 0.173E_i + 0.100IA_i + \varepsilon_i$$

(0.632)
(0.392)
(0.000)

$$\text{Panel B, Model 2(a): } MC_{it} = -24210000 - 2.789NPAT_i + 0.606EQ + 19148IA_i + \varepsilon_i$$

(0.068)
(0.049)
(0.001)
(0.000)

Panel A, Model 2(a) is estimated for the per share basis ( $R_{22}$ ) and Panel B, Model 2(a) is for the firm-level aggregates ( $R_{23}$ ). The F-statistic used to test the overall fit of the above models are 9.052 and 24.273 respectively, which are highly statistically significant with p-value at 1% level. The coefficients of all independent variables have the appropriate expected signs. The coefficient of R&D is statistically significant in both models at 1% level. This indicates that R&D disclosures of a non-financial nature are value relevant in Sector 1: Pharmaceuticals, Bio technology and Life Sciences, companies reported negative earnings. Further, reasonable explanatory powers (30.9% and 66%) were reported in these models as measured by adjusted  $R^2$ .

### 7.3.2.2 Strength of Management Team

$$\text{Panel A, Model 2(b): } P_{it} = 0.072 - 0.096E_i + 0.100IA_i + \varepsilon_i$$

(0.681)
(0.700)
(0.110)

$$\text{Panel B, Model 2(b): } P_{it} = -38090000 - 6.103NPAT_i + 28215IA_i + \varepsilon_i$$

(0.183)
(0.002)
(0.043)

Panel A, Model 2(b) is estimated for the per share basis ( $R_{22}$ ) and Panel B, Model 2(b) is for the firm-level aggregates ( $R_{23}$ ). The F-statistic used to test the overall fit of the

above models are 1.812 and 8.289 respectively. However, only panel B, model 2(b) is statistically significant (at 1% level). The coefficients of all independent variables have the appropriate expected signs. The coefficient of IA of Strength of Management Team is statistically significant only in panel B, model 2(b) at 5% level (which is not significant in panel A, model 2(b)). This indicates that strength of management team disclosures are value relevant in Sector 1: Pharmaceuticals, Bio technology and Life Sciences, companies reported negative earnings. Further, a reasonable explanatory power (28.8%) was reported in panel B, model 2(b) as measured by adjusted R<sup>2</sup>.

### 7.3.2.3 Environmental Reporting

$$\text{Panel A, Model 2(c): } P_{it} = 0.201 - 0.230E_i + 0.200IA_i + \varepsilon_i$$

(0.059)
(0.327)
(0.060)

$$\text{Panel B, Model 2(c): } P_{it} = 7369384 - 4.306NPAT_i + 0.8070EQ + 106612 IA_i + \varepsilon_i$$

(0.640)
(0.014)
(0.000)
(0.432)

Panel A, Model 2(c) is estimated for the per share basis (R<sub>22</sub>) and Panel B, Model 2(c) is for the firm-level aggregates (R<sub>23</sub>). The F-statistic used to test the overall fit of the above models are 2.370 and 12.034 respectively, which are statistically significant with p-value at 10% and 1% levels. The coefficients of all independent variables have the appropriate expected signs. The coefficient of IA of environmental reporting is statistically significant only in panel A, model 2(c) at 10% level (which is not significant in panel B, model 2(c)). This indicates that environmental reporting disclosures are value relevant in Sector 1: companies reporting negative earnings. However, the reported 10% significance level and 7.1% explanatory power (measured by adjusted R<sup>2</sup>) limits the strength of the above result.

### 7.3.3 Sector 2: Technology, Hardware and Equipment

#### 7.3.3.1 Forward Looking Information

$$\text{Panel A, Model 3(a): } P_{it} = -0.045 + 0.326E_i + 0.534BV + 0.100IA_i + \varepsilon_i$$

(0.425)                      (0.488)                      (0.001)                      (0.065)

$$\text{Panel B, Model 3(a): } P_{it} = -8155802 - 0.085NPAT_i + 0.805EQ + 52866IA_i + \varepsilon_i$$

(0.292)                      (0.693)                      (0.019)                      (0.158)

Panel A, Model 3(a) is estimated for the per share basis ( $R_{22}$ ) and Panel B, Model 3(a) is for the firm-level aggregates ( $R_{23}$ ). The F-statistic used to test the overall fit of the above models are 8.162 and 6.772 respectively which are highly statistically significant with p-value at 1% level. The coefficients of all independent variables (other than earnings of Panel B, Model 3(a) have the appropriate expected signs. The coefficient of IA of forward looking information is statistically significant only in panel A, model 3(a) at 10% level (which is not significant in panel B, model 3(a). This indicates that forward looking disclosures are value relevant in Sector 2: Hardware, Technology and Equipment. Further, a reasonable explanatory power (53.1%) was reported in panel A, model 3(a) as measured by adjusted  $R^2$ .

#### 7.3.3.2 Corporate Governance

$$\text{Panel A, Model 3(b): } P_{it} = -0.065 + 0.264E_i + 0.688BV + 0.0030IA_i + \varepsilon_i$$

(0.372)                      (0.583)                      (0.000)                      (0.107)

$$\text{Panel B, Model 3(b): } P_{it} = 18960000 - 0.330NPAT_i + 1.186EQ + 6452IA_i + \varepsilon_i$$

(0.052)                      (0.091)                      (0.000)                      (0.027)

Panel A, Model 3(b) is estimated for the per share basis ( $R_{22}$ ) and Panel B, Model 3(b) is for the firm-level aggregates ( $R_{23}$ ). The F-statistic used to test the overall fit of the above models are 7.479 and 9.226 respectively, which are highly statistically significant

with p-value at 1% level. The coefficients of all independent variables (other than earnings of Panel B, Model 3(b) have the appropriate expected signs, indicating that they are positively correlated with share prices. The coefficient of IA disclosure of corporate governance is statistically significant in both models (at 10% in Panel A, model 3(b) and at 5% in Panel B, model 3(b). This indicates that corporate governance disclosure of a non-financial nature is value relevant in Sector 2: Hardware, Technology and Equipment. Further, reasonable explanatory powers (50.6% and 56.5%) were reported in these models as measured by adjusted  $R^2$ . However, the small sample size of this sector limits the strength of the above results.

### 7.3.4 Sector 2 and Sector 3 Combined Together

#### 7.3.4.1 Strength of Management Team

$$\text{Panel A, Model 4: } P_{it} = -0.071 + 0.753 BV + 0.001 IA_i + \varepsilon_i$$

(0.483)                      (0.000)                      (0.179)

$$\text{Panel B, Model 4: } P_{it} = -3330184 + 1.638 NPAT_i + 0.370 EQ + 23170 IA_i + \varepsilon_i$$

(0.749)                      (0.000)                      (0.000)                      (0.030)

Panel A, Model 4 is estimated for the per share basis ( $R_{22}$ ) and Panel B, Model 4 is for the firm-level aggregates ( $R_{23}$ ). The F-statistic used to test the overall fit of the above models are 17.689 and 20.562 respectively, which are highly statistically significant with p-value at 1% level. The coefficients of all independent variables have the appropriate expected signs, indicating that they are positively correlated with share prices. The coefficient of IA of strength of management team is statistically significant only in Panel B, model 4, at 5% level. This indicates that strength of management team disclosures of a non-financial nature are value relevant when sectors 2 and 3 are

combined together. Further, reasonable explanatory powers (46.1% and 60.1%) were reported in these models as measured by adjusted  $R^2$ .

The above results indicate that some of the industry-specific intangible assets are value relevant in the Australian market. Particularly, the disclosure of R&D, environmental reporting and strength of management team are significant in deciding share prices in Sector 1: Pharmaceuticals, Bio Technology and Life Sciences. Similarly, disclosure of forward looking information and corporate governance in Sector 2, and strength of management team in Sector 2 and 3 combined together are identified as value relevant intangible assets.

#### **7.4 Discussion of Results**

Results of the inter-industry comparison, intra-industry comparison and assessment of value relevance of each intangible assets disclosure are discussed in this section. The reported large numbers of average word count of all three industry sectors suggests that there are considerable voluntary intangible assets disclosures provided in annual reports in high-tech industries in Australia. This is consistent with the findings of Guthrie and Richard (2000), that in nearly every instance of reporting involving intellectual capital attributes were appeared to be expressed discursively rather than in numerical terms. Further, the findings are consistent with the suggestion of Gelb (2000), that firms with higher levels of intangible assets perceive accounting disclosures as a relatively ineffective means of communicating with investors and, therefore, are more likely to emphasise supplementary disclosures such as voluntary publications and investor relations.

The rationale for voluntary disclosures is discussed in prior literature. For example, Garcia-Ayuso (2003) reported that managers believe that the voluntary disclosure of information on intangibles has positive effects on their governance mechanisms and strengthens relationships with their stakeholders. In terms of image, Guthrie et al. (1999) found that disclosure of intangible assets in annual reports helps to make capital markets more efficient by reducing information asymmetry between insiders and investors, and those disclosures help the capital market to provide a more accurate market capitalisation of firms. Marr et al. (2003) found five main reasons for the measurement of IC: to help organizations formulate their strategy; to assess strategy execution; to assist in diversification and expansion decisions; to use these as a basis for compensation; and to communicate measures to external stakeholders. Further, companies may wish to minimise the abnormal earnings generated in markets by way of conveying more information as voluntary disclosures. Kohlbeck and Warfield (2007) reported that internally generated and (unrecorded) intangible assets represent a major source of abnormal earnings and the persistence of bank abnormal earnings and, consequently, the pricing multiples on bank abnormal earnings vary with the level of unrecorded intangible assets. However, there are arguments that the voluntary disclosures are not a perfect solution for information asymmetry. For example, AAA Financial Accounting Standards Committee (2003) stated that voluntary disclosures of intangible information are not widespread which suggests that the net private benefits that accrue to firms from these disclosures are relatively small.

Well known commentators such as Elliot (1994) Wallman (1996) and Lev (1996) argue that the relevance of financial statements has declined through time. The large run-up in the US equity prices relative to book values and earnings during the 1990s, especially for technology firms, added fuel to this argument (AAA Financial Accounting Standards Committee, 2003).

The inter-industry comparison revealed that disclosure of some intangible assets is specific to an industry sector. Assets such as R&D, patents, intellectual property, community services, royalties and licences and technology appear to be significant in industry Sector I: Pharmaceuticals, Bio Technology and Life Sciences. Intangible assets related to customers and markets appear to be specific to Sector 3: Telecommunication Services. These results are consistent with the findings of Guthrie and Richard (2000). In particular, there are similarities in the main areas of intellectual capital reporting focus on human resources, technology and intellectual property rights, and organisational and work-place structure in Australia. Further, the tendency of reporting the IA of corporate governance and strength of management team is common to all selected companies, which may reflect the need for the transparency of good governance. Finally, companies may wish to obtain a competitive advantage by disclosing the strength of the management team, as discussed by Gray and Skogsvik (2004).

The intra-industry comparison revealed similarities, as well as disparities of intangible assets reporting practices. Specific evidence was found that non-financial, intangible reporting intensity is high in large companies. Particularly, the largest company in each industry sector had the largest total word count of IA disclosures. This finding suggests that large companies tend to disclose more information compared to small companies, consistent with the findings of Brammer and Pavelin (2006). Large, less indebted companies with dispersed ownership characteristics are significantly more likely to make voluntary environmental disclosures. However, consistent with the findings of Guthrie and Richard (2000), this study observed that there is no proper format of presentation of voluntary disclosures in annual reports. This may be explained by the

fact that there is no formal guideline specifying the format of presentation of voluntary disclosures in annual reports. Goodwin and Ahmad (2006) stated that there are no specific standards for most intangibles, meaning that recognition and measurement of intangibles are subject only to a general provision.

Research and development is the most popular IA for the majority of companies in Sector 1: Pharmaceuticals, Bio Technology and Life sciences. Since R&D is the key for the growth in this sector, companies in this sector may wish to obtain a competitive advantage by making more voluntary disclosures under the capitalisation restricted regulatory reforms. This finding is consistent with the discussion of Gray and Skogsvik (2004), given that there has been a strong emphasis on disclosure relevant information about R&D activities, which are crucially important for the future profitability and the growth of pharmaceutical companies. Under these circumstances, there is no surprise that R&D of Sector 1: Pharmaceuticals Bio Technology and Life Sciences is value relevant in the Australian market since the market is proved as an efficient (Groenewold, 1997; Gan et al., 2005).

## **7.5 Summary**

The reporting practices of intangible assets of high-tech industries in Australia have been outlined in this chapter, analysed from both an inter-industry and intra-industry context. The voluntary disclosures of intangible assets were quantified to address sub-question 1 of the research project: ‘what is the magnitude of intangible assets disclosure in the form of non-financial information in company annual reports?’ The quantification was done by counting the number of words of disclosure (word count) using NVivo 8. The un-audited sections of the annual reports were scrutinised to identify the voluntary



disclosures of intangible assets. The intangible assets monitor developed by Sveiby (1997) was applied to categorise the voluntary disclosures of intangible assets. Industry-specific reporting practices were then observed in the inter-industry comparison of word count of intangible assets. An intra-industry comparison was performed by selecting the top companies in each industry sector. Similarities, as well as disparities, were identified in the IA reporting practices of those companies. The tests carried out to address sub-question 2: ‘to what extent each category of IA disclosure significant in terms of value relevance?’ revealed that only some industry-specific intangible asset disclosures were significant in terms of value relevance in high-tech industries in Australia.

The findings suggest that the voluntary disclosure of intangible assets is popular in high-tech industries in Australia, due to the practice of discursive disclosure of IA and the restricted capitalisation regulations related to IA such as AASB 138: Intangible Assets. Further, the large companies tend to share more information with the market compared to small companies. The identification of voluntary disclosure of industry-specific IA implies the dire need of companies to communicate their strengths such as R&D, strength of management team and good governance practices. Further, the value relevance of intangible assets disclosures proposes to improve the business reporting models by introducing a proper format to disclose the real value creating activities of companies.

Chapter 7 provided the results of the data analysis for the reporting practices of intangible assets in the form of voluntary disclosures and discussed the results referring to prior literature. Chapter 8 completes the study by providing the conclusions and future directions.

## **Chapter 8: Conclusions and Future Directions**

Value relevance studies provide insights into how accounting amounts reflect information that is used by investors. Findings of value relevance studies contribute to increase both the relevance and reliability of accounting information (Henderson et al., 2004). Barth et al. (2001) argue that value relevance studies are informative for accounting standard setters, since relevance and reliability are the two most important characteristics for selecting the financial information to be included in financial reports.

Since Ball and Brown's (1968) study, accounting researchers have documented the association between accounting earnings and stock returns. Studies have been expanded to incorporate the value relevance of accounting information, including both balance sheet measures of assets and liabilities and income statement measures of earnings by using Ohlson's Value Relevance Models. There are few studies that have addressed value relevance of non-financial information in addition to accounting information. While early studies focussed on the US market, more recent research has investigated the value relevance of accounting information in markets other than the US (Barth and Clinch, 1998; Liang, 2005; Ahmed and Falk, 2006; Banghoj and Plenborg, 2008).

The aim of the study was to test the value relevance of financial information and intangible assets disclosures, in the form of non-financial information in high-tech industries in Australia. The study was conducted in two main phases: identification and quantification of intangible asset disclosures in the form of non-financial information; and examination of value relevance of accounting information as well as intangible asset disclosures; in high-tech industries in Australia. Two different methods were

applied for the above two phases. Content analysis was employed for phase 1 and Ohlson's (1995) valuation model (with some modifications) was applied in phase 2. This model represents the firm value as a linear function of earnings, book value and other information disclosures. The 'other information' phase of this model is particularly significant in this study, since the main research question was to examine the value relevance of accounting information and intangible asset disclosures in high-tech industries in Australia. Ohlson's (1995) original model was modified to enable capturing the impact of IA disclosures in the form of non-financial information of the firm's value. In particular, the quantified intangible asset disclosures were introduced as the third variable to the original model. This modification can be considered as an original contribution to accounting literature.

The following sections provide the summary of the findings, contributions, limitations of the study and finally, directions for future research.

## **8.1 Summary of the Findings**

Summary of the findings were drawn from the results of the analysis of data, presented in Chapters 5, 6 and 7. Chapter 5 focused on the main research question: 'is the financial information and IA disclosure in the form of non-financial information, value relevant in high-tech industries in Australia'? Results of Chapter 5 indicate that the book value is highly value relevant in all three industry sectors that formed the basis of this study. Of the three variables tested (earnings, book value and non-financial, IA disclosures) earnings was found to be the least value relevant variable. Further, non-financial, IA disclosures were also found to be value relevant in high-tech industries in Australia. This provides support for the previous US and Australian studies that

concluded investors would probably increasingly rely upon alternative information sources (Collins et al., 1997; Brown et al., 1999; Francis and Schipper, 1999; Lev and Paul, 1999; Brimble and Hodgson, 2007).

Intangible assets reporting practices of companies were observed from an inter-industry and intra-industry context via the results obtained from the word count of non-financial, IA disclosures (sub-question 1 of the study). The results revealed similarities as well as differences in reporting practices of companies in the same industry sector. There was clear evidence to conclude that non-financial, intangible assets reporting intensity is high in large companies. Particularly, the largest company in each industry sector reported the largest total word count of IA disclosure. The results also highlighted the fact that disclosure of corporate governance and the strength of the management team appear to be very popular in Australian companies. Further, disclosures of some intangible assets were identified as industry-specific. For example; research and development is popular in Pharmaceuticals, Bio technology and Life Sciences sector while intangible assets related to customers and markets appear popular in the Telecommunication Services sector.

The tests carried out to address sub-question 2: 'to what extent is each category of intangible asset disclosures significant in terms of value relevance?' provides evidence that some of the industry-specific, voluntary IA disclosures are significant in terms of value relevance in the Australian market. They are: research and development, environmental reporting, strength of management, forward looking information and corporate governance.

The findings discussed in Chapter 6 addressed sub-question 3 of the study, ‘factors that may influence the value relevance of information’. The results suggest that the size and age of the company positively influence to increase in the value relevance of financial and non-financial information and profitability led to an improvement in the value relevance of earnings and book value. Further, product orientated industry type and ownership concentration causes a decrease in the value relevance of earnings, while product orientated industry type led to alone an increase in the value relevance of intangible asset disclosures in high-tech industries in Australia.

This study also found that the size of the company is the most influential factor followed by profitability, that affects the share price via it’s interact in with non-financial IA disclosures. Industry type was also found to significantly affect share prices by interacting with IA disclosures. The age of the company and the ownership concentration do not appear to significantly influence share prices by interacting with IA disclosures.

## **8.2 Contribution of the Study**

The findings of this study contribute to the body of knowledge in several ways. In terms of value relevance research, the study increases the understanding of relevance and reliability of accounting information. This study identified the non-financial, intangible assets disclosures and developed an intangible assets index for the high-tech industries in Australia. It also identified and quantified intangible asset disclosures in terms of word count. Further, the disclosure practices of intangible assets were investigated from both an inter-industry and intra-industry context in high-tech industries in Australia. The examination of value relevance of financial and non-financial information is the

main contribution of this study to accounting literature. The value relevance of financial and non-financial information was examined by modifying Ohlson's (1995) value relevance model. The partial replication and modification of Ohlson's (1995) Value Relevance Model, which incorporated quantified voluntary disclosures of intangible assets, can be considered as an original contribution to the accounting literature. Further, this study adds to accounting literature by examining the value relevance of voluntary disclosures of each category of intangible asset and testing the factors influencing value relevance.

The findings of this study also contribute to the theoretical framework of 'share valuation'. In addition to the price predictions in the market-based demand and supply of shares (based on short-term share market trends), the traditional share valuation models are mainly developed on the financial information of companies, such as, earnings per share, price to earnings ratio, return on invested capital and return on assets. However, the value relevance of non-financial IA disclosure implies that the share price consists of non-financial information, in addition to financial information. As such, the suggestion to incorporate non-financial information to value shares is a valuable input to theoretical share valuation models.

This study provides major practical contributions in terms of corporate reporting regulation. As such, the accounting standard setting authorities may consider the findings of this study useful in setting and revising accounting standards related to high-tech industries. For instance, accounting standard setting authorities may consider the value relevance of IA disclosure in the form of non-financial information to redesign the mandatory reporting model with more future orientated, dynamic and forward-looking

input. In particular, consideration may be given to capitalise the intangible assets such as the strength of management team, industry innovation and business strategy, which create real values to the company, but are not measurable in terms of accounting. Further, the finding of high levels of value relevance of book value and lower levels of value relevance of earnings should be considered by the standard setters. This will require further investigation of the causal relationships and possible correction of the mandatory requirements of calculations and recognition of earnings.

In addition to the accounting standard setting authorities, this study provides potential to guide the management of companies to refine their corporate reporting models. The finding of value relevance of non-financial, intangible asset disclosures is a valuable input for the companies to redefine the business reporting model. They may consider to optimise, manage and report, giving priority to the real value creating activities and processes of the company. Further, the corporate reporting models may be refined by adopting a better format to disclose the strengths of companies by way of variety of intangible assets. Such a complete business reporting model may lead to a more refined fund allocation of capital markets by providing more accurate information. An efficient allocation of funds in capital markets will be enhanced by identifying other forms of competing information in the business reporting models in addition to financial information.

Finally, the findings may guide financial analysts, investors and other users of financial statements in appropriately assessing the potential of a company and its ability to achieve sustainable results.

### **8.3 Limitations**

The findings of the study are to be interpreted in light of a number of limitations. Some of the limitations are specific to the current study whereas others relate to the research methodologies.

#### **8.3.1 Limitations Specific to the Current Study**

There are four main limitations to this study. First, due to the time limitations imposed within the scope of a PhD, it was not possible to consider more than three industry sectors of the ASX to conduct an extensive content analysis and then test the value relevance. This limits the generalisability of findings of the study to the ASX. However, the three industry sectors were thoroughly represented in this study by analysing the top companies. Second, the significance of non-financial, IA disclosures was considered only by the number of words of disclosure. The assumption is that the more important the information, the greater likelihood that it will be disclosed by more words. Alternatively, companies disclose significant information using attractive pictures, images, graphs, and using specific fonts in annual reports as well as less words. The non-consideration of such elements of the contents of annual reports is another limitation to the study. Third, the annual report is the only source considered as the medium of non-financial disclosure. Although annual reports can be predominantly considered as the most formal document of external communication, the fact that alternative sources, such as press releases, magazines related to specific industries, company websites and newspaper reports have been ignored is also a drawback of the study. The final limitation is a failure to conduct surveys and/or interviews to obtain the



views of the users of financial statements about the significance of non-financial IA disclosures.

### **8.3.2 Limitations related to Research Methods of Data Collection and Analysis**

The limitations related to research methods are twofold; one related to content analysis; and the other related to value relevance models. Researchers cannot easily ascertain the quality of disclosures using content analysis. Content analysis is based on the notion that the quality of disclosure is high when the quantity of disclosure is high, which does not always equate with consideration of the quality of such information. Further, content analysis, by nature is a subjective process which relies on what Kerlinger (1969) refers to as manifest content categories being set up by the researcher and then counting the number of occurrences of these categories. The establishment of the manifest content categories is one of the main areas of possible subjective bias.

There are several limitations in the models that apply to the measurement of value relevance. First, most of the studies of value relevance are silent on market efficiency and appear to make inferences based on the implicit assumption that the stock market is efficient in the semi-strong form. However, substantial empirical evidence exists to suggest that the market may not be completely efficient in the processing of public information (Aboody et al., 2002). Second, Brown et al. (1999) argue that issues arise as a result of use of  $R^2$  to measure the value relevance, particularly with the scale effect. Arbitrary stock splits are an obvious cause for scale effects. Thirdly, multiple regression analysis does not allow researchers to consider the causal relationships between the dependent and independent variables, but the focus is on the association rather than one-way cause-and-effect relationship.

#### **8.4 Directions for Future Research**

The findings of the study, as well as the limitations considered in Section 8.3 highlight a number of future research avenues. First, future research could examine value relevance of intangible asset disclosures in other sectors of the ASX. The three selected industry sectors may not represent all high-tech industries in Australia. Industry sectors such as Semiconductors and Semiconductor Equipment; and Software and Services appear as very sophisticated technology-involved companies. Future research may focus on the companies listed under those sectors and extend the current study by examining the non-financial intangible assets reporting practices and value relevance of disclosures. Further, the results of the current study are not generalisable to the ASX because of technology biases of the selected industries. As such, future research may consider other industry sectors of ASX and extend the study and develop generalisable results to the ASX.

A second research opportunity relates to the quality of disclosures. The quality of the content is not always positively associated with quantity since the measurement of quality is a subjective process. However, quality may be strengthened by scrutinising the content and providing weights for different aspects of disclosure. Future research may focus on qualitative aspects that: identify the central themes of disclosures; understand the focus; and analyse in order to more thoroughly examine the phenomena of disclosures.

The third suggestion refers to the investigation of other forms of external financial reporting. While the use of annual reports as the main external reporting medium is well documented and, therefore, accepted as the most relevant type of corporate documents

in the literature, there are alternative means of disseminating corporate information to various stakeholders. Examples of such avenues include press releases, quarterly and half-yearly reports, intellectual capital statements, special reports and company web sites. In some situations, disseminating information via alternative media is faster and more efficient than the formal annual reports. Future research may consider these alternative sources in addition to formal communication between company and stakeholders.

Finally, future research may investigate the influence of circumstances of the voluntary disclosures practices of companies. More specifically, research of this type may examine the influence of the harmonisation of accounting standards (adoption of IFRS) for the voluntary disclosures of intangible assets, by investigating voluntary disclosures before and after the adoption of IFRS. Investigation of the influence of business culture for the voluntary disclosures of intangible assets is another area of research interest as global business cultures vary significantly. Similarly, investigation of the influence of different stages of the business life cycle and the influence of different institutional settings such as ownership concentration may provide a valuable contribution to accounting literature on voluntary disclosures.

## **Appendix A**

### **Raw Data: Financial Information**

Raw data used for the analysis is provided in this appendix. The data collected to examine the value relevance of financial information as well as to examine the factors influencing value relevance are presented in this appendix, under three industry sectors.

Table A.1: Raw Data, Financial Information, Sector 1	223
Table A.2: Raw Data, Financial Information, Sector 2	225
Table A.3: Raw Data, Financial Information, Sector 3	226

**Table A.1: Raw Data, Financial Information**  
**Sector 1: Pharmaceuticals, Bio Technology and Life Sciences**

ASX code	Company Name	Share Price (\$)	Earnings Per Share (\$)	Book Value per Share (\$)	Ind. Type *	Age of the Firm (Years)	Net Profit after Tax (\$)	Market Capitalization (\$)	Equity (\$)	Shares Outstanding (Number of shares)**	Own Con***	
1	ACR	Acrux Limited	0.7300	-0.0300	0.2423	0	3.75	- 5,026,000	114811337.7	38,109,000	157275805	57.13
2	ACU	Avantogen Limited	0.0400	0.4200	0.0026	0	36.58	- 3,040,676	22663798.16	1,483,734	566594954	92.55
3	ACL	Alchemia Limited	0.2200	-0.0690	0.2036	0	4.50	- 10,943,000	35143491.02	32,520,000	159743141	59.21
4	ANP	Antisense Therapeutics Limited	0.0700	-0.4000	0.0117	0	7.50	- 2,136,886	37865447.62	6,334,646	540934966	72.11
5	AAH	Arana Therapeutics Limited	0.8400	-1.7400	1.2940	0	22.42	- 4,580,000	197388271.1	304,073,000	234986037	48.19
6	APH	Ascent Pharnahealth Ltd.	0.2000	3.0000	0.5351	0	4.00	4,183,000	27763800	74,277,000	138819000	77.66
7	AVX	Avexa Limited	0.1200	-8.9000	0.1313	0	3.75	- 36,093,000	50961001.68	55,776,000	424675014	34.61
8	AVH	Avita Medical Ltd.	0.0400	-0.2040	0.2262	0	14.83	- 12,188,280	2394576.8	13,543,855	59864420	26.62
9	BLT	Benitec Limited	0.0500	-0.9600	0.0047	0	10.33	- 2,774,690	14513904.9	1,358,035	290278098	59.89
10	BDM	Biodiem Limited	0.0600	-0.0669	0.0812	0	4.42	- 4,470,506	4010430.36	5,425,190	66840506	68.58
11	BNO	Bionomics Limited	0.3200	-0.2100	0.0960	0	8.50	- 4,783,917	72099327.68	21,627,426	225310399	76
12	BPO	Bioprospect Limited	0.0200	-0.0100	0.0125	0	7.42	- 4,657,171	9051102.04	5,675,610	452555102	95.88
13	BTA	Biota Holdings Limited	0.7200	-0.0350	0.3460	0	22.50	- 6,489,000	131706623.5	63,300,000	182925866	38.54
14	BTC	Biotech Capital Limited	0.1600	-0.0861	0.3339	0	7.83	- 7,386,000	13446320.8	28,061,000	84039505	45.06
15	BIT	Biotron Limited	0.1600	-0.0200	0.0196	0	7.42	- 1,882,093	15051288.48	1,843,377	94070553	47.96
16	BNE	Bone Medical Limited	0.1200	-0.0362	0.0165	0	23.42	- 2,825,253	9370263.12	1,286,083	78085526	88.47
17	CST	Cellestis Limited	2.0600	0.0235	0.1591	0	7.17	2,256,000	199956691.3	15,443,000	97066355	39.7
18	CXS	Chemgenex Pharmaceuticals Ltd.	0.7700	-0.0344	0.1312	0	21.92	- 6,419,926	143838092.9	24,509,366	186802718	86.5
19	CIR	Circadian Technologies Limited	0.7400	-0.0286	1.2812	0	17.17	- 2,286,119	29692128.52	51,407,413	40124498	55.8
20	CUV	Clinuvel Pharmaceuticals Limited	0.2500	-0.0480	0.1714	0	7.33	- 14,655,791	75595043	51,814,516	302380172	65.62
21	CTE	Cryosite Limited	0.1200	0.0100	0.0926	0	7.08	447,059	5596747.56	4,321,088	46639563	73.91

Table A.1 Contd.

