РАЗДЕЛ 3 КОРПОРАТИВНОЕ УПРАВЛЕНИЕ В АВСТРАЛИИ

SECTION 3 CORPORATE GOVERNANCE IN AUSTRALIA

RELATING FIRM PERFORMANCE TO CORPORATE GOVERNANCE CHARACTERISTICS: A RESEARCH PERSPECTIVE ON THE PUBLICLY LISTED INFORMATION TECHNOLOGY COMPANIES IN AUSTRALIA

Tasadduq Imam*, Abdullahi Ahmed**, Kevin Tickle***

Abstract

The objective of this research is to relate company performance (in terms of different measures) to corporate governance characteristics (like board size, internal or external majority governance) for the publicly listed information technology (IT) companies in Australia. A sample of 55 such companies are considered. Results reveal that, contrary to the popular belief in respect to positive influence of external board members, performance of the IT companies tend to worse with higher degree of board independence. We attribute the characteristics of these outcomes to the dynamic properties of the IT industrial sector in Australia. Linear regression models relating the performance measures to board characteristics along with other financial information have also been developed. The number of senior management members has been identified as the key board characteristic factor in these models, implying the importance of major internal control over highly independent board for the publicly listed Australian IT companies.

Keywords: Corporate Governance, Board Composition, Board Structure, Balance Ratio, Linear Model, Firm Performance, IT industry, Australia

**Corresponding author, Faculty of Arts, Business, Informatics and Education, CQUniversity, Rockhampton, QLD 4702, Australia*
Email: t.imam@cqu.edu.au
***Faculty of Arts, Business, Informatics and Education, CQUniversity, Rockhampton, QLD 4702, Australia*
Email: a.ahmed@cqu.edu.au
****Faculty of Arts, Business, Informatics and Education, CQUniversity, Rockhampton, QLD 4702, Australia*
Email: k.tickle@cqu.edu.au

1. Introduction

The structure of a company's governing board and its effect on the company's performance is a well pursued research area (Shleifer and Vishny, 1997; Van der Walt et al., 2006; Shijun, 2008; Bowen, 1994). A company's business effectiveness is influenced by a number of factors including the economy in which the company primarily operates,

the characteristics of the company and governing laws of the countries in context. A number of different studies, so, have been conducted to relate firm performance measures to corporate governance characteristics for companies at varied industrial sectors and economies (Abidin et al., 2009; Aggarwal et al., 2007; Bai et al., 2004; Black and Kim, 2011; Chamberlain, 2010; Charny, 1998; Chen et al., 2009; Goswami, 2002). The conclusions achieved from these studies have also differed considerably.

Generally good and well designed corporate governance policies are advocated for high performance. Emphasis is given on the inclusion of a number of outside directors in the governing body, with a view that their independence from interests attached to the company would lead to better management and performance. In this regard, it is notable that the necessity of good corporate governance practices has recently attracted the attention of wide range of communities, particularly due to the collapse of big reputable firms from mismanagement of resources.

A prominent contemporary example is the enormous financial loss sustained by the Swiss bank UBS as a result of rouge trading and lack of proper supervision (Wright et al., 2011; Thomasson and Koltrowitz, 2011). Similar detrimental impacts on economy from failure of large corporates have also occurred in Australia. In 2001, OneTel, then a major Australian telecommunications company, collapsed due to ambitious undertakings and erroneous decision makings (Legard, 2001; Avison and Wilson, 2002). In the same year, HIH, a major insurer, collapsed due to poor corporate governance and caused a $5.3 billion deficiency in the economy (Lipton, 2003). Another recent example, also concerning improper corporate governance practices, is the failure of Lehman Brothers (Bris, 2010). With such history of large corporation failures and the current economic turmoil, adequate corporate governance principles particularly in the area of robust risk management have been prescribed (Kirkpatrick, 2009).

Information Technology (IT) is a relatively new industrial sector, comprising of companies primarily dealing with (but not limited to) software development, provision of web services, database management, hardware and communication equipments design and marketing, and information processing. The sector is very dynamic with quickly changing business environment, fast scientific development, rapid variations in consumer demand and high competitions. Effective management and well considered corporate government policies are, hence, very important for survival and operations of the IT companies. Considering the differing characteristics of the IT business sector from other industrial areas, it is of interest to examine how corporate governance characteristics relates specifically to performance of the IT companies, a research area yet to be well explored.

In recent years, Australia has posed itself as a leading entity in the global economy and the IT sector forms an important part of its economic structure. This article reflects on this particular area of Australian economy and empirically relate corporate governance characteristics to firm performance. More specifically, focus is made on the board composition and characteristics of a sample of 55 publicly listed Australian IT companies, and performance in terms of a number of measures is statistically analyzed. Further, a linear regression model for these performance measures, with board characteristics and other company information as the control variables, are developed. The importance of board characteristics on these linear regression models is also examined.

The rest of the article is organized as follows. Section 2 focuses on relevant literature, followed by a summarized overview of the board structure for the Australian publicly listed IT companies in Section 3. Section 4 provides details of the data used in this research, while Section 5 presents statistical analysis and regression model development. Lastly Section 6 concludes the article with summarized discussions and potential future directions.

2. Related Literature

Corporate governance establishes the legal, cultural and institutional guidelines, allowing the owners and other stakeholders exercising authority over a company's management and thereby creates a system of accountability with a view to interest protection for all the concerned entities (Bowen, 1994; Shleifer and Vishny, 1997; John and Senbet, 1998; Pearce and Osmond, 1999; Oxelheim and Randy, 2003). The key component within this system is a governing board comprising of personnel both internal and external to the company. There is, however, no common structure, and the board composition and governing principles vary considerably among the companies.

There are also noticeable disagreements among the researchers in regards to effective model of corporate governance. For example, the US corporate governance model has been optimistically viewed by a number of scholars (Fischel and Easterbrook, 1991; Romano, 1993; Easterbrook and Fischel, 1996; Holmstrom and Kaplan, 2003), while the same system has been criticized and questioned in other studies (Jensen, 1989, 1993). The model employed in other countries have also come under severe scrutinies, and those adopted at one geographical location have been claimed to be ineffective for firms at the other geographical localities (Roe, 1993; Charny, 1998; Goswami,

2002; Husted and Serrano, 2002; Roche, 2005; Wenger and Kaserer, 1997; Paredes, 2003).

A considerable number of studies have examined the impact of board characteristics and corporate governance principles on the performance measures. Bello (2011), for instance, identifies poor corporate governance as a key factor behind financial distress sustained by firms, and recommends auditing and accounting resolution. Hermalin and Weisbach (1988) promote increased participation of outside directors for improved management. McIntyre et al. (2007) find correlation between firm performance and governing body characteristics (including composition, age and experience of the board members) for a dataset comprising of all companies in the S&P/TSX Composite Index. Larmou and Vafeas (2010) claim that increase in board size is positively associated with the share price performance for a number of small firms having poor performance history. Chamberlain (2010) investigates the relationship between financial performance and board member characteristics of the largest 100 Canadian firms. The study concludes that positive and significant relation exists between firm performance and external component of the governing body. Abidin et al. (2009) investigate the association between board structure and corporate performance in Malaysian context, and agree on the importance of outside directors for long term success.

There have also been studies arguing the influence of board characteristics on firm performance. For instance, Ahmed et al. (2006) note, for a sample of listed New Zealand firms, that earnings informativeness is negatively related to board size and unrelated to the proportion of external directors. Adams and Ferreira (2009) examine the impact of gender diversity in the governing body and find the average effect on firm performance to be negative. Bhagat and Black (2001) challenge the US corporate governance practices of public companies being dominated by the outside directors. The study reveals that firms having higher board independence do not perform better than the other firms. Shujin (Shijun, 2008) reports that firms possessing larger board size have lower variability in performance. Frick and Bermig (2010) analyze the impact of board composition and size on the valuation and performance for 294 German firms and fail to find any effect of these on the performance. Another recent research by Guest (2009) has also observed strong negative influence of board size on performance in terms of profitability, Tobin's Q and share returns. Duchin et al. (2010) point out that the effectiveness of external monitoring is dependent on the information cost. The study reveals that for low information cost firms outside directors have positive impacts on performance, while for high information cost firms performance decreases with increased board size.