Table A.1 Contd.

ASX code	Company Name	Share Price (\$)	Earnings Per Share (\$)	Book Value per Share (\$)	Ind. Type *	Age of the Firm (Years)	Net Profit after Tax (\$)	Market Capitalization (\$)	Equity (\$)	Shares Outstanding (Number of shares)**	Own Con***
22	CSL CSL Limited	39.7600	1.2760	5.1011	0	14.00	701,802	21872211141	2,806,125,000	550105914	66.91
23	CYT Cytopia Limited	0.1100	-0.0960	0.1426	0	10.25	- 7,603,000	8735407.45	11,325,000	79412795	57.46
24	GBI Genera Biosystems Limited	0.1700	-0.0895	0.1152	0	0.00	- 3,239,917	8702586.28	5,899,532	51191684	55.61
25	GTG Genetic Technologies Limited	0.1500	-0.0150	0.0574	0	20.92	- 5,451,638	54358484.85	20,785,093	362389899	72.76
26	GIA Giaconda Limited	0.0300	-0.0300	0.0255	0	2.75	- 2,821,415	2204955.15	1,874,141	73498505	85.44
27	HGN Halcygen Pharmaceuticals Limited	0.2000	-0.0456	0.1503	0	1.00	- 3,472,806	15219800	11,438,427	76099000	51.58
28	HTX Healthlinx Limited	0.0500	-0.0190	0.0424	0	4.58	- 1,429,160	3820961.8	3,239,513	76419236	65.88
29	HXL Hexima Limited	0.6000	-0.0450	0.4969	0	0.83	- 3,029,909	40749842.4	33,748,698	67916404	71.25
30	IDT IDT Australia Limited	2.0300	0.1650	0.7646	0	17.33	7,110,000	87244785.81	32,861,000	42977727	56.64
31	LFE Life Therapeutics Limited	0.0500	-0.0780	0.0313	0	22.08	- 9,238,000	5881358.4	3,684,000	117627168	49.35
32	LCT Living Cell Technologies Limited	0.1700	-0.0364	0.0601	0	3.75	- 6,794,037	32597244.49	11,527,248	191748497	59.59
33	MSB Mesoblast Limited	0.8300	-0.0881	0.2295	0	3.50	- 10,062,379	94793494.07	26,216,132	114209029	74.92
34	MBP Metabolic Pharmaceuticals Limited	0.0400	-0.0148	0.0547	0	9.58	- 4,441,167	12037884.44	16,461,066	300947111	36.65
35	NRT Novogen Limited	1.5300	-0.2080	0.3652	0	13.75	- 24,777,000	149318820	35,637,000	97594000	78.77
36	PAB Patrys Limited	0.2200	-0.0486	0.1524	0	0.92	- 7,323,602	33163113.72	22,975,675	150741426	79.55
37	PXS Pharmaxis Ltd.	2.2000	-0.1080	0.6292	0	4.58	- 20,440,000	416537411.4	119,121,000	189335187	62.6
38	PYC Phylogica Limited	0.0700	-0.0320	0.0193	0	3.25	- 4,483,938	9797860.03	2,694,638	139969429	59.94
39	PBT Prana Biotechnology Limited	0.4900	-0.0776	0.0565	0	8.25	- 13,560,678	85609931.54	9,866,327	174714146	79.21
40	PBP Probiotec Limited	1.2700	0.1355	0.9470	0	1.58	6,309,098	59114505.85	44,079,844	46546855	64.8
41	PGL Progen Pharmaceuticals Limited	0.6700	-0.4330	1.2473	0	12.50	- 26,148,000	40427527.98	75,259,000	60339594	53.31
42	SIP Sigma Pharmaceuticals Limited	1.1600	0.0850	1.3186	0	5.67	77,154,000	1056256560	1,200,653,000	910566000	37.55
43	SRX Sirtex Medical Limited	2.2400	0.0220	0.4176	0	7.83	1,210,000	124920624.6	23,287,000	55768136	88.15
44	SLA Solagran Limited	0.3800	0.0290	0.2163	0	24.50	- 3,762,040	48718270.88	27,732,362	128205976	71.61
45	SPL Starpharma Holdings Limited	0.3000	-0.0400	0.1145	0	7.75	- 7,491,000	53398396.8	20,383,000	177994656	59.81
46	VLA Viralytics Limited	0.0500	-0.0140	0.0334	0	21.67	- 3,681,125	13027314.95	8,694,450	260546299	27.09
47	VHL Virax Holdings Limited	0.0300	-0.0165	0.0007	0	21.50	- 1,773,449	3220582.05	73,052	107352735	63.22
48	XCD Xceed Capital Limited	0.0400	-0.0174	0.0746	0	12.25	- 1,737,000	4000547.52	7,466,000	100013688	68.78

\*Industry Type: Product Orientated

\*\*Shares outstanding at the end of the financial year (number of shares)

\*\*\*Ownership Concentration: Percentage of Ordinary Shares held by largest 20 shareholders

**Table A.2: Raw Data, Financial Information  
Sector 2: Technology, Hardware and Equipment**

ASX code	Company Name	Share Price (\$)	Earnings Per Share (\$)	Book Value per Share (\$)	Ind. Type*	Age of the Firm (Years)	Net Profit after Tax (\$)	Market Capitalization (\$)	Equity (\$)	Shares Outstanding (Number of shares)**	Own Con***
1	ASU Alpha Technologies	0.0100	0.2	0.0188	0	11.93	1,927,000	9510045.96	17,849,000	951004596	88.07
2	AMO Ambertech Limited	0.4800	0.104	0.6366	0	12.42	3,179,000	14742670.08	19,554,000	30713896	87.58
3	AAT Autron Corporation Limited	0.0300	0.0116	0.0342	0	59.83	11,496,000	20824855.56	23,730,000	694161852	40.17
4	CLT Cellnet Group Limited	0.3000	-0.07	0.7484	0	18.80	- 4,646,000	19950276.3	49,767,000	66500921	81.2
5	CDA Codan Limited	0.7100	0.006	0.3829	0	8.60	1,009,000	115052272.3	62,044,000	162045454	91.4
6	ERG ERG Limited	0.0100	-0.1204	-0.0136	0	53.94	- 99,044,000	8585059.43	- 11,711,000	858505943	46.06
7	ETT ETT Limited	0.0100	-0.0084	0.0068	0	37.85	- 7,088,133	8420343.64	5,718,088	842034364	62.15
8	INT Intermoco Limited	0.0100	-0.0119	0.0060	0	65.80	- 13,431,980	11302900.27	6,780,541	1130290027	34.2
9	KYC Keycorp Limited	0.2100	-0.0012	0.3127	0	31.84	- 102,000	17300822.7	25,758,000	82384870	68.16
10	KLM KLM Group Ltd.	0.3100	0.0365	0.2373	0	37.02	2,181,000	18544510	14,195,000	59821000	62.98
11	MIK Mikoh Corporation Limited	0.1400	-0.02172	0.0140	0	65.50	- 4,909,314	25306906.24	2,528,916	180763616	34.5
12	MBI Mobi Limited	0.0300	-0.0571	0.0673	0	41.62	- 9,732,152	5117029.74	11,485,632	170567658	58.38
13	NTC Netcomm Limited	0.1500	0.0239	0.1010	0	40.69	2,146,404	13494734.25	9,083,616	89964895	59.31
14	PIE Pinetworks Limited	0.0100	-0.00724	0.0037	0	58.76	- 2,042,111	2817844.26	1,042,235	281784426	41.24
15	QRS Qrsciences Holdings Limited	0.0600	-0.0025	0.0583	0	52.17	- 33,940,000	4752214.02	4,621,000	79203567	47.83
16	SCD Scantech Limited	0.6500	0.066	0.4332	0	31.84	1,153,488	11382842.9	7,585,860	17512066	68.16
17	TCN Techniche Limited	0.0800	0.0027	0.0882	0	34.09	136,506	4050527.44	4,467,452	50631593	65.91
18	TNC Transol Corporation Limited	0.0100	-0.004	0.0161	0	51.93	- 1,523,633	3636413.62	5,855,883	363641362	48.07
19	TSH TSV Holdings Limited	0.0140	0.0232	0.3829	0	30.19	2,349,000	1306222.316	35,724,000	93301594	69.81
20	XTE Xtek Limited	0.0200	-0.06	0.0257	0	16.62	- 4,608,049	1430450.84	1,837,145	71522542	83.38
21	ZYL Zylotech Limited	0.0300	-0.0125	0.0147	0	75.61	- 2,045,854	4926018.36	2,417,983	164200612	24.39

\*Industry Type: Product Orientated

\*\*Shares outstanding at the end of the financial year (number of shares)

\*\*\*Ownership Concentration: Percentage of Ordinary Shares held by largest 20 shareholders

**Table A.3: Raw Data, Financial Information**

**Sector 3: Telecommunication Services**

ASX code	Company Name	Share Price (\$)	Earnings Per Share (\$)	Book Value per Share (\$)	Ind. Type*	Age of the Firm (Years)	Net Profit after Tax (\$)	Market Capitalization (\$)	Equity (\$)	Shares Outstanding (Number of shares)**	Own Con***
1	AMM Amcom Telecommunications	0.17	0.0197	0.1980	1	44.36	10,143,000	87427802.47	101,844,000	514281191	55.64
2	BGL Bigair Group Limited	0.04	-0.027	0.0486	1	22.89	- 2,353,564	3451388.56	4,193,649	86284714	77.11
3	BRO Broad Investments Limited	0.01	-0.0017	0.0020	1	70.89	- 4,265,757	25764462	5,059,534	2576446200	29.11
4	CVA Clever Communications	0.05	-0.0336	0.0747	1	29.30	- 3,488,440	5185094.45	7,746,641	103701889	70.7
5	CMO Comtel Corporation Limited	0.03	-0.2222	0.0971	1	12.32	- 27,102,264	3659749.5	11,839,955	121991650	87.68
6	EFT EFtel Limited	0.06	0.00171	0.1004	1	32.39	270,000	9470280	15,851,000	157838000	67.61
7	ETC Telecoms Corporation Limited	0.33	0.0081	0.0311	1	25.74	11,431,000	474545006.1	44,782,000	1438015170	74.26
8	FRE Freshtel Holdings Limited	0.16	-0.0433	0.0628	1	34.83	- 7,811,000	28882469.92	11,337,000	180515437	65.17
9	FUL Fulcrum Equity Limited	0.01	-0.0597	-0.0084	1	23.16	- 19,352,000	4577185.69	- 3,830,000	457718569	76.84
10	FUT Future Corporation Australia Limited	0.01	-0.00028	0.1223	1	48.54	- 203,969	204271.63	2,498,070	20427163	51.46
11	IIN Iinet Limited	1.44	0.155	1.4569	1	14.16	19,897,445	184912387.2	187,081,866	128411380	85.84
12	MTU M2 Telecommunications Group Limited	0.65	0.0701	0.3753	1	42.50	5,157,000	47826350	27,614,000	73579000	57.5
13	MAQ Macquarie Telecom Group Limited	0.61	-0.057	2.1029	1	10.16	- 1,165,000	12571258.81	43,338,000	20608621	89.84
14	MNW Mint Wireless Limited	0.03	-0.0025	0.0303	1	25.01	- 4,310,103	5164026.63	5,222,349	172134221	74.99
15	MKB Moko.Mobi Limited	0.05	-0.0518	0.0283	1	0.98	- 3,114,862	3004414.95	1,697,557	60088299	99.02
16	MMY Mercury Mobility Ltd.	0.12	-0.016	0.0344	1	21.88	- 1,628,129	12472416.36	3,577,996	103936803	78.12
17	PEO People Telecom Limited	0.02	-0.0021	0.0674	1	17.80	- 617,841	5944295.24	20,031,104	297214762	82.2
18	PWK Pipe Networks Limited	3.51	0.00158	1.5783	1	31.30	7,204,000	159747320.1	71,833,000	45512057	68.7
19	QUE Queste Communications Limited	0.11	-0.0338	1.2049	1	15.86	- 993,161	3234536.69	35,430,004	29404879	84.14
20	REF Reverse Corp Limited	1.38	0.217	0.1167	1	17.44	20,077,000	127371743.7	10,769,000	92298365	82.56
21	SOT SP Telemedia Limited	0.13	-0.039	0.6237	1	19.55	- 18,933,000	63913395.65	306,650,000	491641505	80.45
22	TPC Tel.Pacific Limited	0.15	0.0266	0.0894	1	12.55	2,929,568	16489356.15	9,832,494	109929041	87.45
23	TLS Telstra Corporation Limited	4.18	0.299	0.9841	1	100.00	3,711,000,000	52011740000	12,245,000,000	12443000000	
24	TNC Transol Corporation Limited	0.01	-0.004	0.0138	1	50.51	- 1,523,633	4243339.63	5,855,883	424333963	49.49
25	WRR World Reach Limited	0.01	0	-0.0022	1	48.68	10,856	6097265.1	- 1,313,535	609726510	51.32

\*Industry Type: Service Orientated

\*\*Shares outstanding at the end of the financial year (number of shares)

\*\*\*Ownership Concentration: Percentage of Ordinary Shares held by largest 20 shareholders



## **Appendix B**

### **Raw Data: Word Count of Intangible Assets**

Raw data related to intangible assets is provided in this appendix. Word count of intangible assets obtained from analysing the non-financial sections of company annual reports are presented in this appendix, under three industry sectors.

Table B.1: Raw Data, Word count of Intangible Assets, Sector 1	228
Table B.2: Raw Data, Word count of Intangible Assets, Sector 2	232
Table B.3: Raw Data, Word count of Intangible Assets, Sector 3	234

**Table B.1: Raw Data: Word Count of Intangible Assets**  
**Sector 1: Pharmaceuticals, Bio Technology and Life Sciences**

ASX code	Company Name/ Intangible Asset	Technology	Risk Mgt.	R&D	Product Mix	Patents	Intellectual Property	Forward Looking information	Corporate Governance	Business Strategy	Awards Received	Team Work	Strength of Management Team	Strength of Employees	Leadership
ACR	Acrux Limited	12	0	1430	0	0	4	209	2218	132	0	0	1880	22	14
ACU	Avantogen Limited	0	0	3643	0	0	0	353	1234	0	0	0	909	0	0
ACL	Alchemia Limited	152	52	2844	0	914	261	946	2617	559	0	0	1702	0	0
ANP	Antisense Therapeutics	169	290	1550	0	771	0	0	1774	135	0	0	1208	0	0
AAH	Arana Therapeutics Limited	346	0	3504	0	0	340	76	1810	32	0	0	3294	76	0
APH	Ascent Pharmahealth Ltd.	0	207	272	0	0	0	84	1256	137	0	0	1661	187	0
AVX	Avexa Limited	0	0	2607	0	0	0	154	2496	0	0	0	1551	171	0
AVH	Avita Medical Ltd.	0	73	835	0	0	0	292	1598	142	0	0	1403	149	0
BLT	Benitec Limited	0	0	1034	0	571	0	237	2214	0	0	0	2191	0	0
BDM	Biodiem Limited	0	0	2439	0	0	0	241	2637	0	0	0	1354	0	0
BNO	Bionomics Limited	0	0	2605	0	1050	579	100	3088	211	0	0	2139	60	0
BPO	Bioprospect Limited	0	0	3896	0	0	0	319	2225	0	0	0	623	18	0
BTA	Biota Holdings Limited	0	0	929	0	0	0	118	3353	226	0	0	1667	0	0
BTC	Biotech Capital Limited	34	0	128	0	50	0	120	2321	0	0	0	379	0	0
BIT	Biotron Limited	0	0	1993	0	227	0	80	1449	0	0	0	645	0	0
BNE	Bone Medical Limited	0	0	390	0	0	0	0	3221	51	0	0	1666	0	0
CST	Cellestis Limited	0	0	128	0	0	0	199	0	0	0	0	560	0	0
CXS	Chemgenex Pharmaceuticals	0	162	1961	0	0	41	297	1397	219	0	0	1362	0	0
CIR	Circadian Technologies	411	0	700	0	177	191	321	2916	197	0	0	2621	0	58
CUV	Clinuvel Pharmaceuticals	77	0	4260	0	0	0	73	3055	0	0	43	1483	24	0

Table B.1 Contd.

Table B.1 Contd.															
ASX code	Company Name/ Intangible Asset	Technology	Risk Mgt.	R&D	Product Mix	Patents	Intellectual Property	Forward Looking information	Corporate Governance	Business Strategy	Awards Received	Team Work	Strength of Management Team	Strength of Employees	Leadership
CUV	Clinuvel Pharmaceuticals	77	0	4260	0	0	0	73	3055	0	0	43	1483	24	0
CTE	Cryosite Limited	57	0	52	0	0	0	49	948	0	85	0	546	40	0
CSL	CSL Limited	28	0	1109	0	0	0	212	4005	0	72	0	1158	1153	0
CYT	Cytopia Limited	0	0	3075	0	301	0	166	5977	112	0	0	2581	23	0
GBI	Genera Biosystems Limited	0	0	795	0	0	0	498	2671	0	0	0	881	14	0
GTG	Genetic Technologies	0	150	548	0	0	0	59	1560	339	0	0	2165	14	0
GIA	Giaconda Limited	0	0	2644	0	0	214	59	1348	0	0	0	1139	0	0
HGN	Halcygen Pharmaceuticals	0	0	2714	0	97	249	144	3330	0	0	0	729	0	0
HTX	Healthlinx Limited	0	0	1865	0	0	0	168	3450	0	0	0	3162	0	0
HXL	Hexima Limited	739	123	1198	0	0	87	154	1645	62	0	68	3150	0	35
IDT	IDT Australia Limited	34	0	369	0	0	0	143	2623	17	0	0	790	39	0
LFE	Life Therapeutics Limited	0	0	0	0	0	0	287	3997	0	0	0	1575	74	0
LCT	Living Cell Technologies	0	0	3618	0	30	0	563	1162	0	0	0	1730	47	0
MSB	Mesoblast Limited	0	0	5179	0	43	52	136	3076	199	0	52	1680	0	0
MBP	Metabolic Pharmaceuticals	0	0	525	0	57	0	349	3394	0	0	0	1552	0	0
NRT	Novogen Limited	0	0	1594	0	196	52	81	2368	0	0	0	951	14	0
PAB	Patrys Limited	0	0	4007	0	61	607	458	2570	0	0	0	3157	772	0
PXS	Pharmaxis Ltd.	0	0	10618	0	965	817	347	4339	608	0	0	2920	479	0
PYC	Phylogica Limited	168	0	1414	42	0	95	387	2600	487	0	0	1330	0	0
PBT	Prana Biotechnology	0	0	2122	74	0	1792	132	1695	106	71	0	1122	0	0
PBP	Probiotec Limited	0	0	749	0	36	0	431	4353	0	0	0	59	0	0
PGL	Progen Pharmaceuticals	205	0	1346	0	0	0	350	1567	66	0	0	2235	0	0
SIP	Sigma Pharmaceuticals	0	0	0	65	0	0	433	2937	17	0	0	1686	244	0
SRX	Sirtex Medical Limited	0	0	2160	163	0	0	317	4645	10	0	0	532	0	0
SLA	Solagran Limited	0	0	712	0	0	0	71	2621	22	0	0	576	0	0
SPL	Starpharma Holdings	0	0	2512	0	0	0	94	3944	0	0	0	3140	0	0
VLA	Viralytics Limited	0	0	1174	0	0	0	43	810	0	0	0	498	0	0
VHL	Virax Holdings Limited	0	0	245	0	0	0	0	2832	0	0	0	1305	0	0
XCD	Xceed Capital Limited	0	83	194	0	0	0	42	5140	0	0	0	1214	0	0

Table B.1 Contd.

ASX code	Company Name/ Intangible Asset	Royalty and Licence	Market Share	Market Leader	Market Growth	Govt. Support	Environmental Reporting	Customer Service, Care	Community Service	Business Development	Business Collaboration	Business Acquisition, Integration	Business Position, Market Position	Brands	Total IA
ACR	Acrux Limited	62	62	0	202	0	173	0	0	0	886	134	0	0	7440
ACU	Avantogen Limited	236	0	0	203	0	72	0	0	0	62	0	0	0	6712
ACL	Alchemia Limited	21	226	92	493	356	162	0	53	52	256	139	90	52	12553
ANP	Antisense Therapeutics	382	0	0	0	0	42	0	365	0	133	0	0	0	6819
AAH	Arana Therapeutics	0	0	0	0	0	73	0	31	0	247	17	0	0	9846
APH	Ascent Pharmahealth Ltd.	0	0	94	135	0	0	85	0	0	40	642	41	94	4935
AVX	Avexa Limited	0	0	0	0	0	54	0	0	0	103	0	0	0	7136
AVH	Avita Medical Ltd.	0	10	0	400	0	20	0	0	0	40	15	0	0	4977
BLT	Benitec Limited	256	0	0	0	0	21	0	135	0	105	0	0	0	6764
BDM	Biodiem Limited	0	0	0	108	0	57	0	0	0	0	0	0	0	6836
BNO	Bionomics Limited	38	0	0	0	0	75	0	0	0	544	147	0	0	10636
BPO	Bioprospect Limited	39	0	0	415	0	58	0	0	0	34	0	0	0	7627
BTA	Biota Holdings Limited	862	0	0	0	0	0	0	0	0	23	0	0	0	7178
BTC	Biotech Capital Limited	0	0	0	51	0	17	0	0	0	34	1887	0	0	5021
BIT	Biotron Limited	0	0	0	0	18	23	0	0	0	0	0	0	0	4435
BNE	Bone Medical Limited	47	0	0	0	0	0	0	0	0	37	0	0	0	5412
CST	Cellestis Limited	0	0	0	63	0	36	0	0	0	0	0	0	0	986
CXS	Chemgenex Pharmaceuticals	0	0	0	0	0	70	0	0	0	65	8	0	0	5582
CIR	Circadian Technologies	0	0	0	0	0	12	0	0	20	233	324	0	0	8181

Table B.1 Contd.

Table B.1 Contd

ASX code	Company Name/ Intangible Asset	Royalty and Licence	Market Share	Market Leader	Market Growth	Govt. Support	Environmental Reporting	Customer Service, Care	Community Service	Business Development	Business Collaboration	Business Acquisition, Integration	Business Position, Market Position	Brands	Total IA
CUV	Clinuvel Pharmaceuticals	0	0	0	0	0	28	64	407	124	31	0	67	0	9736
CTE	Cryosite Limited	0	151	0	275	0	0	0	0	526	130	119	0	0	2978
CSL	CSL Limited	31	0	0	0	0	804	0	1717	26	47	0	1814	0	12176
CYT	Cytopia Limited	0	0	0	0	0	299	0	0	0	76	0	111	0	12721
GBI	Genera Biosystems Limited	0	0	0	0	0	47	0	0	0	119	0	0	0	5025
GTG	Genetic Technologies	85	0	0	185	0	158	0	0	18	36	351	0	0	5668
GIA	Giaconda Limited	29	0	118	72	0	24	176	845	0	22	0	0	0	6690
HGN	Halcygen Pharmaceuticals	195	0	0	88	0	0	0	0	0	98	0	0	0	7644
HTX	Healthlinx Limited	0	0	58	22	0	26	0	0	99	269	0	0	0	9119
HXL	Hexima Limited	0	0	0	319	0	105	0	0	0	622	0	0	0	8307
IDT	IDT Australia Limited	0	0	0	31	0	71	0	0	53	43	0	0	0	4213
LFE	Life Therapeutics Limited	0	0	0	0	0	41	0	0	0	72	0	0	0	6046
LCT	Living Cell Technologies	0	0	0	22	0	0	0	0	0	48	0	0	0	7220
MSB	Mesoblast Limited	0	0	0	0	0	50	0	0	0	0	105	0	0	10572
MBP	Metabolic Pharmaceuticals	0	0	0	0	0	0	0	0	0	62	275	0	0	6214
NRT	Novogen Limited	0	0	0	0	0	300	0	0	0	0	0	0	0	5556
PAB	Patrys Limited	0	0	34	0	0	79	0	0	0	316	67	0	0	12128
PXS	Pharmaxis Ltd.	0	0	0	0	2641	86	0	0	0	179	0	0	0	23999
PYC	Phylogica Limited	0	0	0	0	0	25	0	0	0	0	0	0	0	6548
PBT	Prana Biotechnology	0	0	0	0	0	41	0	81	0	0	0	0	0	7236
PBP	Probiotec Limited	0	0	0	0	0	28	0	74	307	0	0	0	181	6218
PGL	Progen Pharmaceuticals	0	0	0	0	0	0	0	0	0	0	0	0	0	5769
SIP	Sigma Pharmaceuticals	0	0	0	0	0	183	112	923	91	94	160	39	0	6984
SRX	Sirtex Medical Limited	0	0	0	778	0	19	1219	442	108	0	0	0	0	10393
SLA	Solagran Limited	38	0	0	75	0	36	0	0	0	47	0	0	0	4198
SPL	Starpharma Holdings	0	0	0	0	0	59	0	92	0	437	0	0	0	10278
VLA	Viralytics Limited	0	0	0	0	0	0	0	0	0	0	307	0	0	2832
VHL	Virax Holdings Limited	313	0	0	0	0	120	0	0	0	422	0	0	0	5237
XCD	Xceed Capital Limited	0	0	0	0	0	43	0	0	0	596	0	0	0	7312

**Table B.2: Raw Data: Word Count of Intangible Assets**  
**Sector 2: Hardware, Technology and Equipment**

ASX code	Company Name	Technology	Risk Mgt.	R&D	Forward Looking information	Corporate Governance	Business Strategy	Awards Received	Team Work	Strength of Management Team	Strength of Employees	Adaptability	Royalty and Licence	Products	Positive impact of the economy
ASU	Alpha Technologies	0	0	0	129	2729	254	0	23	1595	0	0	24	0	0
AMO	Ambertech Limited	0	0	0	169	1389	0	0	0	934	0	0	0	0	0
AAT	Autron Corporation Limited	0	0	0	310	2351	221	0	0	1001	0	0	0	0	0
CLT	Cellnet Group Limited	0	0	0	135	358	0	0	0	468	0	0	0	0	0
CDA	Codan Limited	72	0	0	545	4190	630	0	0	1114	31	0	0	0	92
ERG	ERG Limited	0	321	0	272	1045	0	0	0	380	69	0	0	276	0
ETT	ETT Limited	0	0	0	95	2716	0	0	0	1311	0	0	0	0	0
INT	Intermoco Limited	0	0	0	183	1491	0	0	0	698	0	0	0	0	0
KYC	Keycorp Limited	0	0	0	553	2301	367	0	42	908	67	0	0	785	37
KLM	KLM Group Ltd.	60	0	0	131	666	0	0	0	1847	77	0	0	0	0
MIK	Mikoh Corporation Limited	72	0	0	93	2832	312	0	0	1582	62	0	0	0	0
MBI	Mobi Limited	0	116	0	126	3327	63	0	0	1218	132	0	0	287	0
NTC	Netcomm Limited	0	0	0	207	1647	85	0	0	759	0	29	0	560	0
PIE	Pinetworks Limited	0	0	0	98	2608	0	0	38	684	0	0	0	93	0
QRS	Qrsciences Holdings Limited	0	0	0	403	1243	0	0	0	1253	0	0	29	508	0
SCD	Scantech Limited	39	0	0	183	0	399	155	38	646	0	0	0	632	0
TCN	Techniche Limited	0	0	0	109	677	0	0	0	374	0	0	0	0	0
TNC	Transol Corporation Limited	60	0	0	194	3189	0	0	0	541	0	63	136	2280	0
TSH	TSV Holdings Limited	85	0	100	205	118	0	0	41	745	13	0	0	477	167
XTE	Xtek Limited	0	0	0	135	4797	123	0	42	1181	0	0	101	0	0
ZYL	Zylotech Limited	0	0	45	161	5375	176	0	0	766	63	196	0	255	0

Table B.2 Contd.

Table B.2 Contd.