The importance of understanding effective corporate governance characteristics have been recognized within the Australian context as well. A well-organized guideline in this regard is provided by the ASX Corporate Governance Council (ASXCGC, 2007). The council considers that the Australian companies need to be equipped with good corporate governance policies to compete in global market. So a set of principles in respect to board operations, size and composition, ethical issues, integrity in financial reporting, timely disclosure, preservation of shareholders' rights, risk management and remuneration level are recommended. Fleming (2003) categorizes the principles recommended by the ASX Corporate Governance Council into structural, behavioural and disclosure principles, and studies the corporate governance practices for the Australian companies in terms of these principles over a period of forty years. The article concludes that improvement in the state of corporate governance over the period is unclear and recommends slow changes in practices in this regard. Kang et al. (2007) point out that most of the existing works in corporate governance are based on the US data and may not be applicable to Australia due to regulatory and economic variations. The article also analyzes information on board composition for 100 Australian companies in terms of various diversity criteria and independence. Setia-Atmaja (2008) investigates the influence of board size on firm performance in terms of Tobin's Q. The study identifies positive relationship for the larger sized firms. Lau et al. (2006) reveal the negative relation between corporate performance and the probability of Chief Executive Officer (CEO) dismissal within the Australian context. Chen et al. (2009) study 101 Australian publicly listed companies and indicate that increased board independence does not necessarily lead to promotion of the shareholder's interest. Christensen et al. (2010) examine the impact of corporate governance practices on financial performance in terms of return on assets (ROA) and Tobin's Q. The results show that emphasis on board independence have a negative effect on these measures. Windsor and Cybinski (2007) associate the executive remuneration, firm performance and corporate governance control within Australian voluntary corporate governance arena. This study also does not identify any significant impact of board independence in this context.

Overall, it is observed that researchers are in disagreement over the impact of board characteristics on the firm performance and other properties. A notable observation is, contrary to popular belief and recommendations, several studies have revealed the negative impact of

increased board independence on the Australian firms' performances. Further, majority of these studies have focused on institutions ranging from a wide variety of sectors. Comprehensive study of relating corporate governance characteristics to firm performance in context specific to particular industrial sectors, like the Australian IT industry, is still lacking.

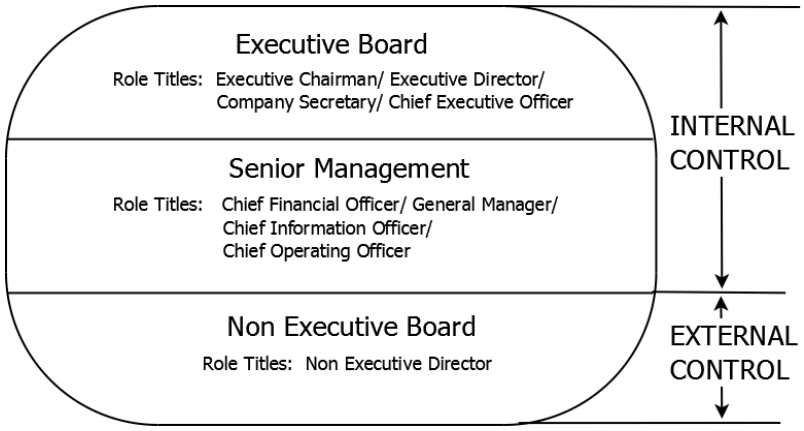
3. Corporate Governance for IT Companies in Australia

IT industries, particularly software development and computing services, have sustained a considerable growth in the recent years in Australia. As per a report from Datamonitor (Datamonitor, 2011), the software industry market value in Australia has reached to 6.2 billion Australian Dollar (AUD), a 10% increase from that in 2009 and a 29% increase from that in 2006. The report also predicts the market to grow to 8.3 billion AUD, a 34% increase, by the year 2015. Another recent report by the House Standing Committee on Economics of the Parliament of the Commonwealth of Australia (HSCE, 2010) has identified the IT industry as a sector where significant investment would lead to considerable future growth in productivity.

The IT industry, however, is very dynamic with rapid scientific development, fast changes in business environment and, particularly in the Australian context, a sector with lack of skilled personnel. With such potential positive influence of the industry on the overall economy and the inherent challenges, it is imperative to conceptualize how the companies within this sector are governed and what impact the governance characteristics have on the performance of these companies. To the best of the investigators' knowledge, this issue is still unexplored in the Australian context. This article aims to bridge this gap through empirical analysis on the publicly listed Australian IT companies in the subsequent discussions.

While the exact nature of business and operational strategies for the publicly listed IT companies in Australia vary considerably, the governing board structure can be generalized as shown in Figure 1. The board is composed of personnel in three roles: Executive Board Members, Senior Management Members and Non-executive Board Members. Executive members are personnel on the company payroll and are involved in administering the total operations of the company. The role title of executive members varies from company to company, though commonly they are referred to as the Chief Executive Officers (CEO). Senior Management members are also employee of the company, involved in administering day to day activities of the company and also participating in the governing board's activities as defined by the institution's policies. The role title of senior management members also vary from company to company, and are often referred to as the Chief Financial Officer, General Manager, Chief Information Officer and Chief Operating Officer. Non-executive members are directors in the board who do not hold any monetary interest with the company. They are usually personnel with reasonable knowledge of the company's business operation, and bring forth their experiences to influence and monitor the activity of the governing body from an outside perspective. Overall, the executive members and the senior management personnel comprise the internal control, while the non-executive members constitute the external control over the governing body.