ASX code	Company Name	Market Share	Market Growth	First National Provider	Environmental Reporting	Customer Service, Care	Customer Base	Community Service	Business Development	Business Collaboration	Business Acquisition, Integration	Brands	Total IA
ASU	Alpha Technologies	0	33	0	27	0	0	0	0	0	112	0	4926
AMO	Ambertech Limited	0	153	0	30	64	0	0	380	0	0	0	3119
AAT	Autron Corporation Limited	0	123	0	25	0	38	0	27	689	1895	0	6680
CLT	Cellnet Group Limited	0	0	0	0	0	0	0	0	0	0	0	961
CDA	Codan Limited	1232	397	0	0	0	54	0	0	58	513	0	8928
ERG	ERG Limited	0	0	0	38	0	0	0	42	45	0	0	2488
ETT	ETT Limited	0	0	0	17	0	0	0	0	226	153	0	4518
INT	Intermoco Limited	0	0	0	23	0	0	0	0	0	62	0	2457
KYC	Keycorp Limited	0	0	0	76	0	0	0	160	711	0	0	6007
KLM	KLM Group Ltd.	0	173	0	125	1588	79	165	487	291	193	0	5882
MIK	Mikoh Corporation Limited	0	376	0	0	0	84	0	130	314	0	0	5857
MBI	Mobi Limited	0	0	0	19	0	25	65	43	114	468	36	6039
NTC	Netcomm Limited	0	0	86	12	32	0	0	22	88	0	22	3549
PIE	Pinetworks Limited	0	0	0	0	0	0	0	0	176	0	0	3697
QRS	Qrsciences Holdings Limited	0	0	0	0	0	0	0	0	291	34	0	3761
SCD	Scantech Limited	38	120	0	809	0	85	79	54	150	0	0	3427
TCN	Techniche Limited	0	51	0	56	0	19	0	108	0	460	0	1854
TNC	Transol Corporation Limited	0	0	0	21	0	0	0	0	130	228	0	6842
TSH	TSV Holdings Limited	56	41	0	28	0	0	0	292	0	373	0	2741
XTE	Xtek Limited	0	77	0	0	0	0	0	405	30	0	0	6891
ZYL	Zylotech Limited	0	105	0	58	275	0	0	260	221	0	39	7995

**Table B.3: Raw Data: Word Count of Intangible Assets**  
**Sector 3: Telecommunication Services**

ASX code	Company Name	Technology	R&D	Intellectual Property	Forward Looking information	Corporate Governance	Business Strategy	Awards Received	Team Work	Strength of Management Team	Strength of Employees	Products	Positive impact of the economy	Market Share
AMM	Amcom Telecommunications	0	0	0	169	1477	36	0	0	1082	0	102	64	0
BGL	Bigair Group Limited	0	0	0	47	2982	92	0	0	654	0	114	0	0
BRO	Broad Investments Limited	0	0	0	49	3917	36	0	0	393	0	57	0	0
CVA	Clever Communications	0	0	0	83	1987	35	0	0	617	0	209	0	0
CMO	Comtel Corporation Limited	0	0	0	105	3481	0	0	0	820	0	45	0	0
EFT	EFtel Limited	0	0	0	65	1921	0	0	0	579	0	144	0	0
ETC	EMT Corporation	90	0	35	95	2377	152	130	154	1243	118	1683	0	0
FRE	Freshtel Holdings Limited	0	135	0	229	2649	685	0	17	1512	0	740	0	0
FUL	Fulcrum Equity Limited	0	0	0	45	3123	0	0	0	555	0	80	0	0
FUT	Future Corporation Australia	0	0	0	45	1468	0	0	0	748	0	33	0	0
IIN	Iinet Limited	0	0	0	64	1882	277	31	143	2095	9	927	0	0
MTU	M2 Telecommunications	0	0	0	603	2499	0	0	459	936	27	924	0	145
MAQ	Macquarie Telecom Group	0	0	0	118	1926	209	0	0	1389	45	329	0	0
MNW	Mint Wireless Limited	0	0	0	143	1455	49	224	0	1183	8	1009	0	0
MKB	Moko.Mobi Limited	0	52	0	146	1508	0	0	0	1118	39	890	0	0
MMY	Mercury Mobility Ltd.	0	0	65	68	1270	0	0	17	441	0	99	0	0
PEO	People Telecom Limited	0	0	0	57	1006	75	15	0	924	18	72	0	0
PWK	Pipe Networks Limited	0	0	0	116	1203	0	0	0	1177	0	0	0	0
QUE	Queste Communications	0	0	0	213	6262	0	0	0	427	0	58	0	0
REF	Reverse Corp Limited	0	0	0	149	1525	0	0	0	951	36	152	22	0
SOT	SP Telemedia Limited	0	0	0	24	2511	0	0	0	736	0	0	0	0
TPC	Tel.Pacific Limited	0	0	0	293	1369	108	0	0	1088	19	56	0	0
TLS	Telstra Corporation Limited	0	276	0	0	7989	247	0	0	2645	289	1629	0	24
TNC	Transol Corporation Limited	0	0	0	74	3673	0	0	0	566	0	36	0	0
WRR	World Reach Limited	0	30	0	0	3946	0	0	0	561	38	117	0	0

Table B.3 Contd.



Table B.3 Contd.

ASX code	Company Name	Market Growth	Government Support	First National Provider	Env. Reporting	Customer Service, Care	Customer Base	Community Service	Business Development	Business Collaboration	Business Acquisition, Integration	Brands	Total IA
AMM	Amcom Telecommunications	244	0	0	0	77	260	0	350	182	394	0	4437
BGL	Bigair Group Limited	0	0	0	0	0	78	0	169	0	0	0	4136
BRO	Broad Investments Limited	0	0	0	14	0	0	0	0	0	231	0	4697
CVA	Clever Communications	0	0	0	0	0	0	0	56	0	178	0	3165
CMO	Comtel Corporation Limited	0	0	0	0	0	0	0	69	48	259	0	4827
EFT	EFtel Limited	0	0	0	0	47	0	0	152	97	70	0	3075
ETC	EMT Corporation	176	0	22	22	0	0	0	25	838	75	0	7235
FRE	Freshtel Holdings Limited	0	0	0	15	15	52	0	14	1059	0	0	7122
FUL	Fulcrum Equity Limited	0	0	0	97	0	0	0	0	0	790	0	4690
FUT	Future Corporation Australia	0	0	0	12	0	0	0	39	131	8	0	2484
IIN	Iinet Limited	229	271	0	137	650	407	451	259	120	356	306	8614
MTU	M2 Telecommunications	0	0	0	25	0	0	0	363	0	627	0	6608
MAQ	Macquarie Telecom Group	0	0	0	0	201	0	0	276	54	0	0	4547
MNW	Mint Wireless Limited	143	0	0	0	0	298	0	275	710	0	147	5644
MKB	Moko.Mobi Limited	155	0	0	14	149	0	0	65	216	0	61	4413
MMY	Mercury Mobility Ltd.	0	0	0	13	0	66	0	143	24	162	30	2398
PEO	People Telecom Limited	0	0	12	26	24	66	0	0	139	79	0	2513
PWK	Pipe Networks Limited	0	0	0	81	0	0	0	0	0	0	0	2577
QUE	Queste Communications	0	0	0	64	0	0	0	0	0	731	0	7755
REF	Reverse Corp Limited	0	0	0	26	0	0	0	91	69	21	0	3042
SOT	SP Telemedia Limited	0	0	0	0	0	0	0	0	0	0	0	3271
TPC	Tel.Pacific Limited	0	0	0	26	0	0	0	326	0	191	0	3476
TLS	Telstra Corporation Limited	229	0	0	167	920	684	117	730	136	264	69	16415
TNC	Transol Corporation Limited	0	0	0	21	0	0	0	1594	585	67	0	6616
WRR	World Reach Limited	0	0	0	21	21	0	0	45	0	0	0	4779

## Appendix C

### Disclosure of Intangible Assets

The Disclosures of selected intangible assets of sample companies are presented in this appendix. Disclosures of R&D, corporate governance and strength of management team of selected representative companies of the sample are provided in this appendix. Research and Development is reported as value relevant in sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Corporate Governance is reported as value relevant in sector 2: Hardware, Technology and Equipment and Strength of Management Team is reported as value relevant in sector 2 and 3 combined together.

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## **C.1 Research and Development**

### **C.1.1 Acrux Limited**

#### **Five major advances in product commercialisation achieved**

Evamist™ launched in USA by KV Pharmaceutical *Peak Annual Sales potential US\$125m*

Major expansion of KV partnership - access to Evamist™ data secured *Faster launch of Ellavie™ in ex-US markets.*

Commenced Phase 3 trial of Testosterone MD-Lotion® *Results due Q3 2009*

New commercial manufacturing alliance with Orion Critical element of commercialization strategy

First animal health product Phase 3 completed by Eli Lilly

More animal health products to follow Now we have the hard evidence to prove our story. With Evamist™ we have product in pharmacies in the US and starting to deliver regular

revenue to Acrux.” “We have several products for global markets following close behind and they all directly benefit from the achievement of getting Evamist™ approved and launched in the US.”

Jon Pilcher Chief Financial Officer

#### **EVAMIST™ LAUNCHED IN USA BY KV PHARMACEUTICAL**

We've been planning every single element of the Phase 3 trial of Testosterone MD-Lotion® for over 12 months. We have moved step-by-step to get it right.”

First animal health product phase 3 completed by elililly acruX has an unrivalled product pipeline, with a balance of late stage and early stage products capable of delivering strong short-term revenue and long-term value.

*Acrux has had an exceptional year, with the successful launch of Evamist™ and rapid progress with development work on several new products.*

In April 2008 we announced that Evamist™, the first product utilising our unique skin spray drug delivery technology, had been launched by US licensee KV Pharmaceutical Company into one of the largest therapeutic categories in women's healthcare.

Three months after the launch, Evamist™ was ranked second in transdermal hormone therapies as measured by “New to Brand Prescriptions” (new patient starts or switches from other brands). KV expects Evamist™ to be a significant contributor to Ther-Rx net revenues during the second half of fiscal 2009

### **Testosterone MD-Lotion® for men – initiate Phase 3 trial**

In June 2008 we announced the commencement of the pivotal Phase 3 trial of Testosterone MD-Lotion®. The trial has been designed to support global registration of the product and we intend to submit marketing applications to regulatory authorities in the fourth quarter of 2009. The trial will enrol up to 150 hypogonadal men at 27 sites in the USA, Europe and Australia. The men will use Testosterone MD-Lotion® for 4 months, during which blood samples will be analysed to determine the level of testosterone in the blood. At least 50 subjects will continue treatment for a further 2 months in order to demonstrate skin safety following 6 months of continuous use. The primary objective of the trial is to demonstrate that Testosterone MD-Lotion® restores average blood levels of testosterone into the normal range. Secondary objectives include the assessment of quality of life and sexual health.

### **Nestorone® contraceptive sprays – complete multiple dose clinical trials of two combination products**

The completion of these trials has been delayed until the end of 2008, due to the recruitment of the required number of volunteers proving more difficult than expected. The design of these trials, in which a large number of blood samples are taken over an extended period, has required a significant time commitment from the volunteers.

### **New products – successful proof of concept clinical trial of one new product**

In November 2007 we announced the addition of Nicotine MDTs® to our clinical product pipeline after an initial clinical trial delivered positive results. The trial tested the delivery

of nicotine into the blood after a single dose of three different spray formulations containing nicotine and from a leading nicotine patch. We noted no significant skin irritation, which

is a significant problem associated with the marketed patches. Worldwide annual sales of smoking cessation therapies are approximately US\$1 billion, dominated by nicotine patches,

lozenges and gums, marketed by three of the largest global pharmaceutical companies. The majority of sales are over-the counter, driven by consumer choice and supported by extensive brand marketing. The current nicotine therapies have limitations and smokers often use them in combination.

Nicotine MDTs® is designed to overcome those limitations and provide multiple benefits in a single product presentation. We expect the spray to provide the prolonged effect of patches,

but with no significant skin irritation and with active and flexible dosing that provides smokers with greater influence over their treatment. Since the completion of the trial, we have discussed the optimal design of the product with potential commercial licensees and are currently completing formulation adjustments before advancing into the next stage of development.

### **Fentanyl MDTs – complete Phase 1 trial under US IND**

This objective was achieved in January 2008. The aim of the trial was to demonstrate that Acrux's MDTs® formulation delivers fentanyl into the bloodstream of healthy volunteers

in quantities known to be safe and effective in controlling chronic pain. The trial was

conducted in Australia under an Investigational New Drug Application (IND) with the FDA.

Data modelling, based on the single dose trial results, was used to compare the delivery from multiple doses of MDTs® with the known delivery from currently marketed fentanyl patches. The patches are available in a number of fixed strengths and are required to be replaced every three days. The results indicated that twice-daily dosing with MDTs®

would achieve a therapeutic level of fentanyl comparable to the highest strength patch. A variable dosing regimen with MDTs®, covering the entire dose range of different strength

patches, could provide a more flexible approach to the control of chronic pain. No serious adverse events or significant skin irritation were recorded during the trial. We are currently in discussions with the FDA to determine further development requirements for the Fentanyl MDTs® product.

### **OTHER IMPORTANT DEVELOPMENTS**

Progress with the final stage of development of Testosterone MDTs®, our testosterone spray for the treatment of hypoactive sexual desire disorder in women, has been very slow. In 2004 we licensed the product to VIVUS for the US market and we are not satisfied with VIVUS' performance. Acrux retains full rights in all other territories and, along with many analysts, we continue to believe that this product has tremendous commercial potential in a large market that currently has no approved treatment. In November 2007 Acrux made a demand for arbitration under its Development and Commercialisation Agreement for Testosterone MDTs® with VIVUS. The demand seeks a reversion of all rights licensed to VIVUS related to Testosterone MDTs®, monetary damages, a portion of a milestone payment under the agreement and declaratory relief. The arbitration process is proceeding, with the parties having selected and qualified a panel of three arbitrators and having agreed to a schedule of pre-hearing discovery. The arbitration hearing is currently scheduled to commence in January 2009.

In April 2008 VIVUS announced agreement with the FDA on its requirements for the Phase 3 clinical studies of Luramist™ (the US brand name for Testosterone MDTs®). VIVUS and the FDA have agreed that the pivotal phase 3 program will include two efficacy trials that will enrol menopausal women for six months of treatment. The primary endpoints are an increase in sexual desire and the number of satisfying sexual events, with a secondary endpoint of a decrease in sexual distress. In addition, VIVUS reached agreement with the FDA on the safety study, which will be a cardiovascular event-based outcomes study. Subjects will be required to have an average exposure to the product of 12 months. The study will enrol approximately 5,200 women, aged 50 years or older, who have at least one cardiovascular risk factor. All patients will remain in the study until a minimum number of cardiovascular events have occurred. VIVUS stated that with the successful completion of the two efficacy studies along with interim results of the safety study, it expects to submit an application to the FDA seeking approval of Luramist within two years from initiation of the safety study. Subjects enrolled in the safety study will receive treatment for up to five years, allowing for longer-term assessments of cardiovascular and breast cancer risks. The long-term assessments are not required for submission or approval of the application

#### **C.1.2 Alchemia Limited**

### **Drug discovery**

Alchemia's Versatile Assembly on Stable Templates (VAST®) technology is designed to accelerate the discovery and optimisation of new drugs.

### **Scientific Advisory Board (SAB) established**

Expedites the commercial development of Alchemia's drug discovery technology, VAST®.

### **Clinical Advisory Board (CAB) established**

Accelerates the clinical development of Alchemia's oncology assets, including *HA-Irinotecan*.

### **Investigational new drug application (IND) filed with US FDA for *HA-Irinotecan***

The IND supports Alchemia's pivotal Phase III trial where the primary objective will be to substantiate the successful Phase II data and demonstrate the superior efficacy of Alchemia's drug.

Progress to be on target for filing of ANDA to permit approval in calendar year 2009

### **Drug targeting (HyACT®)**

- Receipt of the final, Phase II clinical trial report for *HA-Irinotecan*
- Successful meetings with the US FDA and two European regulatory authorities on the clinical trial design for *HA-Irinotecan*
- Establishment of the Clinical Advisory Board (CAB)
- Granting of a key HyACT® patent in Europe

### **Drug discovery (VAST®)**

- Progress in completing our drug discovery platform which will be applicable to a broad range of therapeutic targets
- Advancing drug hits to leads in the drug discovery collaboration with Euroscreen S.A.
- Establishment of the Scientific Advisory Board (SAB)
- Progress with the Pain Research Group of the University of Queensland in developing new opioid drugs without the side-effects of traditional medications

### **HyACT® – multiple high value opportunities**

The successful pre-IND meeting with the FDA regarding our cancer product, *HA-Irinotecan*, followed solid Phase II data in which the therapeutic demonstrated a significant increase in disease control and a more than doubling in progression free survival of cancer patients. Discussions with the FDA (US), MPA (Sweden) and AFSSAPS (France) on a single pivotal trial design means that the trial could be initiated after the filing of an Investigational New Drug application (IND) with the FDA.

The HyACT® platform is broadly applicable to small molecule anti-cancer drugs, be they branded drugs, generics or new chemotherapy agents. However, we believe that the most profitable application of HyACT® could be with newer therapeutics called monoclonal antibodies (mAbs), several of which will lose patent protection early in the next decade. Alchemia is conducting preclinical research with several oncology mAbs and the HyACT® technology, with the aim of entering the market with patented reformulations of these products. Thus far we have data that strongly suggests that we can significantly increase the activity of two very important mAbs, Avastin® and Erbitux® which had global sales of US\$5.97Bn and US\$1.38Bn respectively in 2007.

### **pipeline**

<b>Therapeutic area</b>	<b>Drug</b>	<b>Action</b>	<b>Disease/ condition</b>	<b>Stage</b>	<b>Estimated date</b>	<b>Partner</b>
<b>Cardiovascular</b>	Generic fondaparinux	Indirect factor Xa inhibitor	VTE	Preparing to file	FY 2009- ANDA CY 2009-	Market launch

Dr Reddy's

<b>Oncology</b>	<i>HA-Irinotecan</i>	Topoisomerase I inhibitor	Colorectal cancer	Clinical - Ph II complete	CY 2008 – IND	
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CY 2009-

Phase III

### **Oncology HyACT®**

antibodies Various Cancer Preclinical –

### **Pain VAST® various**

Opioid receptor agonists Chronic pain Discovery – University of Queensland

### **Metabolic VAST®**

various Undisclosed Obesity Discovery – Euroscreen S.A.

### **Respiratory VAST®**

various Undisclosed Asthma Discovery – Euroscreen S.A.

### **Inflammation VAST®**

various Undisclosed Undisclosed Discovery – Undisclosed

**Discovery** - *chemical compounds with possible therapeutic benefit in man are identified*

**Preclinical** - *compound/treatments are tested to measure efficacy and safety prior to testing in humans*

**Clinical** - *structured studies are conducted in a hospital or clinic in which a drug is evaluated for its effect*

**pipeline alchemia annual report 2008 spreading risk across various therapeutic and disease areas and across various development stages.**

## **generic fondaparinux**

Fondaparinux is the active ingredient in the drug Arixtra® currently marketed by GlaxoSmithKline (GSK). Alchemia has developed a cost effective synthesis for fondaparinux. Patent protection covering Arixtra® has expired, which will enable Alchemia's partner Dr Reddy's to file an ANDA with the FDA for approval. Alchemia's fondaparinux is expected to be the sole generic version of Arixtra®, and as such, not be subject to heavy price discounting common with other generics.

### **Progress in 2008**

After reports of severe allergic reactions upon treatment with unfractionated heparin, the FDA began investigations in the US and abroad. Product recalls of unfractionated heparin began in January 2008 and the problem was traced to the contamination of raw material. Because fondaparinux is a purely synthetic compound it has not faced this contamination risk.

## **targeting drugs to tumours – HyACT®**

HyACT® (Hyaluronic Acid Chemotransport Technology) is Alchemia's proprietary technology used to reformulate cancer drugs and enhance their activity against tumours. The transportation works through a 'receptor based' targeting mechanism in which the hyaluronic acid (HA) is attracted to tumour cells expressing HA receptors on their surface. The first HyACT® product *HA-Irinotecan* successfully completed Phase II clinical trials in 2007. The technology has been applied to many anti-cancer drugs including 5-fluorouracil and doxorubicin, to produce HyFIVE™ and HyDOX™, both of which have undergone Phase I clinical trials.

Preclinical studies have been conducted on many other anticancer drugs, including monoclonal antibodies.

### **Broad application – small molecules and monoclonal antibodies**

HyACT® technology is flexible and is applicable to the reformulation of small molecules and monoclonal antibodies, whether they be generics, drugs in development or even drugs which have failed in the clinic, with the aim of enhancing safety and efficacy characteristics of these drugs.

### **Super generics**

New products typically proceed through a sequence of stages including introduction, growth, maturity and decline, a process described as the product life-cycle. Life-cycle management involves reformulating a therapeutic, before it reaches generic status, producing a new proprietary product with renewed and full patent protection and greater earnings potential than commodity generics.

### **Improving safety and efficacy**

This application refers to the reformulation of compounds that have failed clinical trials due to efficacy or toxicity reasons.

HyACT® reformulation offers this class of drugs a pathway to improved efficacy and safety, which may see them pass through further clinical trials to market. HyACT® offers improvements in safety and efficacy, sustaining or building on a drug's market value.

### **Drug discovery outlook**

One of the most pressing problems facing big Pharma is a lack of productivity in their drug development pipelines. Alchemia's drug discovery platform, based on VAST® chemistry, is designed to fill the gap between rational and random drug discovery. If the structure of a therapeutic target is known several drug discovery approaches can be used. If the target, or its structure, is unknown then only random screening with large libraries can be performed. Alchemia's innovative drug discovery technology is used to identify, and optimise, lead compounds active against targets of unknown structure. The technology is applicable to a very broad range of targets, such as G-protein coupled receptors (GPCR's) and other targets where the structure of the active site is unknown. GPCR's are the therapeutic targets of approximately one half of all drugs which have worldwide sales estimated at US\$100Bn a year.

Alchemia's process represents a novel way of discovering new drugs by first mapping the three dimensional structure of the target using an array of specially designed molecules and then optimising molecules to have the right activity and properties. Thus far, Alchemia has completed only a portion of the VAST® drug discovery array which is suited to a small proportion of potential drug targets. A strategic objective of the Company is to complete the synthesis of a much larger array that will be able to be used to identify hits against a broad range of targets. Alchemia expects to complete this phase in the second half of the current financial year. VAST® compounds to date have performed as expected and have been shown to be very successful against numerous targets. In order to promote the technology to potential partners however, Alchemia's drug discovery system needs to address a broad range of drug targets, and the Company is finalising preparation of the entire array.

### **Oral somatostatin drug program**

This program is focussed on the development of drugs active at the somatostatin receptor which may have application to several diseases including acromegaly and cancer. Over the past year the company has worked to convert its folio of drug candidates into orally available versions. After the discontinuation of ACL16907, Alchemia has focused on a series of orally active back-up molecules. This program is supported by a Federal Government Commercial Ready Grant

### **Pain research**

Alchemia's collaboration with the Pain Research Group at the University of Queensland progressed further during the year with active molecules identified against opioid receptors. The object of the program is to identify new pain relief drugs that do not possess the side effect.

### **Develop products of superior safety and efficacy (to address regulatory and public health concerns)**

- Develop a rigorous project management system.
- Maintain a global leadership position on complex carbohydrate chemistry and cancer targeting using hyaluronic acid.
- Alchemia utilises a stage gate project management system. This divides the drug discovery and development effort into different stages separated by management decisions. The aim is to cull underperforming projects quickly and let those that meet strict criteria to proceed. Decisions are made based on a target product profile.
- Alchemia projects are required to address unmet medical needs and target accessible markets for clinical development.
- Alchemia's generic fondaparinux and *HA-Irinotecan* are products that have demonstrated safety and efficacy in clinical trials.

holding her Preclinical Development role,



Tracey is also the acting Head of Development. Tracey joined Alchemia in 2006 as a result of the successful acquisition of Meditech. She is responsible for the evaluation of lead compounds from both Alchemia's discovery and HyACT® programs where her primary role is to take the potential

#### **Operational performance and highlights for the year**

The key highlights for the financial year included:

##### **generic fondaparinux;**

- Successful technology transfer to Dr Reddy's; with no significant technical hurdles remaining;
- Progress on target for approval in the first half of calendar 2009
- Receipt of Arixtra® sales data, with sales up 87% for calendar year 2007

##### **drug targeting (HyACT®);**

- Receipt of the final, Phase II clinical trial report for *HA-Irinotecan* confirming a 116% in progression-free survival compared with irinotecan alone.
- Successful meetings with the US FDA and two European regulatory authorities on a potential pivotal clinical trial design for *HA-Irinotecan*
- Establishment of a Clinical Advisory Board (CAB)
- Granting of a key HyACT® patent in Europe

##### **drug discovery (VAST®);**

- Progress in completing the VAST® drug-discovery system, applicable to a broad range of therapeutic targets, due for completion early in 2009 • Advancing drug hits to leads in the drug discovery collaboration with Euroscreen S.A.
- Establishment of a Scientific Advisory Board (SAB)
- Progress with the Pain Research Group of the University of Queensland aiming to develop new opioid targeting drugs without the side-effects of traditional analgesics

##### **and in Board news**

- Appointment of a new Non-Executive Director, Mr. Carlo Montagner

##### **Generic fondaparinux**

Alchemia and Dr Reddy's have been working hand-in-hand to complete the first commercial scale manufacture of generic fondaparinux together with the required documentation for the ANDA filing. Fondaparinux's complex synthesis has inevitably presented challenges at commercial scale, however, these challenges have now been overcome. Generic fondaparinux approval and launch is expected in the first half of 2009, depending on review time at the FDA. Given the complexity of the synthesis, Alchemia continues to believe that its generic fondaparinux will be the only generic brought to market, restricting competition to two drugs, Alchemia's fondaparinux and GSK's Arixtra®. Typically a first generic will take 40-50% of the prescription share, and with Alchemia's fondaparinux expected to be the sole generic, a modest level of price discounting is anticipated. The Company therefore expects generic fondaparinux to be a highly profitable product. Alchemia also believes the complexity of the chemistry, and associated IP, required for fondaparinux scale-up presents a significant barrier to entry to competitors considering the manufacture other generic versions of Arixtra® and the Company is unaware of any potential generic competition. Global sales of Arixtra® were up from \$US155m in the year to June 2007 to \$US250m in the year to June 2008 (+61%). Based on the trend in Arixtra® sales, the Company expects to receive at a minimum a 50% profit share from the sale of generic fondaparinux and, at a maximum, a 60% profit share. In the heparin-drug market, Arixtra® is the only drug not derived from biological sources – i.e. it is a fully synthetic molecule. For this reason it was not affected by the recent recall of unfractionated heparins and some low molecular weight heparins from the market, after the raw material used in their manufacture was found to be contaminated. Being a fully synthetic generic, it will be approved through the ANDA (505(j)) route at the FDA.

##### **drug targeting (HyACT®)**

One of the primary objectives of Alchemia's clinical team during 2008 was to develop and pursue a clear path to market for *HA-Irinotecan*, preferably via a single and final pivotal trial. To achieve this, Alchemia's clinical team met with US and European regulatory authorities in April of 2008. After speaking with these authorities the Company believes that a single clinical

development program may be designed and implemented that will satisfy the needs of both agencies. Furthermore, the FDA agreed that in the US, Alchemia could file for approval through the 505(b)(2) NDA regulatory route, as *HA-Irinotecan* is a new formulation of a currently approved drug, irinotecan. This regulatory process will save time and money, compared to a new drug application. Alchemia is currently planning to submit for a Special Protocol Assessment with the FDA, which would provide further confidence that the clinical trial design, endpoints, and statistical analyses for a Phase III study of *HA-Irinotecan* will be acceptable to the FDA. In November 2007, Alchemia announced the formation of the Clinical Advisory Board (CAB). The Board consists of leading colorectal clinical oncologists from Australia, the US, UK and Europe. The CAB is charged with guiding the development of the Company's oncology products and technology (HyACT®). The Board's input is expected to maximise the Company's ability to deliver results that are clinically and commercially significant. The CAB will be chaired by Dr Peter Gibbs, who has been the Principal Investigator for the two successful *HA-Irinotecan* trials run in Australia to date. The past year also saw the Company granted a key HyACT® patent in Europe, further consolidating Alchemia's claim to future revenues from the product. Alchemia continues to investigate the applicability of the HyACT® technology platform to enhance the safety and efficacy of other anti-cancer drugs. Based on results from preclinical studies, the Company remains confident that the technology is suitable for the formulation of many drugs, including therapeutic proteins such as monoclonal antibodies.

### **Drug discovery (VAST®)**

VAST® is an innovative drug discovery technology used to identify, and refine, lead compounds active against targets of unknown structure. The technology is applicable to a very broad range of targets, especially G-protein coupled receptors (GPCR's) and other targets where the structure of the active site is unknown. VAST® represents a novel way of discovering new drugs by first establishing the three dimensional structure of the target and then designing molecules that have the right activity and properties. Thus far, Alchemia has completed only a portion of the VAST® drug discovery array which is suited to a small proportion of potential drug targets. A strategic objective of the company is to complete the synthesis of a much larger number of molecules that will be able to be used to identify

hits against a broad range of targets. Alchemia expects to complete this phase in the second half of the current financial year. VAST® compounds to date have performed as expected and have been shown to be very successful against numerous targets. During the year Alchemia has also utilised its existing VAST® technology to further its research collaboration with Euroscreen. The companies chose to pursue research against two undisclosed targets in the metabolic and respiratory therapeutic areas. Alchemia is now in the "hit to lead" phase of the project, in which active compounds found in the primary biological screen are refined for activity and selectivity. Under the terms of the collaboration Alchemia and Euroscreen will jointly invest in drug candidates and share in future revenues. In October 2007 Alchemia established a Scientific Advisory Board (SAB). This body was established to review and recommend development options for the Company's drug discovery technology VAST®. The SAB comprises international authorities in the field of GPCR research, from academia and industry. Alchemia's collaboration with the Pain Research Group at the University of Queensland progressed further during the year with active molecules identified against opioid receptors. The object of the program is to identify new pain relief drugs that do not possess the side effect profiles of current opioid therapeutics. Alchemia's overarching strategy is to complete the construction of a VAST® drug discovery array, obtain more information from each of the VAST® programs and to ultimately turn VAST® molecules into high value drug candidates. In order to fulfil this objective and prepare for further collaborations, the company has invested in automated drug discovery equipment and implemented a detailed project management system.

## C.2 Corporate Governance

### C.2.1 Codan Limited

#### CORPORATE GOVERNANCE STATEMENT

This statement outlines the main corporate governance practices in place throughout the financial year, which comply with the ASX Corporate Governance Council recommendations, unless otherwise stated.

##### *Board of Directors Role of the Board*

The board's primary role is the protection and enhancement of long-term shareholder value.

To fulfil this role, the board is responsible for the overall corporate governance of the group including formulating its strategic direction, approving and monitoring capital expenditure, setting senior executive and director remuneration, establishing and monitoring the achievement of management's goals and ensuring the integrity of internal control and management information systems. It is also responsible for approving and monitoring financial and other reporting.

The board has delegated responsibility for operation and administration of the Company to the Managing Director.

##### *Board processes*

To assist in the execution of its responsibilities, the board has established a Remuneration Committee and a Board Audit, Risk and Compliance Committee. These committees have written mandates and operating procedures, which are reviewed on a regular basis. The board has also established a framework for the management of the consolidated entity including a system of internal control, a business risk management process and the establishment of appropriate ethical standards.

The full board currently holds ten scheduled meetings each year, plus strategy meetings and any extraordinary meetings at such other times as may be necessary to address any specific significant matters that may arise.

The agenda for meetings is prepared in conjunction with the Chairman, Managing Director and Company Secretary. Standing items include the Managing Director's report, occupational health and safety report, financial reports, strategic matters, governance and compliance. Submissions are circulated in advance. Executives are regularly involved in board discussions and directors have other opportunities, including visits to business operations, for contact with a wider group of employees.

##### *Director education*

The group has a process to educate new directors about the nature of the business, current issues, the corporate strategy and the expectations of the Group concerning performance of directors. Directors also have the opportunity to visit Group facilities and meet with management to gain a better understanding of business operations. Directors are given access to continuing education opportunities to update and enhance their skills and knowledge.

##### *Independent professional advice and access to Company information*

Each director has the right of access to all relevant Company information and to the Company's executives and, subject to prior consultation with the Chairman, may seek independent professional advice from a suitably qualified adviser at the group's expense.

The director must consult with an advisor suitably qualified in the relevant field.

A copy of the advice received by the director is made available to all other members of the board. The Access, Indemnity and Insurance Deed for each director sets out their rights on these matters.

##### *Composition of the Board*

The composition of the board is determined using the following principles: a broad range of expertise both nationally and internationally; a majority of non-executive directors; directors having extensive knowledge of the Company's industries and / or extensive expertise in significant aspects of financial management or general management; a non-executive director as Chairman; enough directors to serve on various committees without overburdening the directors or making it difficult for them to fully discharge their responsibilities; and subject to re-election every three years (except for the Managing Director).

An independent director is a director who is not a member of management (a non-executive director) and who: holds less than five percent of the voting shares of the Company and is not an officer of, or otherwise associated, directly or indirectly, with a shareholder of more than five percent of the voting shares of the Company; has not within the last three years been employed in an executive capacity by the Company or another group member, or been a director after ceasing to hold any such employment; within the last three years has not been a principal or employee of a material professional adviser or a material consultant to the Company or another group member; is not a material supplier or customer of the Company or another group member, or an officer of or otherwise associated, directly or indirectly, with a material supplier or customer; has no material contractual relationship with the Company or another group member other than as a director of the Company; and is free from any interest

and any business or other relationship that could, or could reasonably be perceived to, materially interfere with the director's ability to act in the best interests of the Company.

The board is regularly addressing succession in order to ensure that its composition going forward is appropriate. New and appropriately qualified and independent board members will be introduced over time to enable Codan to achieve its future corporate objectives.

#### **Board Performance Evaluation**

The ASX Corporate Governance Council's "Principles of Good Corporate Governance and Best Practice Recommendations" recommends the establishment of a nomination committee. The role of nomination of proposed directors is being conducted by the full board.

#### **Remuneration report** *Remuneration Committee*

The Remuneration Committee reviews and makes recommendations to the board on remuneration packages and policies applicable to the Managing Director, senior executives and directors themselves. It is also responsible for share schemes, incentive performance packages, superannuation entitlements, retirement and termination entitlements and fringe benefits policies.

The members of the Remuneration Committee during the year were:

Brian Burns (Chairman) – Non-Executive Director

Dr David Klingner – Independent Non-Executive Director

David Simmons – Independent Non-Executive Director (appointed 27 June 2008)

Ian Wall – Non-Executive Director (retired 27 June 2008)

The Managing Director is invited to Remuneration Committee meetings, as required, to discuss senior executives' performance and remuneration packages.

#### *Remuneration policies*

Key management personnel comprise the directors of the Company and executives for the Company including the five most highly remunerated Company and Group executives. Key management personnel have authority and responsibility for planning, directing and controlling the activities of the Company and the Group.

Remuneration levels are competitively set to attract and retain appropriately qualified and experienced senior executives. The Remuneration Committee obtains independent advice on the appropriateness of remuneration packages, given trends in comparative companies both locally and internationally. Remuneration packages can include a mix of fixed remuneration and performance-based remuneration.

The remuneration structures explained below are designed to attract suitably qualified candidates, and to effect the broader outcome of increasing the Group's net profit. The remuneration structures take into account: the overall level of remuneration for each director and executive; the executive's ability to control the relevant segments performance; and the amount of incentives within each key management person's remuneration. Certain senior executives may receive bonuses based on the achievement of performance hurdles. The bonus is capped at 70% of the executive's salary package and for the year ended 30 June 2008 the average bonus achieved was 20.3%. The performance hurdles relate to measures of EBIT and return on working capital versus budget targets and also the qualitative performance of the executive team against objectives agreed as part of the budget and strategic planning processes.

These performance conditions have been established to encourage the profitable growth of the consolidated entity. All bonus amounts that accrue to the relevant executives are paid in cash. There is no separate profit-share plan and no share options have been issued by the Company.

The board considered that for the year ended 30 June 2008 the above performance-linked remuneration structure was appropriate.

Total remuneration for all non-executive directors, last voted upon by shareholders at the 2003 AGM, is not to exceed \$750,000 per annum. Non-executive directors do not receive any performance related remuneration nor are they issued options on securities. Directors' fees cover all main board activities and membership of committees.

#### *Directors' and senior executives' remuneration*

Details of the nature and amount of each major element of the remuneration paid or payable to each director of the Company and each of the five named officers of the Company and the group receiving the highest remuneration are:

Mr J A Uhrig retired as Chairman on 25 May 2007 and Mr D Simmons was appointed as a director on 5 May 2008.

Mr D Hughes left the employment of Codan Limited on 13 June 2007 and Mr R Moody joined Codan Limited on 3 October 2007.

The remuneration amounts disclosed above have been calculated based on the expense to the company for the financial year, therefore items such as annual leave and long service leave, taken and provided for, have been considered. As a result the remuneration disclosed may not equal the salary package as agreed with the executive in any one year.

No options or shares were issued during the year as compensation for any key management personnel. There are no options over shares on issue at the date of this report.

#### *Corporate Performance*

As required by the Corporations Act 2001 the following information is presented:

The net profit after tax of \$1.0 million has been reduced by impairment write downs of \$8.7 million after tax.

Codan Limited listed on the Australian Stock Exchange on 27 November 2003 and therefore details of the company's performance for prior financial years have not been included. The net profit after tax for the 2004 and 2005 years have not been adjusted for the impact of adopting International Financial Reporting Standards.

#### **Board Audit, Risk and Compliance Committee**

The Board Audit, Risk and Compliance Committee has a documented charter, approved by the board. All members must be non-executive directors. The Chairman may not be the Chairman of the board.

The committee advises on the establishment and maintenance of a framework of internal control and appropriate ethical standards for the management of the group.

The members of the Board Audit, Risk and Compliance Committee

Peter Griffiths (Chairman) – Independent Non-Executive Director

Brian Burns – Non-Executive Director

David Klingberg – Independent Non-Executive Director

The external auditors, the Managing Director and Chief Financial Officer, are invited to Board Audit, Risk and Compliance Committee meetings at the discretion of the committee.

The responsibilities of the Board Audit, Risk and Compliance Committee, as detailed in its formal charter, include reporting to the board on: reviewing the annual and half-year financial reports and other financial information distributed externally. This includes approving new accounting policies to ensure compliance with Australian Accounting Standards and generally accepted accounting principles, and assessing whether the financial information is adequate for shareholder needs; assessing corporate risk assessment processes; assessing the need for an internal audit function; assessing whether non-audit services provided by the external auditor are consistent with maintaining the external auditor's independence. The external auditor provides an annual independence declaration in relation to the audit; providing advice to the board in respect of whether the provision of the non-audit services by the external auditor is compatible with the general standard of independence of auditors imposed by the Corporations Act; reviewing the nomination and performance of the external auditor. The external audit engagement partner was rotated in 2007; assessing the adequacy of the internal control framework and the Company's code of ethical standards monitoring the procedures to ensure compliance with the Corporations Act 2001 and the ASX Listing Rules and all other regulatory requirements; and addressing any matters outstanding with auditors, Australian Taxation Office, Australian Securities and Investments Commission, ASX and financial institutions.

The Board Audit, Risk and Compliance Committee reviews the performance of the external auditors on an annual basis and meets with them during the year to: discuss the external audit plan, identifying any significant changes in structure, operations, internal controls or accounting policies likely to impact the financial statements and to review the fees proposed for the audit work to be performed; review the half-year and preliminary final report prior to lodgement with the ASX, and any significant adjustments required as a result of the auditor's findings, and to recommend board approval of these documents, prior to announcement of results; review the results and findings of the auditor, the adequacy of accounting and financial controls, and to monitor the implementation of any recommendations made; as required, to organise, review and report on any special reviews or investigations deemed necessary by the board.

#### **Risk management**

Major risks arise from such matters as actions by competitors, government policy changes, the impact of exchange rate movements on the price of raw materials and sales, difficulties in sourcing raw materials, environment, occupational health and safety, property, product quality, interruptions to production, changes in international quality standards, financial reporting, and the purchase, development and use of information systems.

#### *Oversight of the risk management system*

The board has in place a number of arrangements and internal controls intended to identify and manage areas of significant business risk. These include the establishment of committees, regular budget, financial and management reporting, established organisational

structures, procedures, manuals and policies, external financial and safety audits, insurance programmes and the retention of specialised staff and external advisors.

The Board Audit, Risk and Compliance Committee consider risk in order to ensure risks are identified, assessed and appropriately managed. The committee reports to the board on these matters on an ongoing basis.

#### *Risk management, compliance and control*

The group strives to ensure that its products are of the highest standard. Towards this aim it has certification to AS/NZS ISO 9001 accreditation.

The board is responsible for the overall internal control framework, but recognises that no cost-effective internal control system will preclude all errors and irregularities. Comprehensive practices, have been established to ensure: capital expenditure and revenue commitments above a certain size obtain prior board approval; financial exposures are controlled, including the use of derivatives; occupational health and safety standards and management systems are monitored and reviewed to achieve high standards of performance and compliance with regulations; business transactions are properly authorised and executed; the quality and integrity of personnel; financial reporting accuracy and compliance with the financial reporting regulatory framework; and environmental regulation compliance. *Quality and integrity of personnel* Appraisals are conducted at least annually for all senior employees. Training and development and appropriate remuneration and incentives with regular performance reviews create an environment of co-operation and constructive dialogue with employees and senior management.

#### *Financial reporting*

The Managing Director and the Chief Financial Officer have declared in writing to the board that the Company's financial reports are founded on a sound system of internal compliance and control and risk management practices which implement the policies adopted by the board. This declaration includes stating that the financial reports present a true and fair view, in all material respects, of the Company's financial condition and operational results and are in accordance with relevant accounting standards. This statement is required annually.

Monthly actual results are reported against budgets approved by the directors and revised forecasts for the year are prepared regularly.

#### *Environmental regulation*

The Group's operations are not subject to significant environmental regulation under either Commonwealth or State legislation. However the board believes that the group has adequate systems in place for the management of its environmental requirements and is not aware of any breach of those environmental requirements as they apply to the Group.

#### *Internal audit*

The Board Audit, Risk and Compliance Committee is responsible for determining the need for an internal audit function for the group. The committee has at this point determined that an internal audit function is not required. The committee will continue to assess the need for a formal internal audit function in future years.

#### *Effectiveness of risk management*

The Managing Director and the Chief Financial Officer have declared, in writing to the board, that the financial reporting risk management and associated compliance and controls have been assessed and found to be operating efficiently and effectively. Operational and other compliance risk management processes have also been assessed and found to be operating efficiently and effectively. All risk assessments covered the whole financial year and the period up to the signing of the annual financial report for all material operations in the group.

#### **Ethical standards**

All directors, managers and employees are expected to act with the utmost integrity and objectivity, striving at all times to enhance the reputation and performance of the group. Every employee has a nominated supervisor to whom they may refer any issues arising from their employment. The company continues to review and confirm its processes for seeking to ensure that it does not trade with parties proscribed for illegal or undesirable activities.

#### *Conflict of interest*

Directors must keep the board advised, on an ongoing basis, of any interest that could potentially conflict with those of the Company. The board has developed procedures to assist directors to disclose potential conflicts of interest.

Where the board believes that a significant conflict exists for a director on a board matter, the director concerned does not receive the relevant board papers and is not present at the meeting whilst the item is considered.

#### *Code of conduct*

The consolidated entity has advised each director, manager and employee that they must comply with the entity's code of conduct. The code of conduct covers the following: aligning the behaviour of the board and management with the code of conduct by maintaining appropriate core Company values and objectives; fulfilling responsibilities to shareholders by delivering shareholder value; usefulness of

financial information by maintaining appropriate accounting policies and practices and disclosure; fulfilling responsibilities to clients, customers and consumers by maintaining high standards of product quality, service standards, commitments to fair value, and safety of goods produced; employment practices such as occupational health and safety, employment opportunity, the level and structure of remuneration, and conflict resolution; responsibilities to the community, such as environmental protection policies, supporting community activities and sponsorships and donations; responsibilities to the individual, such as privacy, use of privileged or confidential information, and conflict resolution; compliance with legislation including policies on legal compliance in countries where the legal systems and protocols are significantly different from Australia's; conflicts of interest; appropriate opportunities such as preventing directors and key executives from taking advantage of property, information or position for personal gain; confidentiality of corporate information; fair dealing; protection and proper use of the Company's assets; compliance with laws; and reporting of unethical behaviour.

*Trading in general company securities by directors and employees* The key elements of the Trading in General Company Securities by Directors and Employees Policy are: identification of those restricted from trading – directors and senior executives (all employees from manager upwards) may acquire shares in the Company, but are prohibited from dealing in Company shares:

- except between twenty four hours and four weeks after either the release of the Company's half-year and annual results to the Australian Stock Exchange ("ASX") or the annual general meeting, or any other period as determined by the board, and reported to the market,
  - as being a period during which the market is believed to be fully informed of all matters relevant to the company's share price;
  - whilst in possession of price sensitive information not yet released to the market.
  - raising the awareness of legal prohibitions including transactions with colleagues and external advisers;

requiring details to be provided of intended trading in the Company's shares;  
requiring details to be provided of the subsequent confirmation of the trade; and  
identification of processes for unusual circumstances where discretions may be exercised in cases such as financial hardship.

#### **Communication with shareholders**

The board provides shareholders with information in accordance with Continuous Disclosure requirements, which includes identifying matters that may have a material effect on the price of the Company's securities, notifying them to the ASX, posting them on the Company's website, and issuing media releases.

In summary, the Continuous Disclosure policy operates as follows:

The Managing Director, Company Secretary and the Chief Financial Officer are responsible for interpreting the Company's policy and where necessary informing the board. The Company Secretary is responsible for all communications with the ASX. Reportable matters are promptly advised to the ASX.

The annual report is distributed to all shareholders who request a copy and it includes relevant information about the operations of the group during the year, changes in the state of affairs and details of future developments.

The half-yearly report contains summarised financial information and a review of the operations of the group during the period. This review is sent to all shareholders. The half-year reviewed financial report is lodged with the Australian Securities and Investments Commission and the ASX, and sent to any shareholder who requests it.

All announcements made to the market, and related information (including information provided to analysts or the media during briefings), is placed on the Company's website after they are released to the ASX.

the full texts of notices of meetings and associated explanatory material are placed on the Company's website.

All of the above information, including that of the previous years, is made available on the group's website.

The board encourages full participation of shareholders at the Annual General Meeting, to ensure a high level of accountability and identification with the group's strategy and goals. The external auditor is requested to attend the annual general meetings to answer any questions concerning the audit and the content of the auditor's report.

The shareholders are requested to vote on the appointment and aggregate remuneration of directors, the granting of options and shares to directors and changes to the Constitution. Copies of the Constitution are available to any shareholder who requests it.

#### **OPERATING AND FINANCIAL REVIEW**

The board of Codan Limited has announced an underlying net profit after tax of \$1 0.5 million, before impairment, integration and restructuring expenses for the year ended 30 June 2008, compared with \$11.2 million in the previous year.

The profit arose from full year revenue of \$109.9 million, compared with \$121.6 million in 2006-2007.

The underlying result excludes the effects of the following significant non-recurring items:

Non-cash impairment write downs of assets associated with the company's operations in the digital microwave radio and TV broadcast markets of \$8.7 million (after tax); and

Costs of integration and restructuring following the acquisition of Minelab of \$0.8 million (after tax).

Codan's after-tax net profit including impairment, integration and restructuring expenses was \$1.0 million.

The board has declared a steady final dividend of 3.5 cents per share, maintaining the annual dividend at 6.5 cents per share.

Net cash flows of \$17.0 million from operating activities have more than covered the Group's requirements for operational capital expenditure, capitalised product development and dividends for the full year.

The result for the past year to 30 June 2008 was achieved in the context of the following key factors and initiatives:

The average US dollar exchange rate, given hedging in place, rising to 84.4 US cents from 77.4 US cents year on year. The impact of this was to reduce profit before tax by \$2.6 million;

Continued substantial reduction in expenses and improvements in gross margins and productivity; and

The acquisition of Minelab Electronics Pty Ltd and its subsidiary Parketronics on 29 February 2008 for a total consideration of \$69.4 million, funded by bank debt.

The impairment write downs follow a detailed review of the Group's operations and strategy subsequent to the acquisition of Minelab. Digital microwave radio and broadcast product sales are small and have not contributed to group profit in FY08. Some of the resource being applied to these operations has been redirected to other parts of the Group, including Minelab, where a better return on shareholder funds will be achieved. Customer demand for digital microwave radio and broadcast products will continue to be met. The board considers that shareholder value will be enhanced by the refocus of resources.

The Codan communications products business did not perform as well in the second half of FY08 compared to the first half because of reduced demand from traditional markets. Performance in FY09 will be improved by increasing HF sales to security, protection and military markets, the imminent release of new satellite communications products, and the reduction in product costs arising from outsourcing some manufacturing to Malaysia. The contract with the company's outsourcing partner is signed and the process of transfer of manufacture is underway. We expect savings in the vicinity of 15% of direct cost for outsourced products. Significant benefit will be realised progressively over the next two years.

The acquisition of Minelab has delivered real value to Codan shareholders. The business is proving to be at least as strong as expected at acquisition and adds significant potential for synergies and growth to the Group. Since acquisition, the Metal Detection segment has contributed approximately \$16.2 million in revenue and \$5.3 million in EBIT from normal operations to the Codan Group's full year result. In the same period the interest cost incurred in respect of the acquisition was \$2.2 million (before tax). This contribution is better than forecast by the company at the time of the acquisition, although it was enhanced by the release of a new product in April. In FY09, the board expects the performance of the acquired business activities to also exceed earlier forecasts.

## C.2.2 ERG Limited

### Corporate Governance Statement

As at the date of this report, ERG has established, where appropriate, measures to comply with the "Principles of Good Corporate Governance and Best Practice Recommendations" (ASX

Recommendations) and unless otherwise stated is in compliance with those recommendations.

#### Role and Composition of the Board

The Board of Directors has responsibility to ensure that shareholders' interests are served by overseeing the Group's strategic direction, performance, policies, risk management and communications among other things. The Board's key objective is to build long term, sustainable value for the Group's shareholders.

The Board has an established Board Charter which details the Board's functions, approach to composition, rights and duties of Directors and Board objectives. The charter is available on the Company's website.

The Board currently comprises two Executive Directors and three Non Executive Directors. The Board is satisfied that two of its Directors, Messrs Henson and Clarey are independent representing a Board of 40% independence. This is below that recommended in the ASX

Recommendations, however the Directors believe that the composition of the Board is adequate due to the size and nature of the Company and industry in which it operates, and that the appointment of an additional independent Director to satisfy ASX Recommendation 2.1 is not justified. Further information concerning individual Director experience and qualifications and attendance at meetings is set out in the Directors' Report.

The Board charter contains the right of any Director to seek independent professional advice at the expense of the Company.



### **Board Committees**

Remuneration and Nominations Committee The remuneration function of the committee includes reviewing and recommending to the Board the remuneration of the Executive Directors and senior management, Directors' fees and the approval of invitations to participate in the ERG Executive Option Plan.

The nominations function includes succession planning for key executive roles, assessing the composition of the Board for the desired competencies and recommending the appointment of new Directors. The nominations function also includes Board induction and performance review.

The Board conducts annual reviews of its own performance including an opportunity for each Director to provide feedback on a range of issues. The performance review is overseen by the Chairman of the Remuneration and Nominations Committee. During the last 12 months an internal performance review was conducted involving an assessment by Directors of the Board's performance against a number of criteria relevant to the Board's functions and objectives.

The guidance to ASX Recommendation 9.2 states that a remuneration committee should be chaired by an independent director. Mr Saville is the Chairman of the Remuneration and Nominations Committee due to the current workload on independent Directors Mr Henson, as Chairman of the Board, and Mr Clarey, as Chairman of the Audit and Risk Committee.

The number of Remuneration and Nominations Committee meetings held during the financial year is detailed in the Directors' Report.

The General Manager Human Resources can be invited to attend all matters pertaining to remuneration and nomination.

The Remuneration and Nominations Committee charter is available on the Company's website.

The Company's remuneration policy reflects the market practices in the countries in which it operates. The Company participates in remuneration surveys and has a salary administration system in place which gives effect to market practices. A full remuneration report is provided in the Directors' Report.

The Company does not operate any schemes for retirement benefits, other than statutory superannuation, for Directors.

### **Audit and Risk Committee**

The Board has an established audit committee that operates under a charter approved by the Board. The Board has joined the functions of audit, risk management, internal control and compliance under the Audit and Risk Committee.

The Audit and Risk Committee charter is available on the Company's website.

The audit function of the Audit and Risk Committee includes to review the effectiveness of internal and operating controls, monitor the quality and reliability of financial information, ensure compliance with accounting policies determined by the Board, and oversee the annual audit and half-yearly review performed by the external auditor. All audit meetings are held with the Company's external audit representative and Executive Director – Finance in attendance.

The Board has also established an External Audit Policy which is available on the Company's website.

The risk function of the Audit and Risk Committee includes:

- ..... facilitate and oversee the process for identification and management of business risk;
- ..... review the business risk analysis and consider its rigour and completeness;
- ..... manage the ERG insurance program in light of the business risk analysis;
- ..... review the Company's preparedness for addressing major loss events; and
- ..... review and recommend risk management education processes and tools.

The number of Audit and Risk Committee meetings held during the financial year is detailed in the Directors' Report.

The Board acknowledges that it is responsible for the effective management of business risks at ERG. In this regard, ERG views risk management as applied corporate governance – that is, effective risk management is one of the functional means by which ERG achieves its high corporate governance standards. ERG's approach to risk management is summarised in the ERG Risk Management Policy that

### **Bid Review Committee**

The Bid Review Committee is a management committee that evaluates key projects for which ERG bids. The committee reviews the assessment of the risks and returns from the proposed project and the strategic importance of opportunities. Members of the Board are invited to participate in deliberations of this Committee.

### **Risk Management Policy**

ERG is committed to the protection and enhancement of its people, brand, assets and revenues and return to its shareholders. In this context its risk management policy is designed to cover the full range of strategic, financial, operational, commercial and technical risks and opportunities that may affect the achievement of ERG's strategic objectives.

The risk management policy is available on the Company's website.

### **Director and Employee Conduct**

The Company has established codes of conduct for Directors and employees. These codes of conduct are designed to promote actions which reflect the principles of honesty, diligence, respect for the company's assets and people, avoiding conflicts of interest and the proper use of information. Importantly they also establish clear rules for the compliance with the spirit and letter of the laws in the various countries in which the Company operates.

Full details of the codes of conduct are available on the Company's website.

### **C.2.3 Intermoco Limited**

#### **CORPORATE GOVERNANCE REPORT**

##### **Corporate Governance Statement**

The Intermoco Board is responsible for establishing and maintaining a corporate governance framework, which ensures the enhancement and protection of shareholder value. In undertaking this responsibility, implementation of rigorous accountability and control processes are required.

Intermoco has a strong commitment to effective corporate governance and endorsed the Australian Stock Exchange Corporate Governance Council's Principles of Good Corporate Governance and Best Practice Recommendations published in March 2003.

Membership of the Board has undergone significant change during the course of the previous two years and its structure has not enabled full compliance with regard to Board Structure and Board Committees. The Board restructure will continue, with a view to full compliance over time.

The Company's website [intermoco.com](http://intermoco.com) contains an Investor Section, which details the Company's Corporate Governance policies and procedures. This provides public access to all the information relevant to the Company meeting its corporate governance obligations.

##### **The Board Lays Solid Foundations for Management and Oversight**

The Board of Directors is responsible for setting the strategic direction of the Company and for overseeing and monitoring its business affairs. Directors are accountable to the shareholders for the Company's performance. The major responsibilities of the Board include:

1. Setting overall financial and business goals for the Company
2. Approving annual financial plans and budgets
  - Monitoring business performance and results
  - Approving management recommendations on strategic issues including major capital expenditure, acquisitions, restructuring and funding
  - Ensuring systems are in place which facilitate the effective monitoring and management of principal risks to which the Company is exposed
  - Adopting a strategic plan to achieve the Company's goals
  - Ensuring processes are in place for the effective communication with shareholders and other stakeholder, and
  - Reporting to shareholders on the Company's performance

The Board Charter included in the Corporate Governance Section on the Company website details the principles and procedures, which guide the Board's operations.

##### **Board Structure**

The names and details of Directors in office at the date of this Annual Report are included in the Directors' Report Section of this Annual Report. Directors of Intermoco are considered to be independent when they are independent of management and free from any business or other relationship that could materially interfere with the exercise of their independent judgment. The composition of the Board is guided by the following principles:

- The Board should be comprised of a minimum of three and a maximum of ten Directors - there are currently three Directors;
- The Board should have a broad range of expertise
- The Chairman shall be independent - the current Chairman is an Independent Director;
- A person cannot hold the responsibilities of Chairman and Chief Executive Officer - the current Chief Executive Officer is not the Chairman;
- A majority of the Board will be comprised of independent Directors - the following Directors are considered to be Independent:

Mr. Desmond (Wes) Ferguson  
Mr. Simon Kemp

At the date of this report, a majority of Directors were independent.

### **Nomination Committee**

Given the size of the Board and recent Board restructuring, the Board has not formed a Nomination Committee. The Board as a whole carries out the functions of that Committee.

### **The Board Promotes Ethical and Responsible Decision-Making**

The Board has a formal Code of Ethics and a Code of Conduct, which applies to all Intermoco employees, Directors and contractors. In addition the Board has introduced a Conflict of Interest Policy as well as policy on Securities Trading by Directors and Employees. Copies of these policies and directives are available on the Company website within the Corporate Governance Section.

### **The Board Safeguards the Integrity of Financial Reporting**

The Chief Executive Officer and Chief Financial Officer have provided the Board with an unqualified statement regarding the integrity of the financial statements. The sign off is based on the existence of close process which ensures that the resultant financial statements comply with accounting standards and provide a true and fair view of the Company's financial performance and position.

The Board establishes an Audit, Risk and Compliance Committee when its composition and size enable it to do so. When established, the Committee's responsibilities include reviewing the auditor's independence and management's response to the auditor's findings and recommendations. The overall responsibility of the Committee are set out under a Charter and is to assist the Board in meeting its responsibility to exercise due care, diligence and skill in relation to:

- Financial Reporting
- Application of accounting policies
- Financial Management
- Internal Control
- External audit

In discharging its role, the Committee is empowered to investigate any matter brought to its attention with full access to all books, records, facilities and personnel of the Company and the authority to engage independent advice as it determines necessary.

During the period an Audit Committee was not established. The Board has assumed all responsibilities and functions normally undertaken by the Committee. The Board re-established the Committee following the end of the period, consisting of: Mr Simon Kemp (Chairman); Mr Desmond (Wes) Ferguson.

### **The Board Makes Timely and Balanced Disclosure**

The Board has in place a Continuous Disclosure Policy, which has been implemented across the Company. A copy of the Policy is available on the Corporate Governance section of the Company website.

### **The Board Respects the Rights of Shareholders**

Intermoco has in place a Shareholder Communication Policy, which promotes effective communication with shareholders. A copy of the Policy is available on the Corporate Governance section of the Company website.

### **The Board Recognises and Manages Risk**

The Board is responsible for ensuring that management's objectives and activities are aligned with expectations and risks identified by the Board.

During the period, the Company operated a risk management and internal control framework that can be described as follows:

#### *Financial reporting*

~actual results are regularly reported against budget and revised forecasts for the year are prepared regularly:

- ~The Company reports to shareholders half-yearly. Procedures are also in place to ensure that price sensitive information is disclosed in accordance with the Continuous Disclosure requirements of the ASX Listing Rules and the Corporation Act 2001;
- ~The Chief Executive Officer and Chief Financial Officer have signed statements to the Board for the full and half year financial reports
  - ~ The Company's financial reports present a true and fair view, in all material respects of the Company's financial condition and operational results and are in accordance with relevant accounting standards;
  - ~The Statement given above is founded on a sound system of risk management and internal compliance and control which implements the policies adopted by the Board;
  - ~The statement given above is founded on a sound system of risk management and an internal compliance and control system is operating efficiently in all material respects.

#### *Quality and integrity of personnel*

- ~Formal appraisals are conducted at least annually for management and staff;
- ~The Company has adopted a Code of Conduct for all employees;
- ~The Company has written policies and procedures concerning issues such as health and safety in the workplace, harassment and equal opportunity.