Figure 1. Corporate governance structure for publicly listed Australian IT companies



4. Data Description

A sample of 55 publicly listed Australian companies is selected for this research. The company names are as shown in Table 1. Three data sources are used and a database for computational processing is developed by combining information from these sources. The

data sources used are: Datamonitor360 (http://www.datamonitor360.com), Company360 (http://www.company360.com.au/) and Yahoo!7 Finance (http://au.finance.yahoo.com/).

Datamonitor360 provides financial details on a number of companies located across the world and belonging to the major industry sectors. The source also reflects on governing board structure of the companies, and particularly reflects on the role played by each of the board members. Company360 is based on the commercial database provided by the Dun & Bradstreet (Australia) Pty Ltd, and comprise details and analysis on the leading 50,000 Australian companies. A particular information provide by this database is the (SIC), reflecting principal business of the companies. Also, the source provides information about the number of employees in the companies along with other financial details. Yahoo!7 Finance is an online service delivering up-to-date information on varied financial statistics of Australian companies and stock market status.

In addition to these data sources, information from the Australian Stock Exchange is used to identify the companies belonging to the information technology area and companies for which active trading information are available.

For the 55 companies thus selected, a set of information (as up-to-date on the 17th Nov 2011) reflecting the varied characteristics are collected and processed. The information considered are as shown in Table 2. General information are collected from Company360, while Corporate governance information are collected from Datamonitor360. The rest of the information are collected from Yahoo!7 Finance. Of these other information, five variables reflect a company's valuation, two the profitability, two the management effectiveness, and the rest varied financial measures. Table 2 also presents explanation on the variables considered. In Table 3, summary statistics for the different variables are detailed.

Figure 2, further, shows the number of companies grouped by location and primary SIC. For the companies selected, most are located/head-quartered in New South Wales, followed by Victoria, Western Australia and Queensland. Only few IT companies are quartered in the other localities. While the activities of all these companies fall within the IT industrial sector, the specific nature of primary business for these companies varies. Of the 55 companies, majority of the companies are engaged principally in delivering computer programming and related services (SIC 7371). A number of companies also design and publish pre-packaged software as their principal business (SIC 7372), while a few focus on the wholesale distribution of computing peripherals, equipment, and software (SIC 5045), and the development of customized integrated systems (SIC 7373). A minor number of companies are also engaged in other industrial sectors with information technology based products and services as their key business. There are also a noticeable number of companies that operate within the information technology contexts elsewhere unclassified (SIC 7379). Thus, the companies chosen for this research pose a wide range of samples with varied business activities and governance by varied state laws within the Australian economy.

Table 1. Publicly listed IT companies considered in this research

Companies	
3Q Holdings Limited	IRESS Market Technology Limited
Adacel Technologies Limited	ISS Group Limited
Altium Limited	LongReach Group Limited
Ambertech Limited	MDS Financial Group Limited
Aristocrat Leisure Limited	Melbourne IT Ltd.
ASG Group Limited	MGM Wireless Limited
Bravura Solutions Ltd	MIKOH Corporation Limited
Byte Power Group Limited	Mooter Media Limited
CCK Financial Solutions Ltd.	NetComm Limited
Cellnet Group Ltd.	Oakton Limited
ComOps Limited	Objective Corporation Limited
Compumedics Limited	pieNETWORKS Limited
Corum Group Limited	Powerlan Limited
CPT Global Limited	PRO Medicus Limited
CSG Limited	Prophecy International Holdings Limited
Data#3 Ltd.	QMASTOR Limited
DataMotion Asia Pacific Limited	Razor Risk Technologies Ltd.
DWS Advanced Business Solutions Ltd	Reckon Limited
Empired Limited	Senetas Corporation Limited
Energy One Limited	Sirius Corporation Limited
eServGlobal Ltd.	SmartTrans Holdings Limited
GBST Holdings Limited	SMS Management & Technology Limited
Global Health Limited	Stratatel Limited
GoConnect Limited	Technology One Ltd
Hansen Technologies Ltd.	Transol Corporation Limited
Ideas International Limited	UXC Limited
Infomedia Limited	Webfirm Group Limited
Integrated Research Ltd	