#### *Audit Committee*

Functions of the Audit Committee set out in its Charter include:

- Monitoring corporate risk assessment and processes; and
- Monitoring the establishment of an appropriate internal control framework.

#### *Investment appraisal*

The Company has clearly defined guidelines for capital expenditure. These include annual budgets, detailed appraisal and review procedures, levels of authority and due diligence requirements where businesses are being acquired or divested.

#### **The Board Encourages Enhanced Performance**

The Chairman is responsible for reviewing the overall performance of the Board, Board Committees and individual Directors. The criteria and procedure for reviewing Board performance is detailed in the Intermoco Board and Directors Performance Evaluation statement in the Corporate Governance section of the Company website.

#### **The Board Remunerates Fairly and Responsibly**

The Board establishes a Remuneration Committee when its composition and size enable it to do so. When established, the Committee makes recommendations to the Board on matters of remuneration policy and its implementation. It has authority to approve arrangements for senior management with the exclusion of the Managing Director.

The primary purpose of the Committee is to support and advise the Board in meeting its obligations to the shareholders by:

- Determining executive remuneration policy
- Reviewing remuneration of Directors
- Determining the remuneration of Executive Directors
- Reviewing and approving the remuneration of direct reports to the Managing Director and other senior Executives as appropriate, and
- Reviewing and approving employee equity participation schemes

Since November 2006 the size and composition of the Board has not enabled the Committee to continue to operate. The Board has assumed all responsibilities and functions previously undertaken by the Committee. The board will re-establish the Committee when it possible to do so.

#### **Recognition of the Legitimate Interests of Stakeholders**

The Board has formal code of Conduct and Ethics which is available on the Corporate Governance website.

### C.3. Strength of Management Team

#### C.3.1 Scantech Limited

### BOARD OF DIRECTORS

**P D Pedler**  
**LLB (Hons) (Adel)**

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Chairman of the Board  
Chairman of Remuneration Committee  
Member of Audit Committee

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Peter Pedler is a partner of leading Adelaide law firm Duncan Basheer Hannon. He practices in the fields of commercial and property transactions and advises on due diligence and corporate governance issues. He also advises on Corporations Act and ASX compliance. He was appointed as a Director of Thoroughbred Racing SA in December 2007 and advises a range of public and proprietary companies.

Peter graduated with honours in 1980 and was admitted as a legal practitioner in February 1981. He is involved in a number of church and community organisations.

Peter was appointed to the Board on 12 August 2003.

**D J Lindeberg B.Bus, FCA.**

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Managing Director  
Executive Director  
Member of Audit Committee

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David Lindeberg is a Fellow of the Institute of Chartered Accountants in Australia and joined Scantech in December 1998 as the Chief Financial Officer and Company Secretary. He has had experience in accounting worldwide, working for international accounting firms from 1974 to 1989 in London, Johannesburg, Sydney and Adelaide. David also spent five years working for the South Australian Government.

David joined the board of Scantech in January 2000, as an Executive Director and was appointed Managing Director on 2 March 2001.

**Hon. D C Brown**  
**M.Rur.Sc, Fellow Dip. Bus. Admin.**

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Non - Executive Director  
Member of Audit Committee

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Dean Brown is currently Chairman of Hillgrove Resources Limited which is establishing a copper mine at Kanmantoo in the eastern Adelaide Hills. Dean, who was South Australia's Premier for three years from 1993, resigned as Member for Finniss and as a Parliamentarian last year after 27 years in Parliament.

Dean is involved in a wide range of community organisations. He is the Community Liaison Manager – River Murray for the SA Government, a member of the National Youth Mental Health Advisory Board, Food Bank SA Board member, member of the Agriculture and Food Advisory Board and the Heritage Foundation Board, University of Adelaide and a Playford Memorial Trust Board member.

Dean was appointed to the Board on 29 June 2007.

**L C Brett**  
**BSc, FIAA, FIA (London)**

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Non - Executive Director  
Chairman of Audit Committee  
Member of Remuneration Committee

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Laurance Brett is a principal of the Adelaide consulting actuarial firm, Brett & Watson Pty Ltd. Laurance has worked as an actuary in Adelaide since 1983 and commenced his own consulting actuarial firm in 1993.

Laurance advises large superannuation funds, companies and a number of government departments on a range of actuarial and financial matters.

Laurance was appointed to the Board on 1 September 2005.

I would also like to acknowledge the efforts of the Board. Apart from David the contributions and support of Laurance Brett and Dean Brown during the year under review have been invaluable. I would also like to particularly acknowledge the outstanding contribution by your Company Secretary Valerie Steer.

## DIRECTORS

The following persons held office as Directors of Scantech Limited for the entire period and at the date of this report:

>	Peter Pedler	-	Chairman
>	David Lindeberg	-	Managing Director
>	Laurance Brett	-	Non-Executive Director
>	Dean Brown	-	Non-Executive Director

### C.3.2 Technique Limited

I am pleased to announce that the company has successfully recruited Karl Jacoby to the board as full time Managing Director. Karl has been working with the company for over a year and is a major shareholder. He will bring focus and commitment in the years ahead.

#### Directors

The names of directors in office at any time during or since the end of the year are:

John Derek Hamilton Wolton	Non Executive Chairman
Robert John Shaw	Non Executive Director
Kevin Joseph Sheppard	Non Executive Director
Karl Phillip Jacoby	Managing Director appointed 5 August 2008

Directors have been in office since the start of the financial year to the date of this report unless otherwise stated.

#### Company secretary

The following person held the position of company secretary at the end of the financial year:

Kevin Joseph Sheppard - B.Bus (Acctcy), CPA. Appointed on 20 December 2006, Kevin is a partner in Sheppard Hanson & Co, a firm of Certified Practising Accountants in Brisbane. He was previously the Company Secretary of another listed public company for 19 years.

#### Information on directors

##### Qualifications and experience Special responsibilities

DH Wolton John has in excess of 31 years experience in the Information Technology industry, together with over 11 years experience in commercial capital raisings.

RJ Shaw Bob has extensive experience in Information Technology industry. He has 7 years previous experience as Chairman of Directors of a listed entity.

Chairman

Non-executive director Member of Remuneration Committee.

Non-executive director

Member of Audit Committee. Member of Remuneration Committee.

KJ Sheppard B.Bus (Acctcy), CPA

KP Jacoby GAICD

Kevin is a partner in Sheppard Hanson & Co, a firm of Certified Practising Accountants in Brisbane.

He has 19 years previous experience as Company Secretary of a listed entity.

Karl was appointed Managing Director on 5 August 2008.

He has extensive experience in management, healthcare, manufacturing and equities.

Non-executive director

Company secretary

Member of Audit Committee.

Managing director

Key Management Person	Position
JDH Wolton	Non Executive Director
RJ Shaw	Non Executive Director
KJ Sheppard	Non Executive Director and Company Secretary
CR Boys	Chief Executive Officer Prologic Pty Ltd

### C.3.3 Transol Corporation Limited

#### Directors

The names and details of the Directors in office at any time during or since the end of the Financial Year are as follows:

##### **Mr Martin Ralston B.Ec.**

**Non-Executive Chairman** (Appointed 8 October 2003)

Mr Martin Ralston has been involved in the information technology sector since 1970.

He has worked for BHP, Computer Accounting Services and Accenture (previously Andersen Consulting) where he was a partner from 1985 to his retirement in August 2001. Mr Ralston holds no other listed Company Directorships nor has he held such position in the past three years. Mr Ralston is a member of the Company's Audit and Risk Committee and Remuneration Committee.

##### **Mr Angus Edgar Executive Director** (Appointed 28 May 2003)

Mr Angus Edgar has been employed in the Finance/Stockbroking industry for 23 years since 1985 with the majority of that time employed with various share broking companies. During that period he has been directly involved with providing corporate advisory services to private and ASX listed companies and the listing of several new companies onto the ASX. Mr Edgar is a Director of Melbourne Capital Limited, a corporate advisory company, and the Chairman of Photo-Me Australia Limited. Mr Edgar is a member of the Company's Audit and Risk Committee and Remuneration Committee.

##### **Mr Richard Stanger**

B.Bus, MAMA

**Executive Director** (Appointed 15 October 2007)

Mr Stanger formed Liberty Mining International Pty Ltd to commence project acquisition and exploration in The Kingdom of Cambodia. Liberty Mining International Pty Ltd has since July 2007 become a 100% owned subsidiary of Transol Corporation Ltd and Mr Stanger joined the board of Transol Corporation Ltd as an Executive Director.

Mr Stanger has over 25 years' business experience in a wide range of industries, with a significant emphasis on exploration and mining. Since 1987, he has worked as a Management Consultant, both in a private capacity and also with Proudfoot Consulting and with the Jamieson Consulting Group in a wide variety of industries including mining (underground and open-cut) and in an international capacity for some of the largest and most prestigious multi-national and national companies. Mr Stanger has been involved in most aspects of the mining industry from property acquisition, exploration, mining production, processing and corporate management. More recently, Mr Stanger worked as the Senior Analyst – Asia Pacific for Proudfoot Consulting. Prior to joining Proudfoot, Mr Stanger was a Director Asia-Pacific for the Jamieson Group of Companies. Mr Stanger recently retired as Executive Director of Great Australian Resources Ltd and previously, as Managing Director of listed Dynasty Metals Australia Ltd on the Australian Stock Exchange.

Mr Stanger commenced work in Cambodia in 2004 and acquired Liberty International Pty Ltd's first two licenses in 2005, commencing active exploration in that year. Mr Stanger is a member of the Audit and Risk Committee and Remuneration Committee.

##### **Mr Andrew Metcalfe**

B.Bus, CPA, FCIS **Non-Executive Director** (Resigned 18 December 2007)

Mr Metcalfe is a qualified Accountant with over 20 years experience across a variety of industry sectors, holding the position of Company Secretary and CFO for a number of ASX listed entities and unlisted public entities for Property, Retail, Energy, Manufacturing, and Technology Industries. Mr Metcalfe is a Fellow of the Institute of Chartered Secretaries.

### **C.3.4 TSV Holdings Limited**

On behalf of the Directors I wish to thank Robert Grey, his senior management team and all employees for their efforts during the year.

#### **COMPOSITION OF THE BOARD**

As at the date of this Annual Report, the Directors are as follows:

Mr. Bruce Higgins Independent Chairman

appointed 2 May, 2007

Mr. Robert Grey Managing Director

appointed 1 January, 2007

Mr. Paul Finkelstein Independent Non Executive Director

appointed 1 January, 2007

Each Director is a senior and experienced executive with skills and experience necessary for the proper supervision and leadership of the Company. As a team, the Board brings together a broad range of qualifications and experience in electronic communications, finance, accounting, law, and public company affairs.

#### **Directors**

The names of the directors in office at any time during or since the end of the year are:

Mr. Bruce Higgins Chairman – Non–Executive appointed 2 May 2007

Mr. Robert Grey Managing Director appointed 1 January 2007

Mr. Paul Finkelstein Non Executive Director appointed 1 January 2007

Mr. David Carter Chairman – Non–Executive resigned 27 July 2007

#### **Mr. Bruce Higgins**

Non Executive Chairman (Independent),  
Member Audit & Risk Management Committee

AGE – 48

Mr. Higgins has a bachelor degree in electronic engineering, master of business administration in echnology management and is a fellow of the Australian Institute of Company Directors and a chairman and non executive director of XTEK Limited Holdings. (ASX: XTE). Mr. Higgins has in the past served on the boards of Redflex Holdings (ASX: RDF) as both non executive and executive director, Raytheon Systems Company Australia Pty Ltd, Aerospace Technical Services Pty Ltd, IT Skills Exchange and non executive director of Learning Seat Pty Ltd., an e-learning company and non executive director of Defence Manufacturers Association.

Mr. Higgins has executive management experience as former CEO of Redflex Traffic Systems Inc, CEO of Raytheon Systems Company Australia, and executive experience with Honeywell and smaller listed companies, and has managed and directed rapid growth technology businesses for the past 20 years.

#### **Current equity holding:**

505,936 Ordinary Shares

400,000 Options

#### **Mr. Robert Grey**

Managing Director

AGE – 53

Mr Grey founded Austco Communications Systems in 1986, and was responsible for increasing envenues from \$5 million in 1989 to \$19 million prior to the Company's acquisition by TSV Holdings on 1st January 2007. Mr Grey retains a significant shareholding in TSV Holdings. Throughout his career, Mr Grey has been involved in electronic communications in Australia



and internationally, first as an engineer in telephony system development and installations, and later as the spearhead of Austco's expansion into new markets and territories.

Mr Grey holds a Bachelor of Engineering in Communications from Curtin University, WA, and a Diploma of Electronic Engineering from Mount Lawley College.

**Current equity holding:**

21,877,951 Ordinary Shares  
Nil Options

The following person held the position of company secretary and chief financial officer at the end of the financial year:

**Mr. Paul Finkelstein**

Non Executive Director (Independent), Chairman Audit & Risk Management Committee, Member Nomination & remuneration committee AGE – 57

Mr Finkelstein is a Certified Practising Accountant and is a senior partner in Finkelstein Hickmott Pty Ltd, Certified Practising Accountants. Paul has been a principle in his own practice in excess of 25 years and during this time has been heavily involved with general business consultancy and helping set up and develop a number of service related businesses. In recent years he has focused more in the areas of general business consulting and business management. Due to his extensive knowledge and experience, he has been invited to become a Director of a number of client companies.

Finkelstein Hickmott Pty Ltd has been providing Austco Communication Systems Pty Ltd with accounting services and financial advice for the past 15 years.

**Current equity holding:**

107,000 Ordinary Shares  
250,000 Options

**Mr. Jason D'Arcy**

Company Secretary  
B.Bus.Acc., B.Ec., CPA, (appointed 31 March , 2004)  
AGE – 39

Mr Jason D'Arcy is the Company Secretary and Chief Financial Officer of TSV. Jason is experienced in mergers & acquisitions, public company disclosure requirements including statutory reporting, ASX disclosures and in delivering quality management information within an organisation. Jason is a CPA, with B.Ec and B.Bus (Accounting) qualifications. Jason has extensive ASX listed company financial experience in his former roles as the CFO and Company Secretary of Baxter Group Limited (ASX:BAX) and Cellestis Limited (ASX: CST). Jason has also worked in senior finance roles for AV Jennings Limited (ASX:AVJ), Gordon Industries Limited and Kawasaki Ltd.

**C.3.5 Xtek Limited**

**Directors**

The following persons were Directors of XTEK Limited during the whole of the financial year and up to the date of this report unless otherwise indicated:

Mr. Bruce Higgins  
Mr. Craig Higgins  
Major General Michael O'Brien (Appointed 25 September 2007)

Reference 2 - 5.51% Coverage

## **Information on Directors**

**Mr. Bruce Higgins** *Chairman and Non Executive Director. Age 48.*

### **Experience and expertise**

Mr. Higgins has a Bachelor Degree in Electronic Engineering, Master of Business Administration in Technology Management and is a Fellow of the Australian Institute of Company Directors and Chairman and Non-Executive Director of TSV Holdings Limited (ASX: TSH). Mr. Higgins has in the past served on the Boards of Redflex Holdings Limited, Raytheon Systems Company Australia Pty Ltd, Aerospace Technical Services Pty Ltd, IT Skills Exchange, Learning Seat Pty Ltd, and Defence Manufacturers Association. Mr. Higgins has executive management experience as former CEO of Redflex Traffic Systems Inc, CEO of Raytheon Systems Company Australia, and executive experience with Honeywell and smaller listed companies, and has managed and directed rapid growth technology businesses for the past 20 years.

### **Other Directorships**

TSV Holdings Limited (Appointed 2 May 2007).

Legend Corporation (Appointed October 2007).

### **Special responsibilities**

Chairman of the Remuneration and Human Resource Committee.

Chairman of the Nomination Committee (Appointed 26 April 2007).

### **Interests in shares and options**

404,926 ordinary shares and 600,000 options over ordinary shares at 30 June 2008.

**Mr. Craig Higgins** *Non Executive Director. Age 51.*

### **Experience and expertise**

Mr. Higgins has a Bachelor of Management Studies majoring in accounting and cost accounting and is a member of each of the Australian and New Zealand Institute of Chartered Accountants. He is Chairman of 900 Degrees Limited (NHD), has served on the Board of Mobilesoft Limited (ASX: MSO) as a Non-Executive Director and has executive management experience as the former CEO and CFO of a leading provider of facility management and multi discipline support services including more than a decade of service experience in the physical security industry. Mr. Higgins has also served in General Management and CFO roles at a leading property services firm and one of Australia's largest private internet and network service providers after commencing his career with Price Waterhouse.

### **Other Directorships**

900 Degrees Limited (Appointed 2 May 2008)

### **Special responsibilities**

Chairman of the Audit, Finance and Risk Committee.

### **Interests in shares and options**

260,000 options over ordinary shares at 30 June 2008.

**General Michael O'Brien CSC (Rtd)** *Non Executive Director. Age 61*

### **Experience and expertise**

General O'Brien is a former regular Army Officer who served with distinction in the Australian Army for over 37 years and was awarded the Conspicuous Service Cross for his military service. He is a graduate of the Royal Military College Duntroon, the Australian Staff College, the Royal Military College of Science (UK) and the Australian College of Defence and Strategic Studies. General O'Brien has a Bachelor's Degree in Science, A Master of Defence Administration from Cranfield in the UK (MBA equivalent) and is a Fellow of the Australian Institute of Company Directors. His previous military appointments include senior positions in the Defence Materiel Organisation (Director General) and as Support Commander Army (Major General) responsible for Army Base Logistics prior to his retirement in 2001. In addition to his operational appointments within the military, General O'Brien has served on the Board of Directors of the Defence Force Credit Union Limited (DFCU) since 1985. He was Chairman of its Board during the period 1990 - 2005.

### **Other current Directorships**

National Vice-President, Royal United Service Institute of Australia.

## **Company Secretary**

**Mr. Lawrence Gardiner**

### **Experience and expertise**

Mr. Gardiner was appointed to the position of Company Secretary on 17 August 2004. Mr. Gardiner served with the Australian Army for 21 years and specialised in the fields of logistic management and explosive ordnance / bomb disposal operations. Mr. Gardiner served a further period of 13 years with the Australian Federal Police Protective Service, performing senior executive roles in the areas of counter terrorist first response and protective security operations before retiring at the rank of Chief Superintendent in 2003 to take up a senior management position with XTEK. He has also served as a Director of the International Association of Bomb Technicians and Investigators for over 11 years. Mr. Gardiner is a current member of the Australian Institute of Company Directors, and the Australian Institute

of Management.

### **Service agreements**

Remuneration and other terms of employment for the Chief Executive Officer, Company Secretary and the other specified executives are formalised in individual service agreements. The major provisions relating to remuneration are set out below:

Mr. David Jarvis (*Chief Executive Officer*)

- A written employment agreement in place, effective from 1st August 2005, expiring on 31st July 2008, unless otherwise terminated or renewed.
- Base salary, inclusive of superannuation, to the value of \$187,642 per annum.
- Motor vehicle allowance (Novated Lease vehicle fully maintained) to the value of \$30,000 per annum.
- Eligibility for Company Long Term Incentive Performance Rights Plan (LTIPRP) effective from 28 November 2006.
- Eligibility for Company Short Term Incentive Plan (STIP).
- Personal medical insurance.
- Qantas club membership.

Mr. Nick Weber (*Director Business Development*)

- A written employment agreement in place, effective from 1st August 2005, expiring on 31st July 2008, unless otherwise terminated or renewed.
- Base salary, inclusive of superannuation, to the value of \$225,630 per annum.
- Motor vehicle allowance (Novated Lease vehicle fully maintained) to the value of \$30,000 per annum.
- Eligibility for Company Long Term Incentive Performance Rights Plan (LTIPRP) effective from 28 November 2006.
- Eligibility for Company Short Term Incentive Plan (STIP).
- Personal medical insurance.
- Qantas club membership.

Mr. Lawrence Gardiner (*Company Secretary & Director Corporate Services*)

- A written employment agreement in place, effective from 1st August 2005, expiring on 31st July 2008, unless otherwise terminated or renewed.
- Base salary, inclusive of superannuation, to the value of \$112,410 per annum.
- Motor vehicle allowance (Novated Lease vehicle fully maintained) to the value of \$30,000 per annum.
- Eligibility for Company Long Term Incentive Performance Rights Plan (LTIPRP) effective from 28 November 2006.
- Eligibility for Company Short Term Incentive Plan (STIP).
- Personal medical insurance.
- Qantas club membership.

Mr. Stephen Wilde (*Chief Financial Officer*)

- A written employment agreement in place, effective from 1 September 2005, expiring on 31st August 2008, unless otherwise terminated or renewed.
- Base salary, inclusive of superannuation, to the value of \$130,730 per annum. This was reviewed to \$145,000 per annum in April 2007 on appointment as CFO.
- Annual salary increment of 5% of base salary coupled to personal performance outcomes.
- Eligibility for Company Long Term Incentive Performance Rights Plan (LTIPRP) effective from 28 November 2006.
- Eligibility for Company Short Term Incentive Plan (STIP).

Mr. Charles O'Neil (*Director, Sales*)

- A written consultancy agreement in place, effective from 1<sup>st</sup> June 2006, expiring on 30<sup>th</sup> June 2009, unless otherwise terminated or renewed.
- Base consultancy fee, exclusive of GST, to the value of \$140,000 per annum.
- Motor vehicle allowance to the value of \$8,000 per annum.
- Eligibility for Company Short Term Incentive Plan (STIP).

All agreements expiring after balance date are in the process of being renegotiated or have been renewed.

### C.3.6 Broad Investments Limited

#### INFORMATION ON DIRECTORS

The following persons were directors of Broad Investments Limited during the financial year and up to the date of this report:

*Executive Chairman* Mr Vaz Hovanessian

*Non-executive Directors*

Mr Robin Armstrong

Mr Neil Gibson

Mr George Lee – resigned on 29

October 2007 Mr Johannes Scholtz

The qualifications, experience and special responsibilities of each of the directors currently in office are as follows:

Name and qualifications	Age	Experience and special responsibilities
Vaz Hovanessian B.Bus., M.App.Fin, CPA, FCSA.	53	Executive Chairman & Company Secretary. Member of the Audit committee. Over 25 years' experience in corporate and financial services and/or public company directorships.  A successful businessman, with extensive interests in property and tourism. Appointed on 30 December 2003.  <i>Other current directorships</i>  Executive Chairman of E-com Multi Limited (appointed August 1993) Non-executive Chairman of FairStar Resources Limited (appointed 15 March 2008).  <i>Former Directorships in the last 3 years</i> Entertainment Media and Telecoms Corporation Limited (appointed 16 November 2002; resigned 22 December 2006).
Neil Gibson	66	Non-executive Director. Mr. Gibson is an accountant with varied experience in business including company secretarial, stock broking, rural properties and hotels and 15 years in communications services business in Queensland, Northern Territory and country New South Wales. Appointed 22 September 2006.
Johannes Scholtz B. Commerce	44	Non-executive Director and member of the Audit Committee. Has over 15 years experience in senior level management in Australia, New Zealand & South Africa, in the manufacturing and steel industries, including Corporate finance roles and turnarounds of small companies. Appointed on 30 May 2005

Robin Armstrong	54	<p>Non-executive Director. Mr. Armstrong is a stockbroker and Director of Findlay &amp; Co Stockbrokers Ltd which specialises in Broking services to retail and wholesale clients and Underwriting and Corporate Advisory Services to small to medium sized companies, and who has substantial experience with technology and mining floats.</p> <p>Appointed on 30 March 2007</p> <p><i>Other current directorships</i></p> <p>Findlay Securities Ltd (appointed 13 April 2007)</p> <p>Cardia Technologies Ltd (appointed 15 September 2006)</p> <p>Esperence Minerals NL (appointed 17 December 2007)</p> <p>Astro Diamond Mines NL (appointed 29 October 2007)</p>
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## SECRETARY

The company secretary is Mr Vaz Hovanessian. Mr Hovanessian was appointed to the position of company secretary in 2003. Before joining Broad Investments Limited he held a similar position with another listed public company.

### C.3.7 Comtel Corporation Limited

## DIRECTORS

The names and details of the Company's Directors in office during the financial year, and until the date of this report are as follows. Directors were in office for this entire period unless otherwise stated.

#### **Kevin Weldon, AM, Non-Executive Chairman**

Mr Weldon AM is the chairman of the Weldon International group of companies, the former Executive Chairman of UCMS, a Director of Imagination Entertainment and was the founding president of the International Life Saving Federation. He is Australia's most dynamic and successful book publisher and has owned publishing companies in Australia, Europe and the USA. He brings over 50 years of international business and entrepreneurial experience to the Board.

Appointed 31 July 2007.

#### **David Sweet, Executive Director**

Mr Sweet has a Bachelor of Business Degree and has held a number of executive roles over the past 12 years, which have included Vodafone and iTouch in Australia and New Zealand. As a Director of Vodafone Australia, Mr Sweet was responsible for the restructure of the sales and distribution group by streamlining and focusing operations as they related to customer markets. Mr Sweet's experience in the telecommunications arena, especially in the areas of sales, distribution and strategic development of international telecommunications businesses is extensive.

Mr Sweet has not been a Director of any other listed companies in the past three years. Appointed 18 June 2004.

***Roger Steinepreis, Non-Executive Director***

Mr Steinepreis graduated from the University of Western Australia where he completed his law degree. He was admitted as a barrister and solicitor of the Supreme Court of Western Australia in 1987 and has been practising as a lawyer for approximately 20 years.

He is the legal adviser to a number of public companies on a wide range of corporate related matters. His areas of practice focus on company restructures, initial public offerings and takeovers.

Appointed 9 March 2006.

***Victoria Lord, Non-Executive Director***

Ms Lord has a Bachelor of Commerce from the University of Melbourne, and a Post Graduate in Applied Finance and Investment. She is also a member of the Development Board for the Murdoch Children's Research Institute.

Ms Lord has worked as an equities analyst, corporate financier and investment manager over the past decade.

Ms Lord has not been a Director of any other listed companies in the past three years. Appointed 16 November 2007.

**COMPANY SECRETARY**

Mr Campbell Nicholas has been a certified practicing accountant for over 15 years. He was appointed as company secretary on 31 July 2007 and has held the position of company secretary in Sonnet Corporation from September 2005.

**Employment Contracts**

***Executive Director***

The Chief Executive Officer, Mr David Sweet, is employed under contract. The current employment contract commenced on 1 October 2007 and terminates 30 September 2009, at which time the Company may choose to commence negotiation to enter into a new employment contract with Mr Sweet. Under the terms of the present contract:

Mr Sweet receives fixed remuneration of \$350,000 per annum. Mr Sweet may resign from his position and thus terminate the contract by giving 6 months written notice. The Company may terminate this employment agreement by providing 6 months written notice and provide payment in lieu of this notice (based upon the fixed component of Mr Sweet's remuneration). The Company may terminate the contract at any time without notice if serious misconduct has occurred. Where termination with cause occurs, the CEO is only entitled to that portion of remuneration that is fixed, and only up to the date of termination.

***Other Executives***

All executives are employed under contract. The agreements outline the components of the remuneration paid to executives and require the remuneration of executives to be reviewed annually. The agreements do not require the Group to increase fixed remuneration, pay a short term incentive, make termination payments or offer a long term incentive in any given year. The criteria for the payment of bonuses to executives are based on a combination of achieving earnings targets set by the Board of Directors, specified individual targets and the discretion of the Board.

The Company may terminate the contract at any time without notice if serious misconduct has occurred. Where termination with cause occurs, the executive is only entitled to that portion of remuneration that is fixed, and only up to the date of termination.

The agreements may be terminated by written notice from either party or by the employing entity within the Group making a payment in lieu of notice. The notice periods are listed in the table below:

<b>Notice Period</b>	<b>Name of Executive</b>	<b>Company</b>	<b>Executive</b>
	Craig Johnson	6 months	6 months
	Campbell Nicholas	6 months	6 months
	Paul McFadden	6 months	6 months
	Paul Norton <sup>1</sup>	3 months	3 months

1. The 3 months notice period is effective from 1 August 2009. For the period 1 October 2007 to 31 July 2009, Mr Norton's employment is subject to terms and conditions in the Empowered share sale agreement.

### **C.3.8 Fulcrum Equity Limited**

#### **Directors**

The directors of the Company at any time during or since the end of the financial year are:

**Mr M Boyd B.Com., C.A., A.S.I.A., F.A.I.C.D., Age 43 (Executive Chairman)**

Mr Boyd is a Chartered Accountant with substantial experience in business management and development. Mr Boyd has been instrumental in a number of business opportunities that have gone on to list on the Australian Stock Exchange including Sonic Healthcare Limited, Foundation HealthCare Limited and LifeCare Health Limited. Mr Boyd has been a director since May 2001. Mr Boyd is a member of the Company's Remuneration Committee and Audit Committee.

Mr Boyd is also Non-Executive Director of ASX listed Advance Healthcare Group Limited (March 2007 – current), a company involved in the distribution of pharmaceuticals and surgical supplies and the development and operation of medication management and supply service to consumers, Non-Executive Chairman of RiTract Limited (resigned 16 April 2008), a medical safety device company, Non-Executive Chairman of ExpressRX, an unlisted medical technology company and Non-Executive Director of ASX listed Ultrabay (Resigned 12 June 2008), a mobile payment technology company.

Mr. Boyd's business history includes being the former Chairman of Sonic Healthcare Ltd., Australia's largest pathology and imaging company, former director of Silex Systems Ltd., a technology company involved in isotope enrichment and purification for the semi-conductor industry, now an ASX listed company.