Table 2. Information considered for each of the companies and explanations (Brigham and Houston, 2009; Cagan and Shank, 2009; Yahoo!7, 2011)

Information Category	Variable	Explanation
General	*State*	Australian state where the company is headquartered
	Primary SIC	Primary Standard Industrial Classification, expressing principal business
	No. of Employees	Total number of Employees
Corporate Governance	*No. of Executive Board Members*	Number of persons playing executive roles in the governing body
	No. of Non Executive Board Members	Number of persons playing external director roles in the governing body
	No. of Senior Management Members	Number of senior management level personnel in the governing body
	Total Board Size	Total number of personnel in the governing body
Valuation	*Market Capitalization*	*(current market price per share) X (the number of outstanding shares)*. Indicates the corporate size.
	Price/Sales Ratio	*(current market price) / (total revenues per share).* An index for valuation of the company stock.
	Price/Book Ratio	*(current market price) / (book values per share).* Reflects the market value of tangible assets.
	Enterprise Value/Revenue	*Enterprise Value* denotes the business's market value. *(Enterprise Value) / (total revenue)* is an indicator of company value, removing capitalization effects.
	Enterprise Value/EBITDA	*(Enterprise Value) / (Earnings Before Interest, Taxes, Depreciation, and Amortisation)*. It is a valuation unaffected by the company's capital structure
Profitability	*Profit Margin*	*(net income) / (total revenues)*, expressed in percentage
	Operating Margin	*(total revenues -total operating costs) / (total revenues)*, expressed in percentage. Represents a company's business operation efficiency
Management Performance	*Return on Assets*	*(earnings from continuing operations) / (average total equity)*, as percentage. Indicates the effectiveness of company assets utilization in generating earnings.
	Return on Equity	*(earnings from continuing operations) / (total common equity)*, as percentage. Provides indication to the return on shareholder's equity.
Income	*Revenue Per Share*	*(Total Revenues) / (Weighted Average Shares Outstanding)*
	Quarterly Revenue Growth	The increase of quarterly total revenues compared to that same quarter in the previous year, expressed in percentage.
	Net Income Avl to Common	*(percentage of net income) / (common)*, indicating amount accrued by common shareholders in dividends and share earnings
Balance Sheet	*Total Cash*	Total cash, as indicated in the balance sheet for the most recent quarter
	Total Debt	Total debt including both short and long term debts, as indicated in the balance sheet for the most recent quarter
	Current Ratio	*(total current assets) / (total current liabilities).* Indicates the ability of the company to meet its short-term obligations
	Book Value Per Share	*(total common equity) / (total common shares outstanding)*
	Total Debt/Equity	*(total debt) / (total equity)*
	Total Cash Per Share	*(Total Cash + Short Term Investments) / (Shares Outstanding at the end of the most recent fiscal quarter)*
Cash Flow	*Operating Cash Flow*	Indicates the net cash utilized or generated due to operating activities
	Levered Free Cash Flow	Indicates cash available to stockholders after interest payments on debt.
Unit Share Price	*Adjusted Closing Price 1 Jul 2010*	Adjusted Closing Price unit share price as at 01 Jul 2010
	Adjusted Closing Price 30 Jun 2011	Adjusted Closing Price unit share price as at 30 Jun 2011

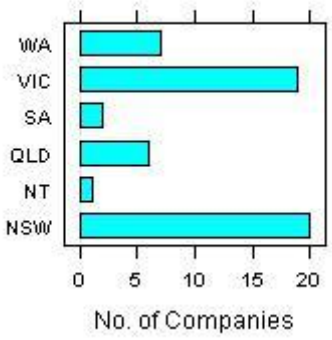
Source: Company360 (General Information), Datamonitor360 (Corporate Governance information), Yahoo!7 Finance (Other Information)

Table 3. Summary statistics for the variables considered (St.Dev. denotes standard deviation)