**Mr M. Jenkins B.Com., Grad. Dip. (Bus.), Age 44 (Independent Non-Executive Director)**

Mr Jenkins qualified as a Chartered Accountant and has extensive international corporate finance and business experience. Mr Jenkins has worked in London as the Australian Government's Investment Commissioner, responsible for inward investment attraction. Prior to that, he was a director of the corporate finance and capital markets divisions of Porter Western Limited, based in Western Australia. Previously, he spent 4 years in London working in European corporate finance for Robert Fleming & Co and Mac Arthur & Co. Mr Jenkins has been a director since October 2001. Mr Jenkins is a member of the Company's Audit Committee and Remuneration Committee. **Mr M Plymin, B.Com., CPA Age 47 (Executive Director) (Appointed 25 March 2008)**

Mr Plymin, a qualified Certified Practising Accountant, is an internationally-experienced CFO / Senior Finance Manager and Business General Manager, with diverse accomplishments over the past 20 years across financial stewardship, risk management, asset-performance management and business acquisitions and divestments.

**Mr B. Ko, LLB, B.Com Age 39  
(Independent Non-Executive Director) (Resigned 25 March 2008)**

Mr Ko was appointed as a Non-Executive Director to the Fulcrum Board on the 29th November 2006. Mr Ko has worked as a lawyer in an international law firm, held the position of CEO for a publicly listed company involved in the Healthcare industry and currently holds a senior management role in finance.

**Mr A. Legg B.Com (acc), CPA, MBA, Age  
38 (Managing Director) (Resigned 31 July  
2007)**

Mr Legg is a Certified Practising Accountant and has acted in both financial and general management positions with a broad range of companies over the past 10 years. Mr Legg resigned effective 31 July 2007.

**Company secretary**

**Ms. S Karzis, B.Juris LLB**

Ms Karzis is a practising lawyer who acts as a Company Secretary for a number of public and private companies.

**C.3.9 Testra Corporation Limited**

**Details of directors and executives**

Changes to the directors of Telstra Corporation Limited during the financial year and up to the date of this report were:

- Belinda J Hutchinson retired as a director on 7 November 2007;
- John M Stewart was appointed as a director on 28 April 2008; and
- John P Mullen was appointed as a director on 1 July 2008.

Information about our directors and senior executives is provided as follows and forms part of this report:

- names of directors and details of their qualifications, experience, special responsibilities and directorships of other listed companies are given on pages 65 to 70;
- number of Board and Committee meetings and attendance by directors at these meetings is provided on page 71;
- details of director and senior executive shareholdings in Telstra are shown on pages 71 to 72; and
- details of director and senior executive remuneration is detailed in the remuneration report on pages 75 to 99.

**Company Secretary**

The qualifications and experience of our Company Secretary are provided on page 69 and forms part of this report.

Reference 2 - 9.47% Coverage

## Directors' profiles

As at 13 August 2008, our directors were as follows:

**Name Age Position Year of initial  
appointment  
Year last re-elected**

(1)

Donald G McGauchie. . . . . 58 Chairman, Non-executive Director 1998 2005



Solomon D Trujillo . . . . . 56 Chief Executive Officer 2005 –

Geoffrey A Cousins . . . . . 65 Non-executive Director 2006 -  
Catherine B Livingstone . . . . . 52 Non-executive Director 2000 2005  
Charles Macek . . . . . 61 Non-executive Director 2001 2006  
John P Mullen(2) . . . . . 53 Non-executive Director 2008 -  
John M Stewart(2) . . . . . 59 Non-executive Director 2008 -  
John W Stocker . . . . . 63 Non-executive Director 1996 2006  
Peter J Willcox . . . . . 62 Non-executive Director 2006 2006  
John D Zeglis . . . . . 61 Non-executive Director 2006 2006

(1) Other than the CEO, directors may not hold office for more than three years or beyond the third annual general meeting following their appointment (whichever is the later) without re-election.

(2) In accordance with our constitution, Mr Stewart and Mr Mullen have been appointed to fill interim positions and will stand for election at the 2008 annual general meeting.

A brief biography for each of the directors as at 13 August 2008 is presented below:

**Donald G McGauchie** AO, FAICD

**Age 58**

Mr McGauchie joined Telstra as a non-executive director in September 1998 and was appointed as chairman in July 2004. He is chairman of the Nomination Committee and is a member of the Audit and Remuneration Committees.

**Experience:**

Mr McGauchie has wide commercial experience within the telecommunication, food processing, commodity trading and finance sectors. He also has extensive public policy experience, having previously held several high-level advisory positions to the government including the Prime Minister's Supermarket to Asia Council, the Foreign Affairs Council and the Trade Policy Advisory Council.

**Directorships of other listed companies - current:**

Director, James Hardie Industries NV (2003- ) and Nufarm Limited (2003- ).

**Directorships of listed companies - past three years:**

Director, National Foods Limited (2000-2005).

**Other:**

Current: Director, Reserve Bank of Australia; Partner, C&E McGauchie - Terrick West Estate.

Former: President of the National Farmers Federation (1994-1998); Chairman, Rural Finance Corporation (2003-2004); Director, Graincorp Limited (1999-2003); Deputy Chairman, Ridley Corporation Limited (1998-2004).

Awarded the Centenary Medal for service to Australian society through agriculture and business in 2003. Appointed an officer in the general division of the Order of Australia in 2004.

**Solomon D Trujillo** – BSc, BBus, MBA, Hon Doctor of Law Degrees (University of Wyoming, University of Colorado)

**Age 56**

On 1 July 2005, Mr Solomon ("Sol") Trujillo joined Australia's leading telecommunications company, Telstra Corporation Limited (Telstra) as its Chief Executive Officer (CEO). He is leading an end-to-end transformation, driving Telstra's evolution into a media communications company.

**Experience:**

Prior to joining Telstra, Mr Trujillo was CEO of London-based Orange, the first American to lead a CAC-40 company; President and CEO of US West Dex Inc; President and CEO of US West Communications; and CEO and Chairman of US West Inc. Mr Trujillo was the first native Hispanic-American to serve as CEO of a Fortune 150 company. Mr Trujillo has also served as a trade policy advisor to the Clinton and Bush administrations.

**Directorships of other listed companies - current:** Target Corporation (1994- ).

**Directorships of listed companies - past three years:** Director, Electronic Data Systems Corporation (EDS) (2005-2005), PepsiCo Inc. (2000-2005), Orange SA (2001-2005) and Gannett Co Inc (2002-2006).

**Other:** Current: Member, World Economic Forum (2005- ) and UCLA's School of Public Affairs (2000- ); Trustee, Boston College; Director, Tomas Rivera Policy Institute (1991- ). Appointed to the Board of the International GSM Association (GSMA) in April 2008. Recipient, the Ronald H. Brown Corporate Bridge Builder Award in 1999 from President Clinton for his lifetime commitment as an advocate of workplace diversity.

### **Geoffrey A Cousins**

#### **Age 65**

Mr Cousins joined Telstra as a non-executive director in November 2006. He is a member of the Nomination and Remuneration Committees.

#### **Experience:**

Mr Cousins has more than 26 years experience as a company director. Mr Cousins was previously the Chairman of George Patterson Australia and is a former Director of Publishing and Broadcasting Limited, the Seven Network, Hoyts Cinemas group and NM Rothschild & Sons Limited. He was the first Chief Executive of Optus Vision and before that held a number of executive positions at George Patterson, including Chief Executive of George Patterson Australia.

#### **Directorships of other listed companies – current:**

Nil

#### **Directorships of listed companies - past three years:**

Director, Insurance Australia Group Ltd (2000-2007).

#### **Other:**

Former: Director, Globe International Limited (2001-2003). Mr Cousins was previously a consultant to a former Prime Minister.

**Catherine B Livingstone** – AO, BA (Hons), FCA, FTSE

#### **Age 52**

Ms Livingstone joined Telstra as non-executive director in November 2000. She is a member of the Audit and Technology Committees.

#### **Experience:**

Ms Livingstone has a degree in accounting and has held several finance and general management roles predominantly in the medical devices sector. Ms Livingstone was the Chief Executive of Cochlear Limited (1994-2000).

#### **Directorships of other listed companies - current:**

Director, Macquarie Bank Limited (2003- ), Macquarie Group Limited (2007- ) and WorleyParsons Ltd (2007- ).

#### **Directorships of listed companies - past three years:**

Nil

#### **Other:**

Current: Director, Macquarie Graduate School of Management Pty Ltd (2007- ); Future Directions International Pty Ltd (2007- );

Member, New South Wales Innovation Council (2007-) and Federal Government's National Innovation System Review Panel (2008- ).

Former: Chairman, CSIRO (2001-2006); Director, Goodman Fielder Ltd (2000–2003) and Rural Press Limited (2000–2003); Chairman and Director, Australian Business Foundation (2000–2005); Director, Sydney Institute (1998–2005); Former Member, Department of Accounting and Finance Advisory Board Macquarie University and Business/Industry/Higher Education Collaboration Committee (BIHECC).

**Charles Macek** - BEc, MAdmin, FAICD, FCPA, FAIM, SF Fin, FCA

#### **Age 61**

Mr Macek joined Telstra as a non-executive director in November 2001. He is a member of the Audit Committee and Nomination Committee and is chairman of the Remuneration Committee.

#### **Experience:**

Mr Macek has a strong background in economics and has had a long association with the finance and investment industry. His former roles include 16 years as Founding Managing Director and Chief Investment Officer and subsequently Chairman of County Investment Management Ltd.

#### **Directorships of other listed companies - current:**

Director, Wesfarmers Ltd (2001- ).

**Directorships of listed companies - past three years:**

Director, Living Cell Technologies Limited (2006-2007).

**Other:**

Current: Chairman, Sustainable Investment Research Institute Pty Ltd (2002- ); Director, Racing Information Services Australia Pty Ltd (2007- ) and Orchard Funds Pty Ltd (2007-); Member, Investment Committee of Unisuper Ltd.

Former: Chairman, Centre for Eye Research Australia Ltd (1996-2003); Member, Financial Reporting Council (FRC) (2000-2003) and Chairman (2003-2007); Chairman and Director, IOOF Holdings Ltd (2002-2003); Director, Famoice Technology Pty Ltd (2001-2004), Vertex Capital Pty Ltd (2004-2006) and Williamson Community Leadership Program Limited (2004-2007); Victorian Councillor, Australian Institute of Company Directors; Member, New Zealand Accounting Standards Review Board (2004-2007).

**John P Mullen**

**Age 53**

Mr Mullen joined Telstra as a non-executive Director on 1 July 2008.

**Experience:**

Mr Mullen has worked for over two decades in a multitude of senior positions with different multinationals. His corporate experience includes 10 years with the TNT Group, with two years as its Chief Operating Officer. From 1991 to 1994, he held the position of Chief Executive Officer of TNT Express Worldwide, based in the Netherlands. Mr Mullen joined Deutsche Post World Net (DPWN) as an Advisor in 1994, becoming Chief Executive Officer of DHL Express Asia Pacific in 2002, Joint Chief Executive DHL

Express in 2005 and Chief Executive Officer DHL Express in 2006.

**Directorships of other listed companies - current:**

Director, Deutsche Post World Net, Board of Management, Germany (2005- ) and Embarq Corporation USA (2006- ).

**Directorships of listed companies - past three years:**

Nil

**Other:**

Current: Member, Australian Graduate School of Management (2005- ); Advisory Council to the City of Seoul (2006- ) and Chairman, National Foreign Trade Council (Washington DC) (2008- ). Former: Director, International Swimming Hall of Fame (USA) (2005-2008).

**John M Stewart** - BA, FCIB, ACII

**Age 59**

Mr Stewart joined Telstra as a non-executive Director on 28 April 2008.

**Experience:**

Mr Stewart has had a long and successful career in the finance industry since he first joined Woolwich PLC in 1977. Mr Stewart was appointed to the Board of Woolwich in 1995 and became Chief Executive Officer in 1996. Following Woolwich's acquisition by Barclays PLC in October 2000, Mr Stewart was appointed Deputy Chief Executive Officer and became a member of the Barclays

Group Board and Group Executive Committee. In August 2003 he joined the Group comprising National Australia Bank (NAB), the Clydesdale & Yorkshire banks in the UK, Bank of New Zealand, and nabCapital as Chief Executive, Europe and Principal Board Member. In February 2004 Mr Stewart was appointed Group Chief Executive Officer of NAB. On 31 July 2008, NAB announced that

Mr Stewart will be succeeded as Group Chief Executive Officer effective 1 January 2009.

**Directorships of other listed companies - current:**

Director and Chief Executive Officer, National Australia Bank (2004- ).

**Directorships of Listed companies - past three years:**

Nil

**Other:**

Current: Chair, Australian Bankers' Association (2007- ); Director, Business Council of Australia (2006- ); Member, Scottish Enterprise's International Advisory Board (2006- ); and Member of the Federal Attorney General's Business-Government Advisory Group on national security.

Former: Executive Director, Barclays PLC (2000-2003); and Group Chief Executive Officer, Woolwich PLC (1996-2000). Recently, Mr Stewart was a member of the Prime Minister's Task Group on Emissions Trading.

**John W Stocker** - AO, MB, BSc, BMedSc, PhD, FRACP, FTSE

**Age 63**

Dr Stocker joined Telstra as a non-executive director in October 1996. He is chairman of the Audit Committee and Technology Committee.

**Experience:**

Dr Stocker has had a distinguished career in pharmaceutical research and extensive experience in management of research and development, and its commercialisation including in his roles as chief executive of CSIRO (1990-1995) and subsequently as Chief Scientist for the Commonwealth of Australia (1996-1999).

**Directorships of other listed companies - current:**

Chairman, Sigma Pharmaceuticals Ltd (2005- ); Director, Circadian Technologies Ltd (1996- ) and Nufarm Limited (1998- ).

**Directorships of listed companies - past three years:**

Chairman, Sigma Company Ltd (1998-2005); Director, Cambridge Antibody Technology Group plc (1995-2006).

**Other:**

Current: Principal, Foursight Associates Pty Ltd; Chairman, CSIRO (2007- ).

Former: Chairman, Grape and Wine Research and Development Corporation (1997-2004).

**Peter J Willcox** - MA

**Age 62**

Mr Willcox joined Telstra as a non-executive director in May 2006. He is a member of the Audit, Nomination and Remuneration Committees.

**Experience:**

Mr Willcox holds a degree in physics from Cambridge University and following a 28 year career in the international petroleum industry was appointed as Chief Executive Officer of BHP Petroleum Limited, from 1986 to 1994. He has wide and diverse experience as a Director and Chairman of Australian and American listed companies.

**Directorships of other listed companies - current:**

Chairman, 3D Oil Ltd (2007- ).

**Directorships of listed companies – past three years:**

Chairman, AMP Limited (2002-2005), Mayne Group Ltd (2002-2005) and Mayne Pharma (2005-2007).

**Other:**

Former: Chairman and Director, CSIRO (2006-2007); Director, F.H.Faulding & Co Ltd (1996-2000); Energy Developments Ltd (1994-2002), Lend Lease Corporation (1994-2000), Schroders (Australia) Ltd (1994-1999), North Ltd (1994-2000), James Hardie Industries Ltd (1992-2001), BHP Ltd (1988-1994), Woodside Petroleum (1986-1993).

**John D Zeglis** - BSc Finance, JD Law

**Age 61**

Mr Zeglis joined Telstra as a non-executive director in May 2006. He is a member of the Technology Committee.

**Experience:**

Mr Zeglis has a legal background, and became partner with the law firm Sidley & Austin in 1978. His qualifications include a BSc in finance from the University of Illinois, and a JD in law from Harvard.

Mr Zeglis has had a long and distinguished career in the US telecommunications sector. He joined AT&T in 1984, and was elected as President of AT&T in 1998 and Chairman and Chief Executive Officer of the AT&T Wireless Group in 1999. He continued as CEO of AT&T Wireless until retiring in November 2004 following the company's sale to Cingular Wireless.

**Directorships of other listed companies - current:**

Director, Helmerich & Payne Corporation (1989- ).

**Directorships of listed companies – past three years:**

Director, Georgia Pacific Corporation (2001-2005).

**Other:**

Current: Director, AMX Corporation; (2005- ) and State Farm Automobile Insurance (2004- ).

Former: Director, Sara Lee Corporation (1998-2000) and Illinois Power Company (1992-1996).

**Qualifications and experience of each person who is a company secretary:**

**Carmel C Mulhern** - BA, LL.M, FCIS

**Age 39**

Ms Mulhern was appointed company secretary of Telstra Corporation Limited on 7 September 2007.

Ms Mulhern joined Telstra in July 2000 as Corporate Counsel and was appointed General Counsel Finance and Administration in 2001. In those roles she has been responsible for Telstra's continuous disclosure compliance, preparation of the annual report and all legal aspects of the annual general meeting and annual financial results announcements. She played a key role in the T2 and T3 floats, Telstra's first off-market share buy-back, and the introduction of the dividend reinvestment plan. Before joining Telstra, Ms Mulhern was a senior associate in a leading national law firm and associate to justices of the High Court of Australia and Supreme Court of Victoria.

**Claire E Elliott** - BA, GDip IS, GDip App IS

**Age 45**

Ms Elliott was appointed as an additional company secretary of Telstra Corporation Limited on 7 September 2007. She is also company secretary of all Telstra subsidiaries including the Telstra Foundation. During her time at Telstra, Ms Elliott has worked on all three privatisation tranches and overseen the implementation of Telstra's two buy-backs and dividend reinvestment plan. She was appointed as additional company secretary to undertake the statutory and administrative duties of company secretary whilst Ms Mulhern was on maternity leave. During the year and through to the date of the report, the following director and company secretary resigned:

- Belinda J Hutchinson retired as a director on 7 November 2007; and
- Douglas C Gration resigned as company secretary on 7 September 2007.

Brief biographies of the former director and company secretary are presented below:

**Director**

**Belinda J Hutchinson** - AM, BEc, FCA

Ms Hutchinson joined Telstra as a non-executive director in November 2001. She was a member of the Audit Committee. Ms Hutchinson resigned as director on 7 November 2007. Ms Hutchinson has had a long association with the banking industry and has been associated with Macquarie Bank since 1993 where she was an executive director. She was previously a vice president of Citibank Ltd.

**Company secretary**

**Douglas C Gration** - FCIS, BSc, LLB (Hons), GDip AppFin

Mr Gration was appointed company secretary of Telstra Corporation Limited in August 2001. Mr Gration resigned as company secretary on 7 September 2007. Mr Gration was a partner in a leading national law firm before joining Telstra. He played a key role in the T1 and T2 privatisations and also advised on telecommunication regulatory matters.

## Appendix D

### Results of the Analysis to test the Assumptions and Inferences:

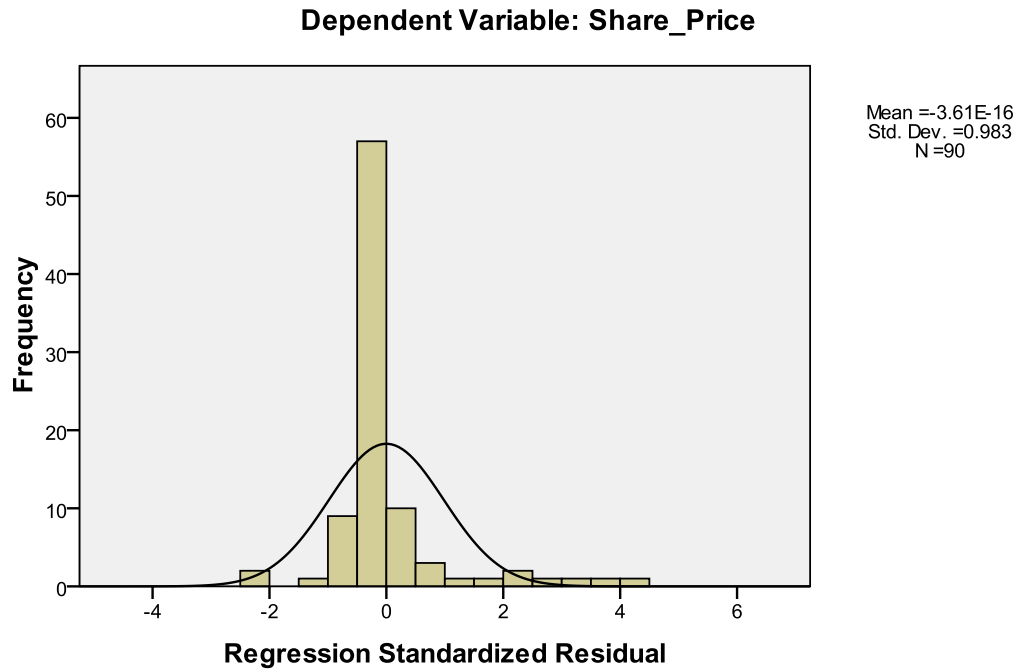
#### Residual Statistics

The results of residual analysis to test the assumptions of linear regressions related to Chapter 5 are provided in this Appendix. Results are presented for each of the selected models separately. Further, the results of the Kolmogorov-Smirnov test, one of the tests for the normality assumption is provided for each model.

D.1	Assessment of Value Relevance: Per-Share Basis, Full Sample	273
D.2	Assessment of Value Relevance: Firm-Level Aggregates: Full Sample	275
D.3	Assessment of Value Relevance: Per-Share Basis, Sector 1: All Companies	277
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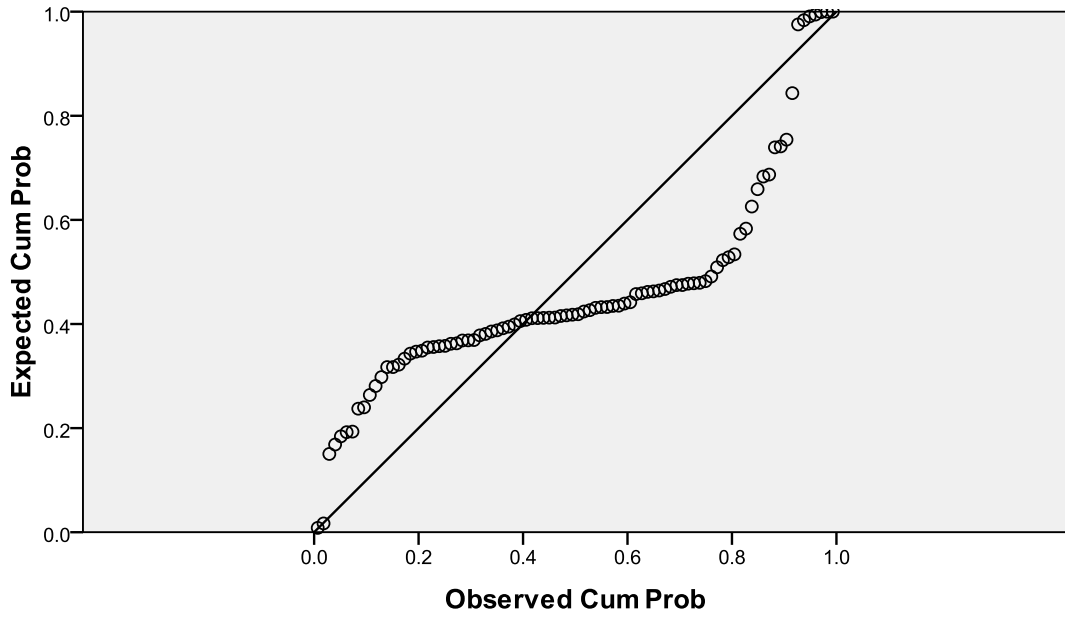
## D.1 Assessment of Value Relevance: Per-Share Basis, Full Sample (Model 1)

### Histogram



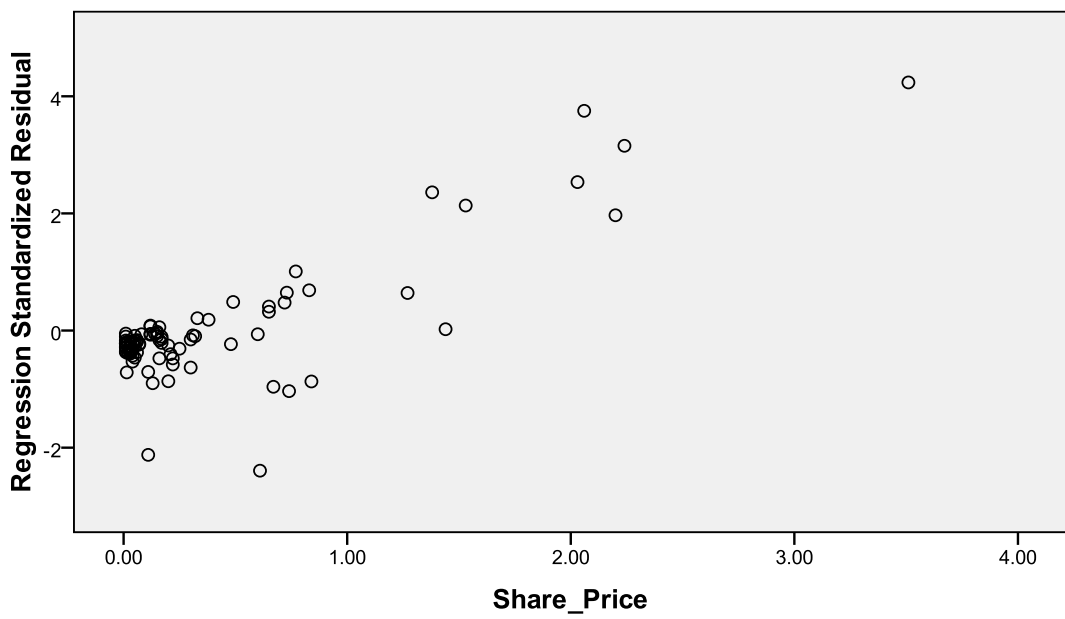
### Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Share\_Price



### Scatterplot

Dependent Variable: Share\_Price





**One-Sample Kolmogorov-Smirnov Test**

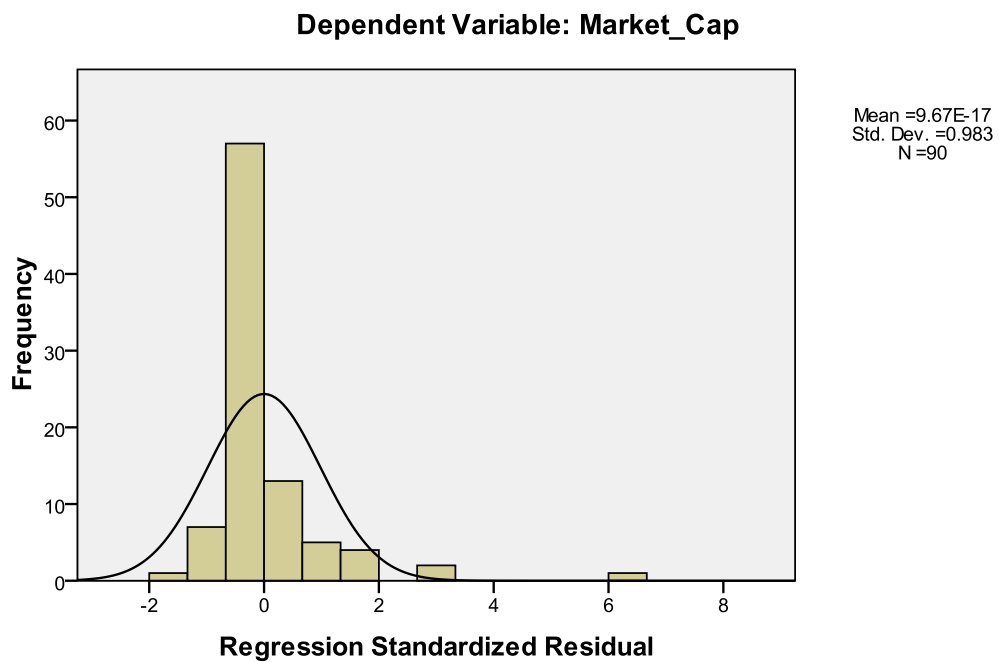
		Unstandardized Residual
N		90
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	.50169358
Most Extreme Differences	Absolute	.277
	Positive	.277
	Negative	-.181
Kolmogorov-Smirnov Z		2.626
Asymp. Sig. (2-tailed)		.000

a. Test distribution is Normal.

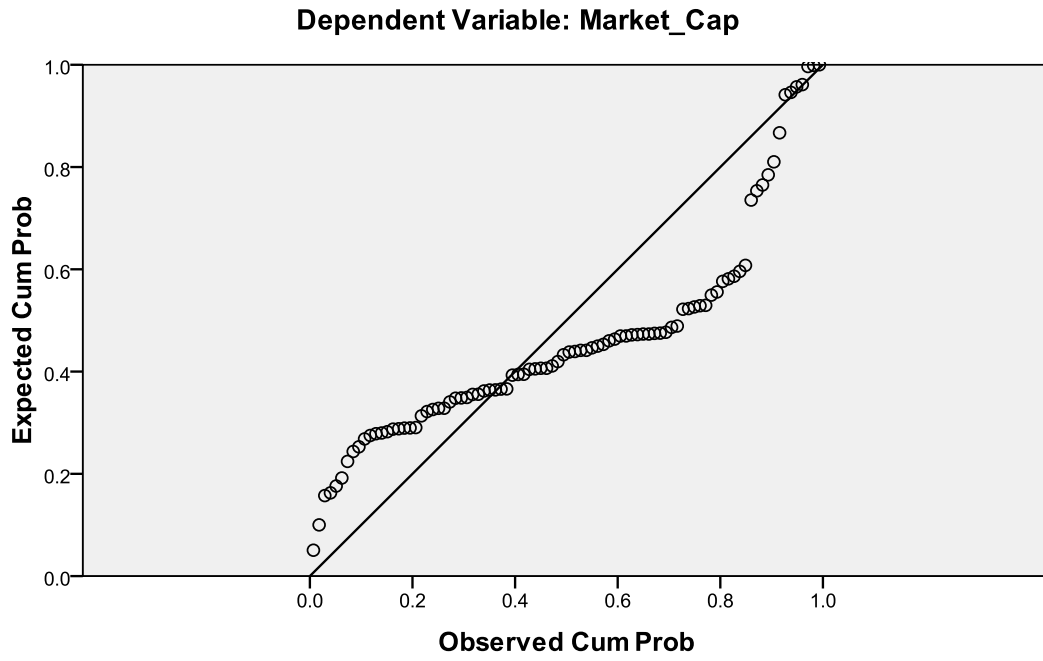
b. Calculated from data.