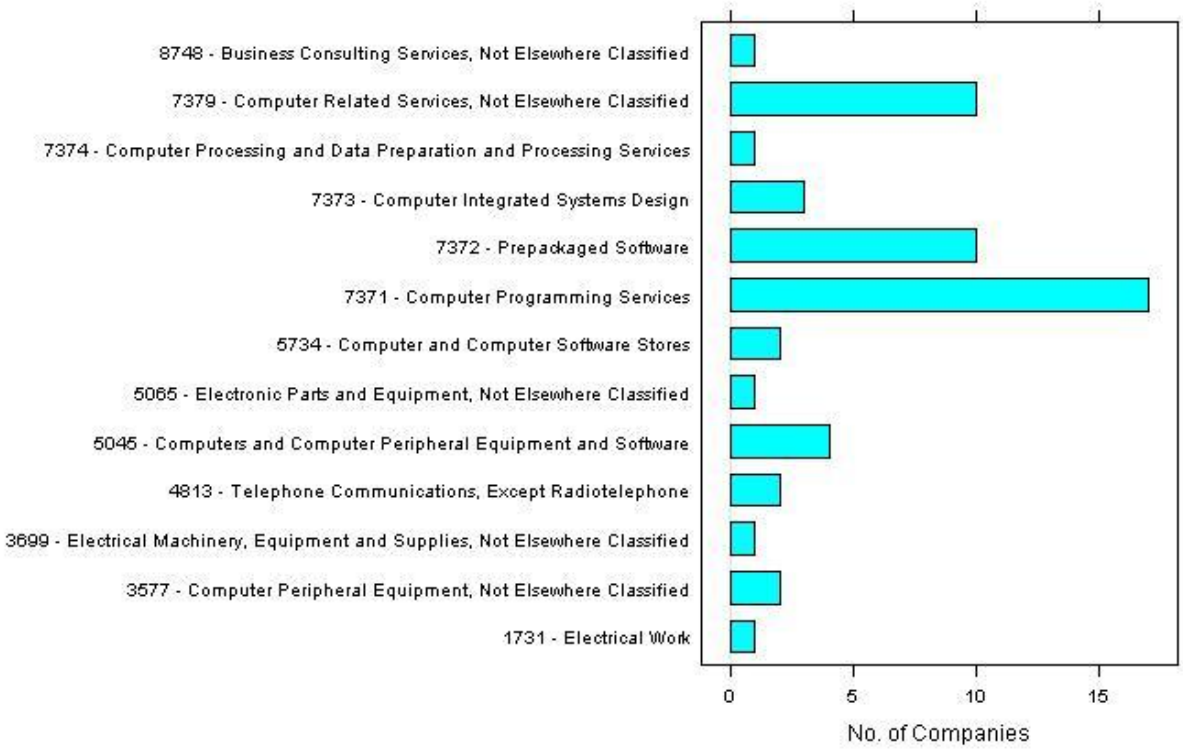
Variable	Minimum	Median	Mean	St.Dev	Maximum
No. of Employee	6	125	278	437.56	2181
No. of Executive Board Members	0	1	1.47	0.90	4
No. of Non Executive Board Members	1	3	3.02	1.31	7
No. of Senior Management Members	0	4	4.22	2.67	10
Total Board Size	3	9	8.71	3.35	16
Market Capitalization (in Million AUD)	1.15	18.40	100.49	223.80	1280.00
Enterprise Value (in Million AUD)	-1.06	18.41	106.50	253.76	1550.00
Price/Sales Ratio	0.10	0.840	3.93	9.18	46.22
Price/Book Ratio	0.12	1.56	2.76	3.16	18
Enterprise Value/Revenue	-9.58	0.84	3.24	9.56	55.90
Enterprise Value/EBITDA	-647.18	4.54	-8.85	90.26	100.23
Profit Margin (%)	-191.57	1.72	-9.13	44.64	91.13
Operating Margin (%)	-1259.18	3.76	-66.79	227.72	34.17
Return on Assets (%)	-84.27	3.07	-5.51	24.99	24.50
Return on Equity (%)	-365.98	3.23	-18.08	78.44	60.65
Revenue (in Million AUD)	0.11	23.38	84.68	152.38	696.25
Revenue Per Share	0.00	0.19	0.63	0.97	4.54
Quarterly Revenue Growth (%)	-59.8	-0.1	16.1	84.55	524.8
Gross Profit (in Million AUD)	-1.0	15.0	40.9	92.73	495.0
EBITDA (in Million AUD)	-22.88	1.12	10.14	23.48	121.76
Net Income Avl to Common (in Million AUD)	-21.09	0.20	5.03	13.96	52.80
Total Cash (in Million AUD)	0.00326	3.27	9.44	13.92	61.93
Total Debt (in Million AUD)	0.00	0.05	13.16	46.91	303.49
Current Ratio	0.05	1.58	1.89	1.38	7.19
Book Value Per Share	-0.03	0.14	0.27	0.35	1.56
Total Debt/Equity	0.00	0.39	17.12	34.15	163.78
Total Cash Per Share	0.0033	3.27	9.44	0.11	61.93
Operating Cash Flow (in Million AUD)	-204.71	1.93	1.95	30.56	58.13
Levered Free Cash Flow (in Million AUD)	-275.92	1.08	-2.40	38.25	26.52
Adjusted Closing Price 1 Jul 2010	0.00	0.21	0.80	1.68	8.25
Adjusted Closing Price 30 Jun 2011	0.00	0.17	0.89	2.23	12.85

Figure 2. Number of companies grouped by - (a) location (b) primary SIC

(a)



(b)



5. Analysis and Outcomes

This section presents our analytical approach and the outcomes in regards to relating the firm performance with the corporate governance characteristics for the chosen companies. The research framework adopted is shown in Figure 3. After information has been collected and combined from the data sources indicated in the previous section, the variables are processed for subsequent steps. Statistical analysis is then undertaken based on the governing board characteristics. The final step comprises a linear regression model development to relate firm performance with the board characteristics and other variables. The following subsections focus on each of these steps in details.

5.1. Process Information

The information collected is augmented by the introduction of a new variable termed *Balance Ratio*. Let, BS, EB, and SM indicate the total board size, the number of executive board members and the number of senior management members in the governing body. Then *Balance Ratio (BR)* is as defined in Eq. 1.

$$BR = \frac{(EB + SM)}{BS} \quad (1)$$

Thus, *BR* represents the weight of Internal body in the governing body. *BR = 0* means the governing board consists only of external executive members, while *BR = 1* means the governing board consists only of internal members (in Executive and Senior Management roles). *BR = 0.5* implies a board having equal number of internal and external representations.

In Figure 4 (a), we show the cumulative distribution function for BR. As notable, only few companies have BR ≤0.45, a number of companies have BR within the range of 0.45 and 0.55, and majority of the companies have BR ≥ 0.55. To aid subsequent statistical analysis, we group the companies based on the values of BR. Eq. 2 indicates the labels of this grouping.

$$0.00 \le BR < 0.45 \Rightarrow EXTERNAL$$
$$0.45 \le BR \le 0.55 \Rightarrow BALANCED$$
$$0.55 < BR < 0.70 \Rightarrow MODERATELY\ INTERNAL$$
$$0.70 \le BR \le 1.00 \Rightarrow HEAVILY\ INTERNAL \quad (2)$$

We presume that, for $0.00 \le BR < 0.45$, activities of the governing board are heavily influenced by the external members due to their numbers exceeding that of the internal members (comprising of internal executives and senior management roles). So, we label these companies as *EXTERNAL*. For $0.45 \le BR \le 0.55$, the governing body comprises about equal number of internal and external members. So, these companies are labelled as *BALANCED*. All other companies are presumed to be influenced by the internal board members. We consider a further arbitrary threshold *0.7* for these companies. For companies having $0.55 < BR < 0.70$, we presume that the governing body is

generally impacted by the internal board members with the external members having some considerable influence. These companies are labelled as *MODERATELY INTERNAL*. On the other hand, for companies having BR $\geq$ 0.70, the governing body is presumed to be significantly impacted by the internal executive members and senior managements. So, these companies are labelled as *HEAVILY INTERNAL*.

Figure 4 (b) shows the number of companies in each of these groups. As notable, majority of the companies are *MODERATELY INTERNAL*. A considerable number of companies are *HEAVILY INTERNAL*. Only few companies are *EXTERNAL*, while the rest are *BALANCED*. In other words, for the publicly listed Australian IT companies, the governing bodies are generally influenced by the internal management. This is also indicated in Figure 4 (c), that indicates the mean and the median of *BR* to be respectively *0.63* and *0.67*. In addition to augmenting the dataset with the introduction of *BR*, we consider a set of variables as the firm-performance variables (i.e., response variables) for subsequent statistical analysis and model development. The variables are as shown in Table 4. As indicated, we consider the two Profitability information (*Profit Margin* and *Operating Margin*) and the two Management Performance information (*Return on Assets* and *Return on Equity*) as the firm-performance variables (response variables) in our research. The rest of the variables are considered as control variables. We recognize that the numerical values for the measured control variables (*Market Capitalization*, *Net Income Avl to Common*, *Total Cash*, *Total Debt*, *Book Value Per Share*, *Operating Cash Flow*, *Levered Free Cash Flow*) and the board structure (corporate governance) information vary considerably. So, to reduce bias in the model development, we normalize these variables for subsequent model development. For model development, we also use a new variable reflecting the 52 weeks percentage change in unit share price over the period 1 Jul 2010 to 30 Jun 2011, in lieu of the adjusted closing unit share price for these dates. For brevity, all the variables are referred to by a set of symbols in subsequent discussions. Table 4 also shows these symbols.