**D.2 Assessment of Value Relevance: Firm-Level Aggregates: Full Sample (Model 8)**

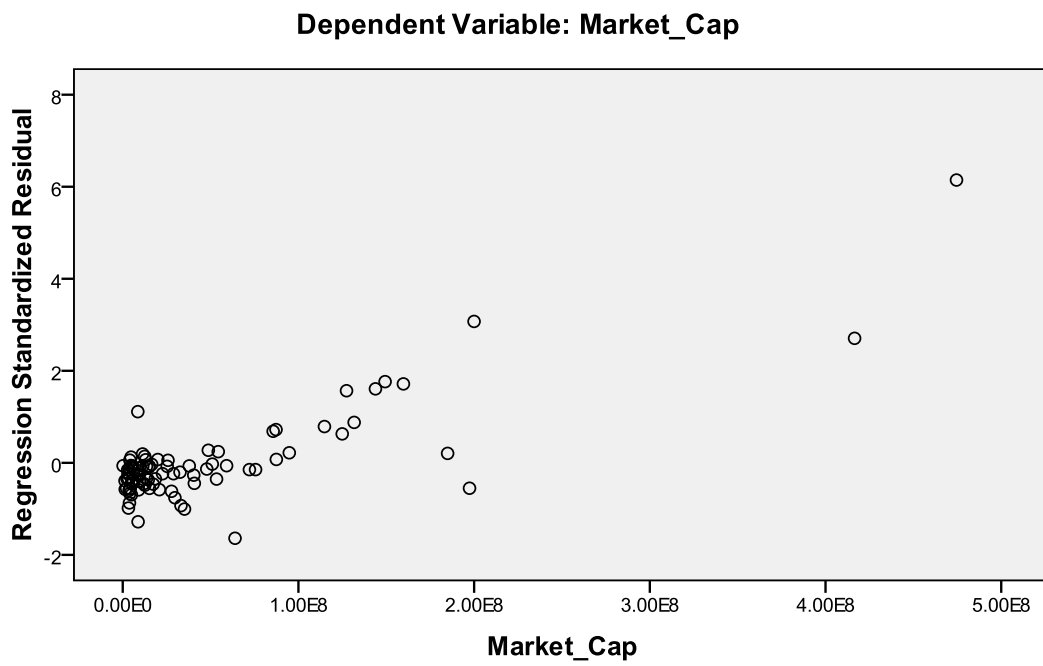
**Histogram**



### Normal P-P Plot of Regression Standardized Residual



### Scatterplot



**One-Sample Kolmogorov-Smirnov Test**

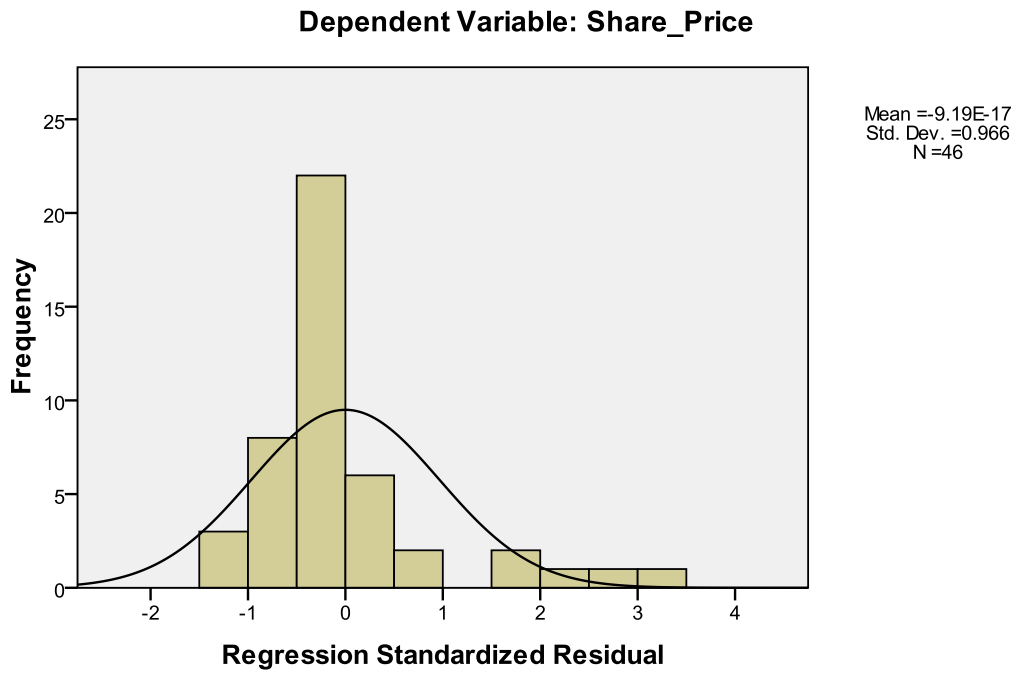
		Unstandardized Residual
N		90
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	.50169358
Most Extreme Differences	Absolute	.277
	Positive	.277
	Negative	-.181
Kolmogorov-Smirnov Z		2.626
Asymp. Sig. (2-tailed)		.000

a. Test distribution is Normal.

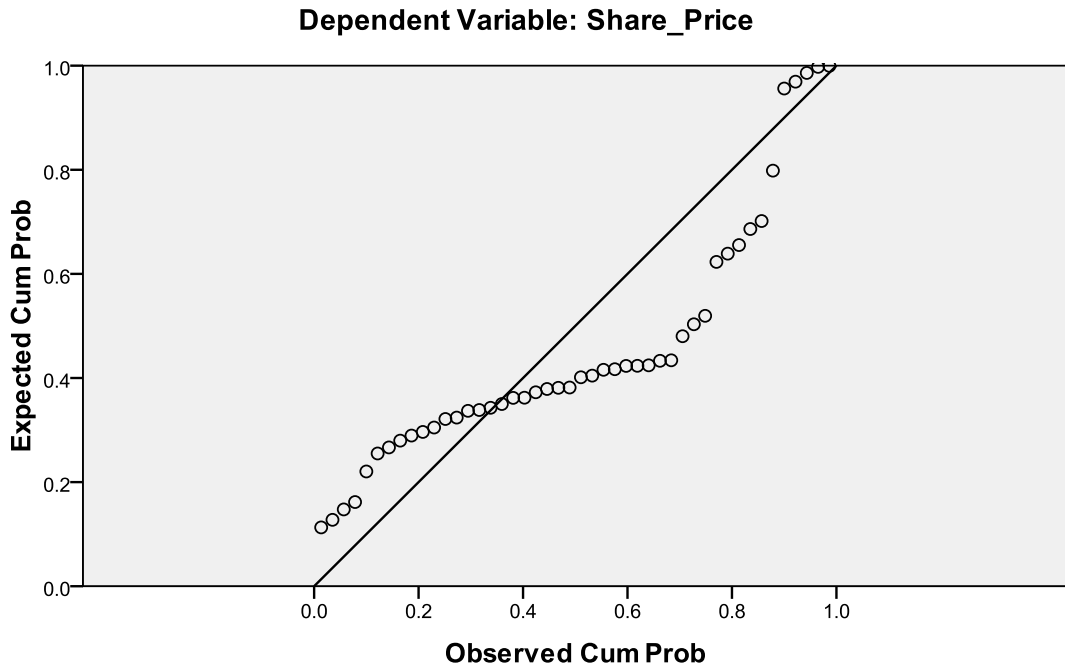
b. Calculated from data.

**D.3 Assessment of Value Relevance: Per-Share Basis, Sector 1: All Companies (Model 2)**

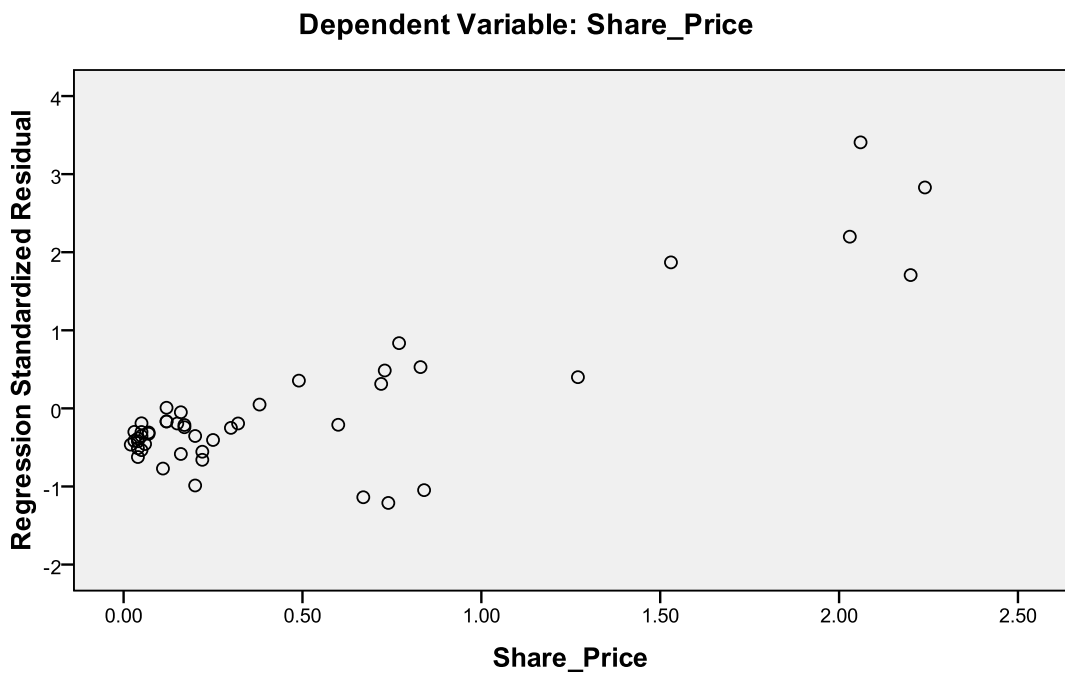
**Histogram**



### Normal P-P Plot of Regression Standardized Residual



### Scatterplot



**One-Sample Kolmogorov-Smirnov Test**

		Unstandardized Residual
N		46
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	.52400577
Most Extreme Differences	Absolute	.264
	Positive	.264
	Negative	-.139
Kolmogorov-Smirnov Z		1.790
Asymp. Sig. (2-tailed)		.003

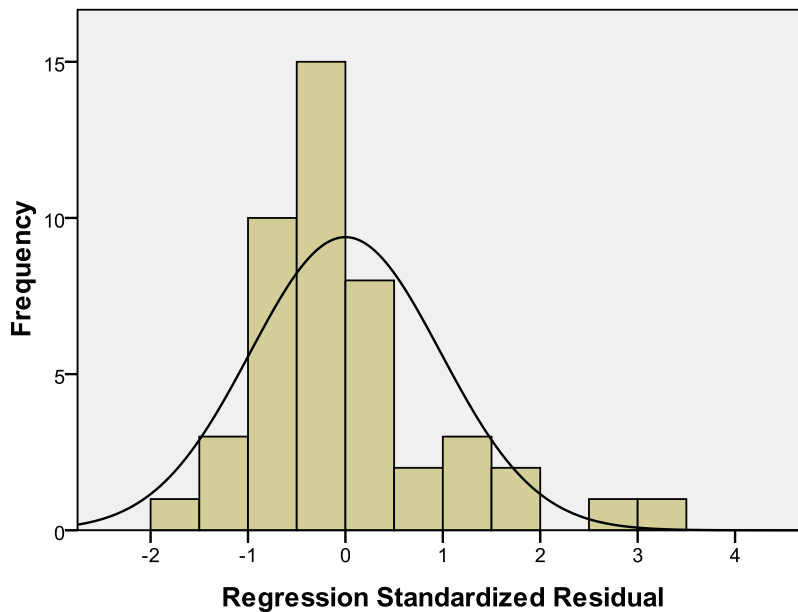
a. Test distribution is Normal.

b. Calculated from data.

**D.4 Assessment of Value Relevance: Firm-Level Aggregates, Sector 1: All Companies (Model 9)**

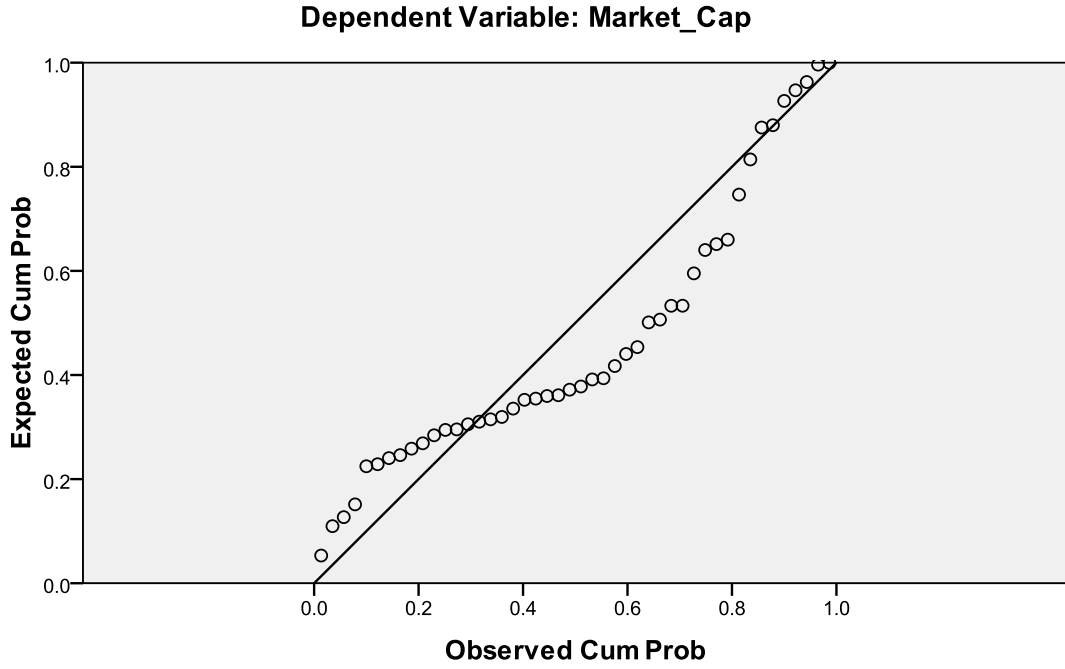
**Histogram**

**Dependent Variable: Market\_Cap**

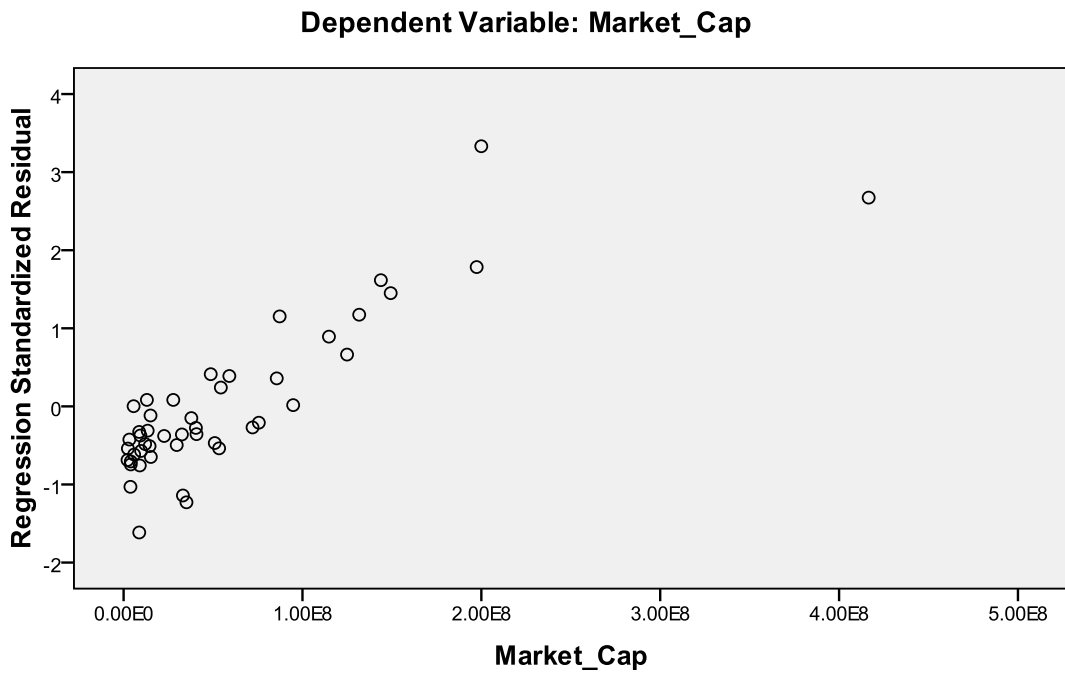


Mean =-.232E-16  
Std. Dev. =0.978  
N =46

### Normal P-P Plot of Regression Standardized Residual

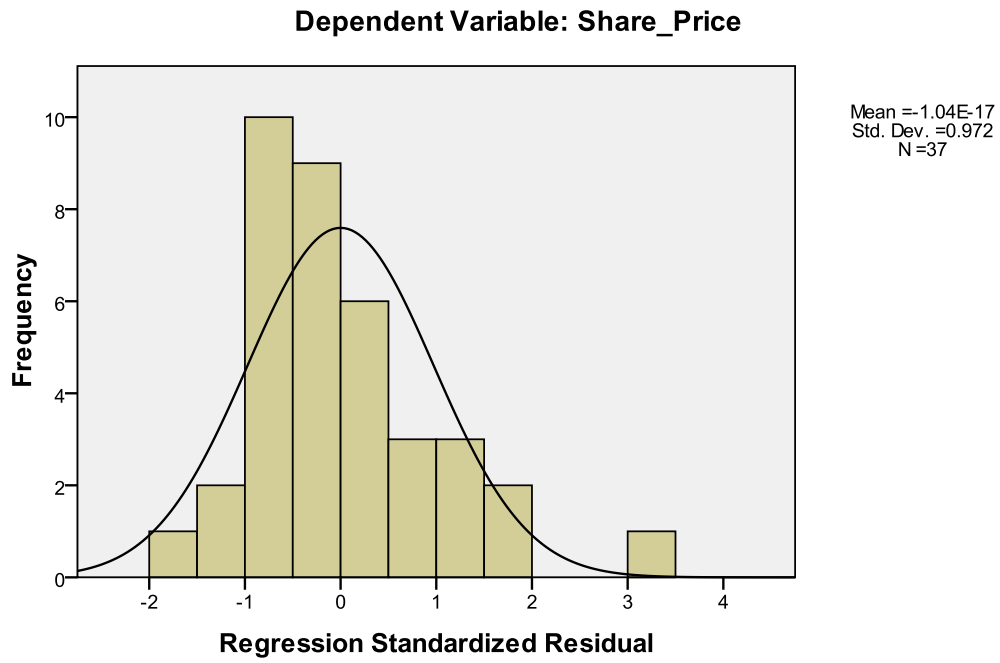


### Scatterplot

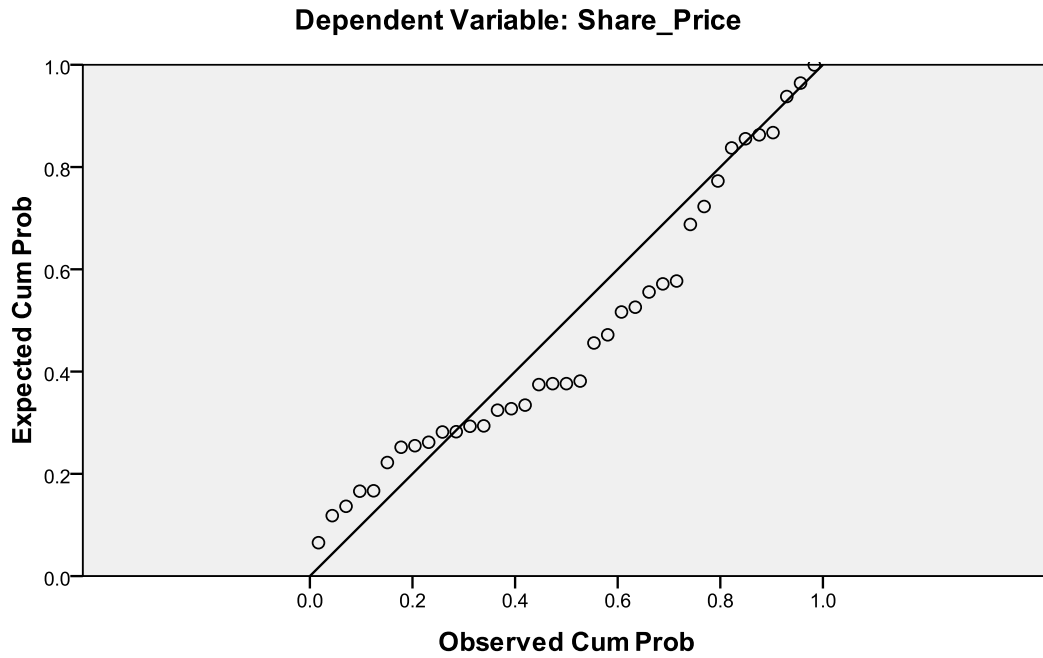


**D.5. Assessment of Value Relevance: Per Share Basis: Sector 1, Companies  
Reported Negative Earnings (Model 3)**

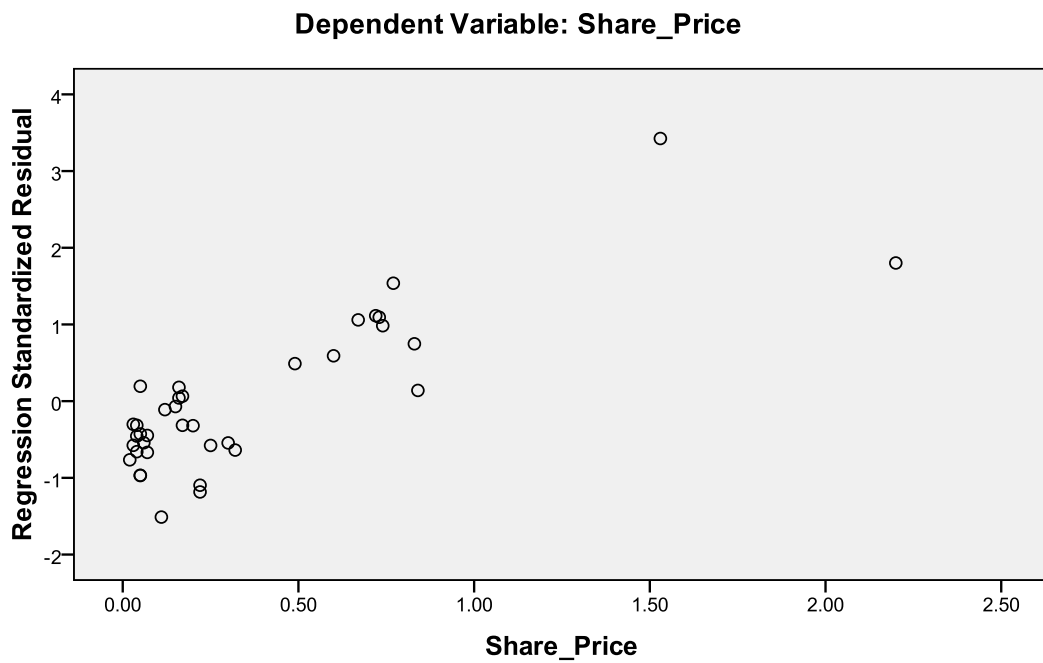
**Histogram**



### Normal P-P Plot of Regression Standardized Residual



### Scatterplot





**One-Sample Kolmogorov-Smirnov Test**

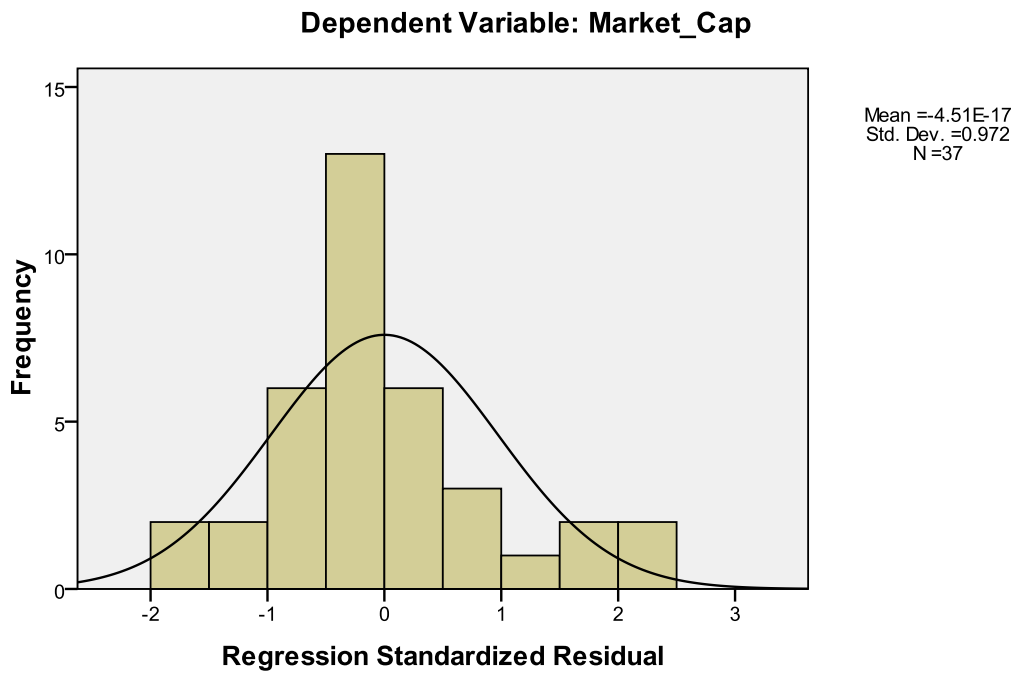
		Unstandardized Residual
N		37
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	5.34531897E7
Most Extreme Differences	Absolute	.157
	Positive	.157
	Negative	-.116
Kolmogorov-Smirnov Z		.953
Asymp. Sig. (2-tailed)		.324

a. Test distribution is Normal.

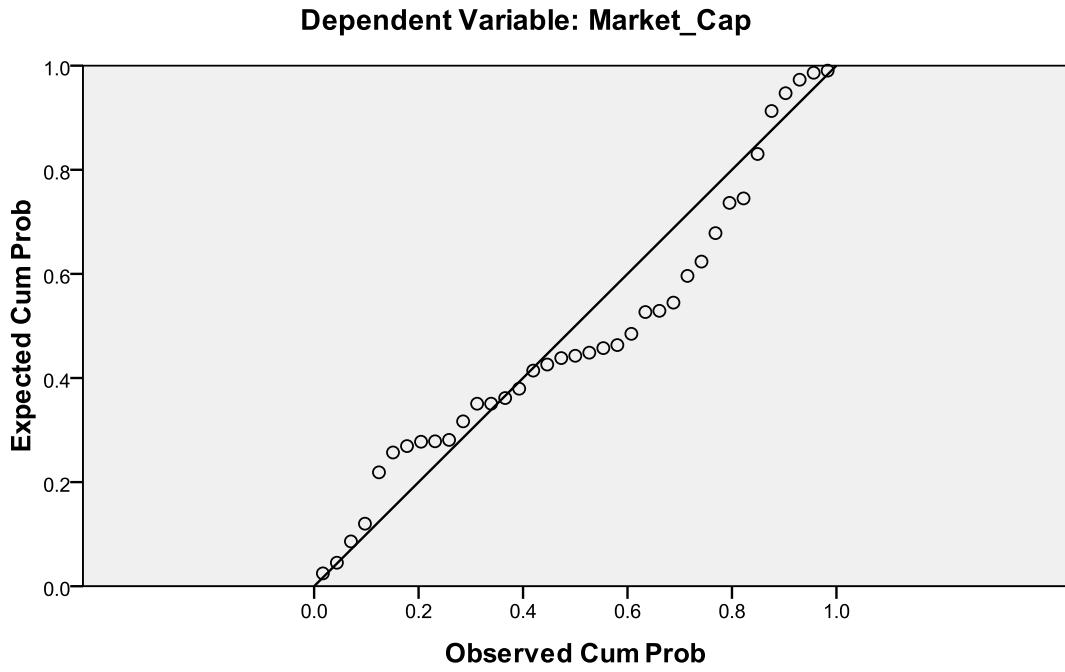
b. Calculated from data.

**D.6 Assessment of Value Relevance: Firm-Level Aggregates: Sector 1, Companies Reported Negative Earnings (Model 11)**

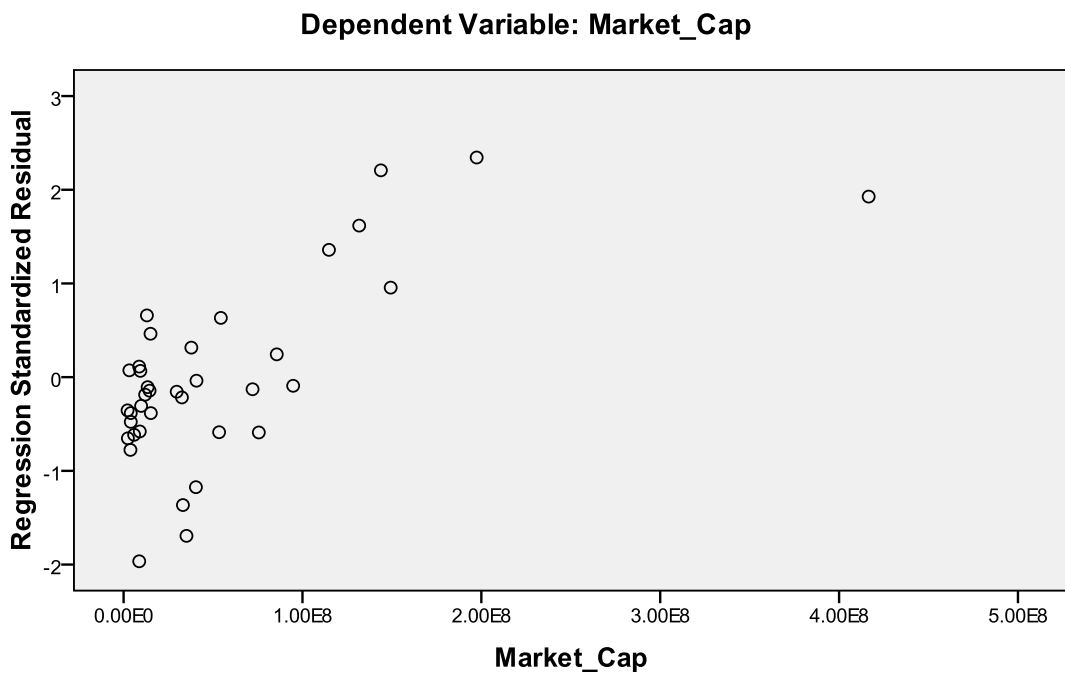
**Histogram**



### Normal P-P Plot of Regression Standardized Residual



### Scatterplot



**One-Sample Kolmogorov-Smirnov Test**

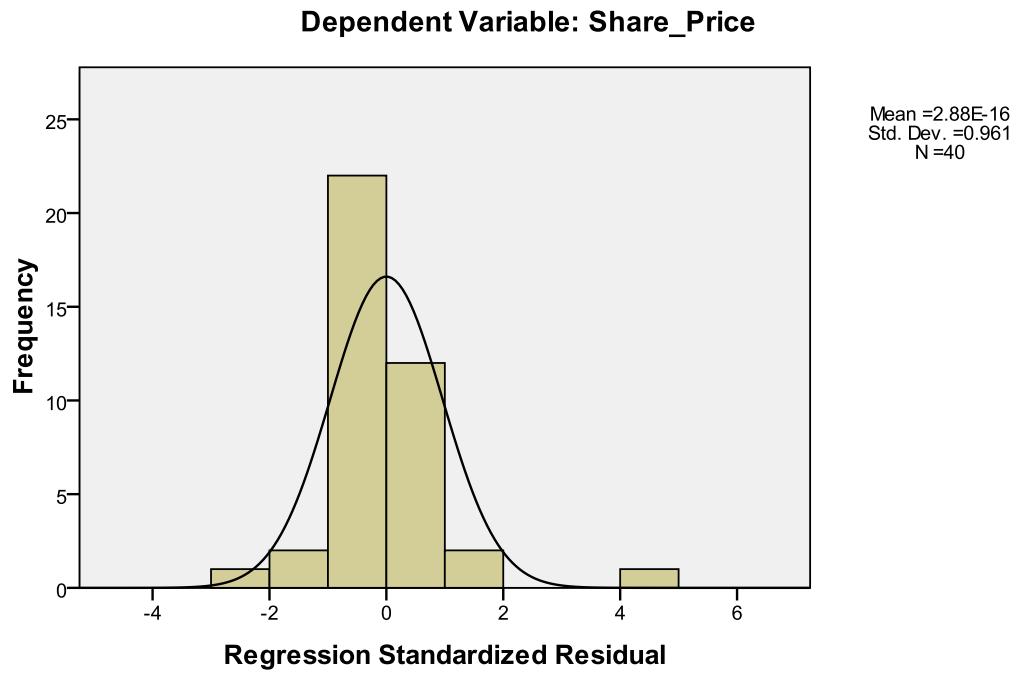
		Unstandardized Residual
N		37
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	5.34531897E7
Most Extreme Differences	Absolute	.157
	Positive	.157
	Negative	-.116
Kolmogorov-Smirnov Z		.953
Asymp. Sig. (2-tailed)		.324

a. Test distribution is Normal.

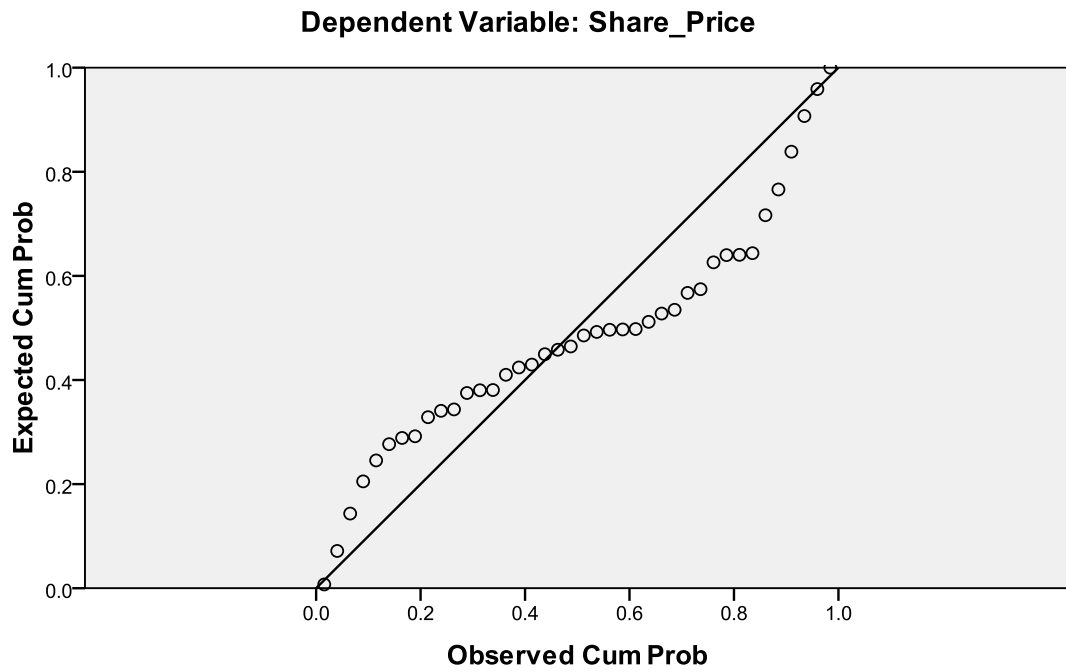
b. Calculated from data.

**D.7 Assessment of Value Relevance: Sectors 2 and 3 Together: Per-Share Basis (Model 7)**

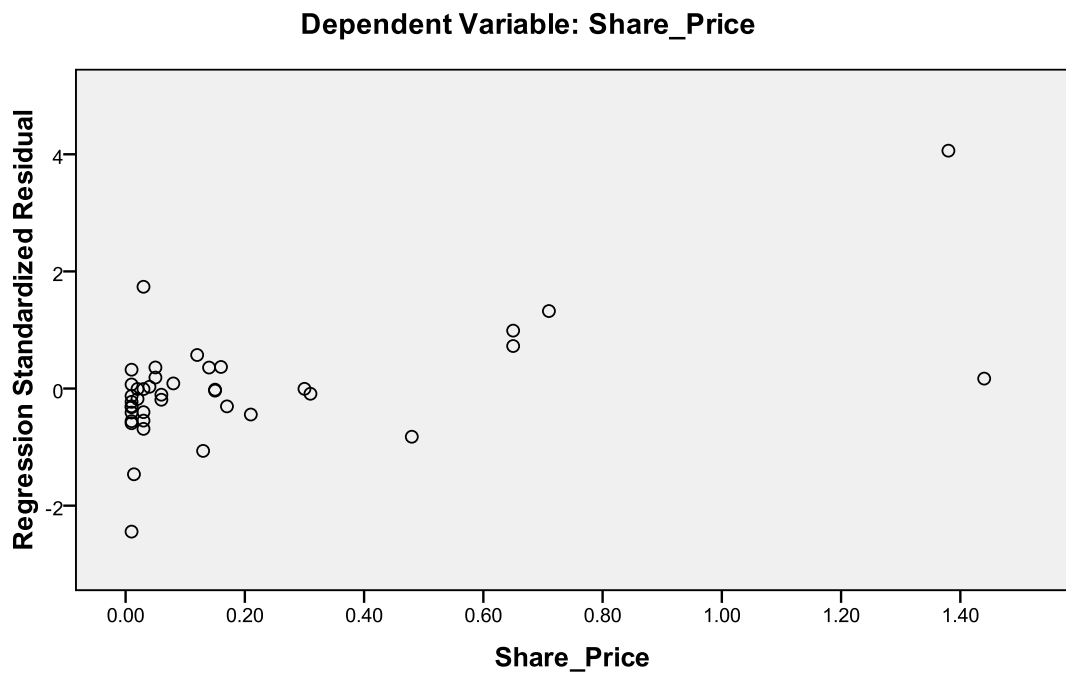
**Histogram**



### Normal P-P Plot of Regression Standardized Residual



### Scatterplot



**One-Sample Kolmogorov-Smirnov Test**

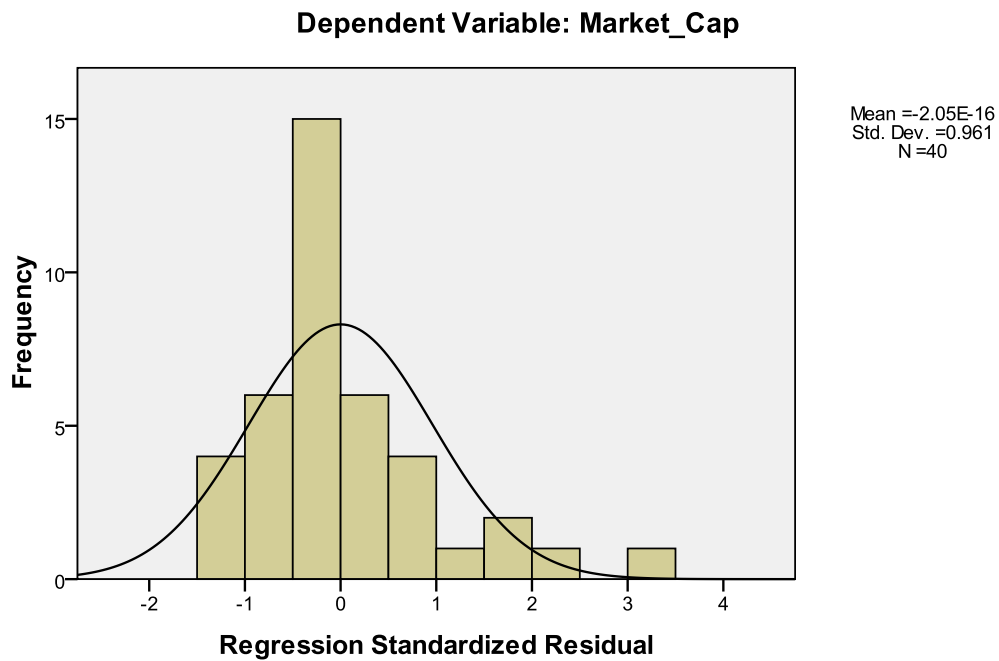
		Unstandardized Residual
N		40
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	.19520949
Most Extreme Differences	Absolute	.201
	Positive	.201
	Negative	-.144
Kolmogorov-Smirnov Z		1.270
Asymp. Sig. (2-tailed)		.080

a. Test distribution is Normal.

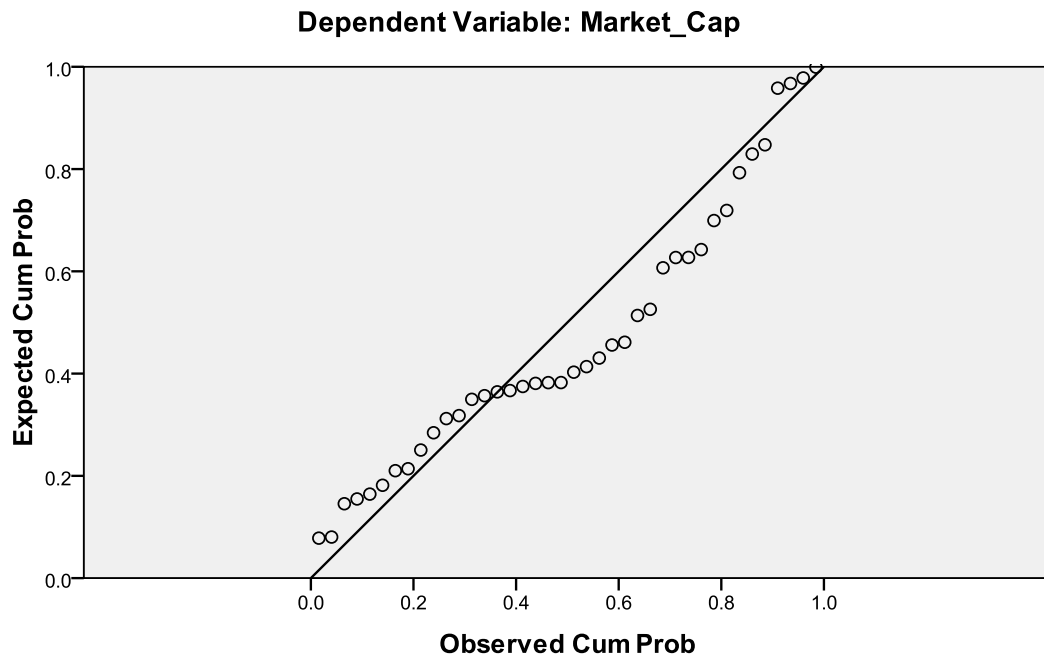
b. Calculated from data.

**D.8 Assessment of Value Relevance: Sectors 2 and 3 Together: Firm-Level Aggregates (Model 16)**

**Histogram**

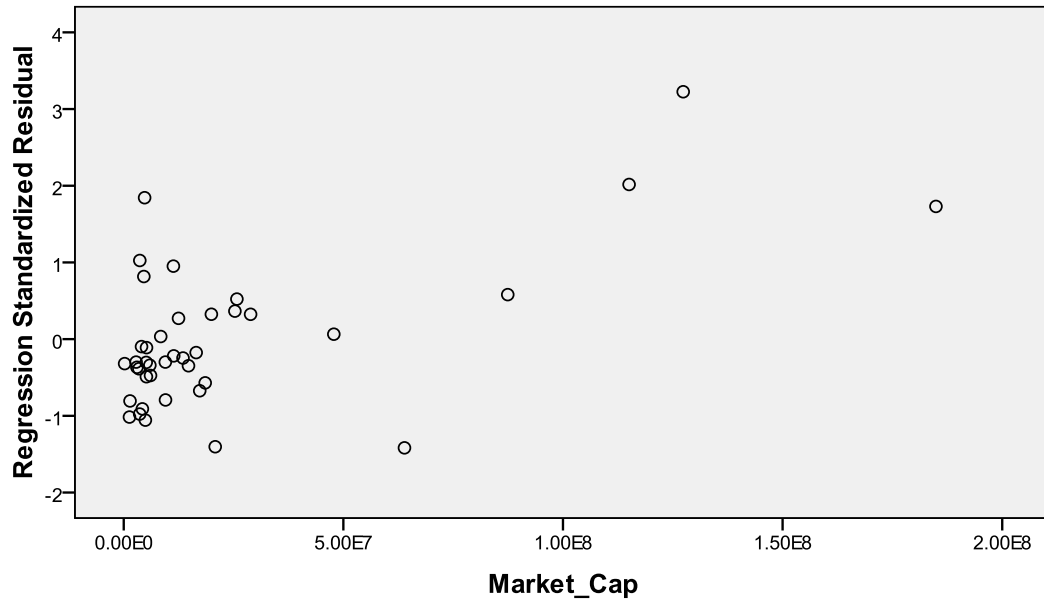


### Normal P-P Plot of Regression Standardized Residual



### Scatterplot

Dependent Variable: Market\_Cap



### One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		40
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	2.37827983E7
Most Extreme Differences	Absolute	.165
	Positive	.165
	Negative	-.086
Kolmogorov-Smirnov Z		1.045
Asymp. Sig. (2-tailed)		.224

a. Test distribution is Normal.

b. Calculated from data.



## **Appendix E**

### **Assessment of Value Relevance of Interaction between Factors influencing Value Relevance and IA Disclosures**

Appendix E provides the results of the regressions to assess the interactions between factors influencing value relevance and non-financial, intangible assets disclosures. Of the five factors considered, only three factors provided significant results; size of the company, profitability and industry type. The outcome of the models reported insignificant results, age of the company and ownership concentration are provided in this appendix, while the significant results are provided and discussed in Chapter 6.

Table E.1	Assessment of Value Relevance of Interaction: Age of the Company and IA	292
Table E.2	Assessment of Value Relevance of Interaction: Ownership Concentration and IA	294

**Table E.1**  
**Assessment of Value Relevance of Interaction: Age of the Company and IA, Per-Share Basis**

**Panel A**

Model	Data Set	Intercept	EPS	BV	Age*IA (100's words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	0.179	0.017	0.837	-0.001	28.6%	12.892	90
	Significance	0.146**	0.758	0.000***	0.693		0.000***	
2	Sector 1, All companies	0.289	0.024	0.950	-0.001	21.4%	5.081	46
	Significance	0.045**	0.677	0.000***	0.612		0.004***	
3	Sector 1, Companies reported negative earnings	0.143	0.257	0.791	0.001	26.5%	5.336	37
	Significance	0.226	0.304	0.001***	0.526		0.004***	
4	Sector 2	0.035	0.252	0.593	0.001	41.6%	5.507	20
	Significance	0.562	0.630	0.002***	0.079		0.009***	
5	Sector 3	0.263	2.744	0.800	-0.004	42.7%	6.462	23
	Significance	0.206	0.124	0.002***	0.386		0.003***	
6	Sector 2&3 together	0.075	2.077	0.640	-0.001	61.5%	21.798	40
	Significance	0.149	0.000***	0.000***	0.871		0.000***	

### Assessment of Value Relevance of Interaction: Age of the Company and IA, Firm-Level Aggregates

#### Panel B

Model	Data Set	Intercept	NP	EQ	Age*IA (100's words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	24620000	0.484	0.657	84.461	18.1%	7.552	90
	Significance	0.039**	0.378	0.000***	0.544		0.000***	
2	Sector 1, All companies	22010000	-1.403	0.826	22.070	29.1%	7.163	46
	Significance	0.193	0.249	0.000***	0.907		0.000***	
3	Sector 1, Companies reported negative Earnings	-8611741	-4.706	0.755	93.150	47.2%	11.709	37
	Significance	0.671	0.006***	0.002***	0.693		0.000***	
4	Sector 2	-4346095	-0.232	1.093	30.509	41.3%	5.452	20
	Significance	0.624	0.288	0.001***	0.651		0.009***	
5	Sector 3	13270000	6.763	-0.070	1224	32.1%	4.475	23
	Significance	0.647	0.022	0.917	0.142		0.015***	
6	Sector 2&3 together	17750000	1.787	0.401	-0.086	54.4%	16.505	40
	Significance	0.007***	0.000***	0.000***	0.999		0.000***	

\*\* Significant at 1% level

\*\* Significant at 5% level

Variable Definitions: Sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication; EPS: Earnings per share; BV: Book value per share; IA: Voluntary Disclosure of Intangible Assets quantified by word count; NPAT: Net Profit after Tax; EQ: Book Value of Total Equity; IA: Voluntary Disclosure of Intangible Assets quantified by word count; Age: Age of the company

**Table E.2**  
**Assessment of Value Relevance of Interaction: Ownership Concentration and IA, Per-Share Basis**

**Panel A**

Model	Data Set	Intercept	EPS	BV	Own*IA (100's words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	0.106	0.026	0.837	0.001	28.8%	13.010	90
	Significance	0.300	0.647	0.000***	0.528		0.000***	
2	Sector 1, All companies	0.268	0.020	0.937	-0.001	21%	4.985	46
	Significance	0.102	0.741	0.001***	0.823		0.005***	
3	Sector 1, Companies reported negative earnings	0.019	0.214	0.720	0.001	31.4%	6.504	37
	Significance	0.885	0.354	0.003***	0.104		0.001***	
4	Sector 2	0.027	0.269	0.604	0.001	41.7%	5.525	20
	Significance	0.727	0.610	0.003***	0.858		0.008***	
5	Sector 3	0.236	3.351	0.734	-0.001	41%	6.093	23
	Significance	0.365	0.056**	0.004***	0.647		0.004***	
6	Sector 2&3 together	0.079	2.082	0.635	-0.001	61.5%	21.802	40
	Significance	0.229	0.000***	0.000***	0.863		0.000***	

**Assessment of Value Relevance of Interaction: Ownership Concentration and IA; Firm-Level Aggregates**

**Panel B**

Model	Data Set	Intercept	NPAT	EQ	Own*IA (100's words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Full Sample	10910000	0.613	0.626	0.009	21.3%	9.023	90
	Significance	0.396	0.260	0.000***	0.107		0.000***	
2	Sector 1, All companies	1190000	-1.012	0.762	0.005	30.4%	7.560	46
	Significance	0.504	0.428	0.001***	0.376		0.000***	
3	Sector 1, Companies reported negative Earnings	-3050000	-4.323	0.653	0.011	51.9%	13.954	37
	Significance	0.144	0.009***	0.002***	0.073		0.000***	
4	Sector 2	-99840000	-0.274	1.189	0.003	43.7%	5.911	20
	Significance	0.369	0.216	0.001***	0.356		0.006***	
5	Sector 3	2750000	4.304	0.561	0.008	24.4%	3.365	23
	Significance	0.472	0.080	0.327	0.698		0.0408**	
6	Sector 2&3 together	1870000	1.790	0.399	-0.001	54.4%	16.529	40
	Significance	0.019***	0.000***	0.000***	0.865		0.000***	

## **Appendix F**

### **Value Relevance of Voluntary Disclosures of each Category of Intangible Asset**

Appendix F provides the results of the regressions to test the value relevance of voluntary disclosures of each category of intangible assets. Of the fifty two regressions run, only fourteen models provided significant results. The outcomes of the models reported insignificant results are provided in this appendix, while the results of the significant models are provided and discussed in Chapter 7.

Table F.1 Assessment of Value Relevance of Each Category of Intangible Assets 297

**Table F.1**

**Assessment of Value Relevance of Each Category of Intangible Assets: Per-Share Basis**

**Panel A**

Model No.	Data Set	Category of IA	Intercept	EPS	BV	IA (100 <sup>7</sup> words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
1	Sector 1 (All companies)	Forward Looking Information	0.229	0.024	0.919	0.001	20.9%	4.970	46
		Significance	0.108	0.686	0.000***	0.900		0.005***	
2		Corporate Governance	0.136	0.025	0.914	0.001	21.6%	5.132	46
		Significance	0.500	0.670	0.000***	0.543		0.001***	
3		Strength of Management Team	0.446	0.016	1.017	0.001	25.1%	6.033	46
	Significance	0.011	0.775	0.000***	0.131		0.002***		
4	Business Collaboration	Significance	0.277	0.023	0.925	0.001	21.7%	5.152	46
		Significance	0.023	0.688	0.000**	0.520		0.004***	
5	Environmental Reporting	Significance	0.148	0.027	0.934	0.002	24%	5.744	46
		Significance	0.238	0.641	0.000***	0.195		0.002***	
6	Sector 1 (Companies reported negative earnings)	Forward Looking Information	0.299	-0.234		0.001	3%	0.473	37
		Significance	0.025	0.346		0.786		0.627	
7		Corporate Governance	0.210	-0.253		0.001	2.2%	0.614	37
		Significance	0.325	0.312		0.558		0.547	
8		Strength of Management Team	0.072	-0.096		0.001	4.3%	1.812	37
	Significance	0.681	0.700		0.110		0.179		
9	Business Collaboration	Significance	0.297	-0.227		0.001	2.5%	0.553	37
		Significance	0.007	0.357		0.633		0.580	
10	Sector 2	Strength of Management Team	-0.084	-0.079	0.632	0.001	48.1%	6.871	20
		Significance	0.385	0.884	0.000***	0.174		0.003***	
11		Business Development	0.039	0.257	0.590	-0.001	41.6%	5.503	20
		Significance	0.396	0.624	0.001***	0.986		0.000***	
12		Business Collaboration	0.029	0.261	0.596	0.001	41.9%	5.565	20
	Significance	0.571	0.616	0.001***	0.767		0.008***		
13	Environmental Reporting	Significance	0.035	0.246	0.589	0.001	41.6%	5.512	20
		Significance	0.487	0.641	0.001***	0.912		0.009***	
14	Sector 2 and 3	Forward Looking information	-0.011		0.795	0.001	46.2%	17.761	40
		Significance	0.861		0.000**	0.171		0.000***	
15		Corporate Governance	0.045		0.814	0.001	43.4%	15.948	40
		Significance	0.647		0.000***	0.945		0.000***	
16		Strength of Management Team	-0.071		0.753	0.001	46.1%	17.689	40
		Significance	0.483		0.000***	0.179		0.000***	
17		Business Development	0.050		0.811	0.001	43.4%	15.944	40
		Significance	0.350		0.000***	0.981		0.000***	
18		Business Collaboration	0.050		0.811	0.001	43.4%	15.944	40
		Significance	0.392		0.000***	0.987		0.000***	
19		Environmental Reporting	0.041		0.767	0.001	45.6%	17.364	40
		Significance	0.395		0.000***	0.225		0.000***	

## Assessment of Value Relevance of Each Category of Intangible Assets: Firm-Level Aggregates

### Panel B

Model No.	Data Set	Category of IA	Intercept	NPAT	EQ	Each IA (100' words)	R <sup>2</sup> <sub>adj</sub>	F Value	N
20	Sector 1 (All companies)	Forward Looking Information	21000000	-1.374	0.838	11303	29.2%	7.177	46
		Significance	0.219	0.261	0.000***	0.837		0.001***	
21		Corporate Governance	14500000	-1.383	0.837	3460	29.4%	7.255	46
		Significance	0.541	0.255	0.000***	0.661		0.000***	
22		Strength of Management Team	29960000	-1.494	0.872	-5395	29.4%	7.254	46
		Significance	0.136	0.226	0.000***	0.661		0.000***	
23		Business Collaboration	23080000	-1.404	0.835	1380	29.1%	7.156	46
		Significance	0.116	0.251	0.000***	0.977		0.001***	
24		Environmental reporting	16230000	-1.056	0.835	159443	32.2%	7.792	46
		Significance	0.252	0.392	0.000***	0.268		0.000***	
25	Sector 1 (Companies reported negative earnings)	Corporate Governance	-23900000	-4.641	0.815	7846	48.2%	12.188	37
26		Significance	0.378	0.007***	0.000***	0.361		0.000***	
27		Strength of Management Team	-14640000	-4.718	0.753	7347	47.4%	11.823	37
28		Significance	0.561	0.006***	0.001***	0.573		0.000***	
		Business Collaboration	-15150000	-5.280	0.768	54427	49.1%	12.563	37
		Significance	0.398	0.003***	0.000***	0.244		0.000***	
		Environmental Reporting	-7369384	-4.306	0.807	106612	47.9%	12.034	37
		Significance	0.640	0.014***	0.000***	0.432		0.000***	
29	Sector 2	Forward Looking Information	-8155802	-0.085	0.805	52886	47.7%	6.772	20
		Significance	0.292	0.693	0.019***	0.158		0.004***	
30		Strength of Management Team	-15240000	-0.283	1.096	12924	45.8%	6.343	20
		Significance	0.242	0.189	0.001***	0.231		0.005***	
31		Business Development	451897	-0.183	1.042	-13598	41.4%	5.468	20
		Significance	0.954	0.400	0.001***	0.634		0.009***	
32		Business Collaboration	-3015043	-0.222	1.070	6736	40.9%	5.380	20
		Significance	0.700	0.306	0.001***	0.750		0.009***	
33		Environmental Reporting	-82486	-0.202	1.049	-47763	40.9%	5.389	20
		Significance	0.992	0.344	0.001***	0.735		0.009***	
34	Sec 2 and 3	Forward Looking information	9509434	1.749	0.410	47955	57.6%	18.677	40
		Significance	0.168	0.000***	0.000***	0.106		0.000***	
35		Corporate Governance	9958215	1.862	0.405	3510	55.7%	17.354	40
		Significance	0.269	0.000***	0.000***	0.308		0.000***	
36		Business Development	19870000	1.852	0.398	-11900	55.1%	16.954	40
		Significance	0.001***	0.000***	0.000***	-0.083*		0.000***	
37		Business Collaboration	17740000	1.787	0.401	47.553	54.4%	16.506	40
		Significance	0.004***	0.000***	0.000***	0.998		0.000***	
38		Environmental Reporting	1810000	1.798	0.401	-7171	54.5%	16.542	40
		Significance	0.001***	0.000***	0.000***	0.831		0.000***	

\*\*\* Significant at 1% level

\* Significant at 10% level

Variable Definitions: Sector 1: Pharmaceuticals, Bio Technology and Life Sciences; Sector 2: Hardware, Technology and Equipment; Sector 3: Telecommunication; EPS: Earnings per share; BV: Book value per share; IA: Voluntary Disclosure of particular Intangible Assets quantified by word count; NPAT: Net Profit after Tax; EQ: Book Value of Equity



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