5.2. Statistical Analysis based on Balance Ratio Group

We consider the grouping based on *BR* and examine whether any statistically significant difference exists between these groups. As notable in Fig. 4 (b), the number of companies in these categories varies considerable, with majority of the companies belonging to the *MODERATELY INTERNAL* and *HEAVILY INTERNAL* groups. To aid statistical analysis, we combine the *EXTERNAL* and the *BALANCED* companies as one group (thus the group represents companies with *BR* $\leq$ *0.55*), and compare this combined group against the other groups.

Based on this modified grouping, statistically significant differences in values for the four response variables (*Profit Margin*, *Operating Margin*, *Return on Assets*, and *Return on Equity*; as indicated in Table 4) are considered. We also recognize that the number of available samples is low and a parametric test is not well-suited. So, the non-parametric Wilcoxon Signed Rank Test is utilized to identify statistically significant difference in median among these groups.

In Table 5, statistical significance for difference in median for the groups based on the two sided non-parametric Wilcoxon Signed Rank Test is presented. Difference significant at least 90% confidence levels are noted. For measures significant in two sided test, further test is performed to determine the sign. In Table 5, the '*' sign beside statistically significant outcomes indicates that the median for first group is significantly less than the second group. The numbers in bracket indicate the confidence levels at which the outcomes are significant.

We observe that, in terms of Profit Margin, the median value for the companies in the EXTERNAL and the BALANCED group are significantly lower (at 90% confidence level) than that for the HEAVILY INTERNAL group. In terms of Operating Margin and Return on Assets, the median values for the companies in the EXTERNAL and the BALANCED are also significantly lower than both the MODERATELY INTERNAL and HEAVILY INTERNAL groups, but at a stronger confidence level (95%). No significant difference exists among the internally controlled groups. Thus, for the chosen sample, the internally controlled companies appear to have performed significantly better, in terms of Operating Margin and Return on Assets, than the balanced and the externally controlled companies (having BR $\leq$ 0.55). In other words, the Australian IT companies having notable influence of external members in the governing body have tended to perform worse than the internally governed counterparts. We presume that this difference comes from the characteristics of IT industry. As indicated previously, the IT industry is a dynamically changing sector, imposing the need of rapid executive decision making to cope with the fast changing market environment. The companies having internal majority in the governing body are well-suited to this sort of sector, and we assume that this has been reflected in the test outcomes.

5.3. Linear Regression Model Development

In this section, we focus on relating the chosen performance variables to the control variables through a set of linear regression models. The goal is to examine which performance variables are influenced by any of the board characteristics information along with other information for a linear model assumption. The symbols indicated in the Table 4 are used to refer to these variables in subsequent discussion. The model is developed in two steps.

As indicated in Table 4, there are 22 control variables. In the first step of model development, we determine which of these 22 factors are important in influencing the values for each of the response variables. In other words, we perform a selection of predictors (control variables) for each of the predictands (response variables) in a linear regression model. For this, a model selection approach based on Akaike's Information Criteria (AIC) (Varmuza and Filzmoser, 2009; Venables and Ripley, 2002) is employed. The implementation in R (R Development Core Team, 2011) is used in this regard. The process is based on a combination of forward selection and backward selection strategy, and iteratively add predictors in the model or drop predictors from the model until a final model possessing the optimal reduction in AIC has been achieved.

In Table 6, the predictors thus chosen for each of the response variables (and a linear regression model structure) have been shown. As notable, different predictors have appeared in the final model for the different response variables. We particularly focus on the response variables for which the predictor set contains at least one of the board structure information. This is due to our objective of relating firm performance with the corporate governance characteristics. We observe that the response variable RA (Return on Assets) do not consider any of the corporate governance information, while all the other 3 response variables contains at least one of the corporate governance characteristics in the predictor sets. We conclude that, for a linear parametric model assumption and the Australian IT companies, the Return on Assets is negligibly impacted by the firm's board characteristics. We note that the number of senior management members in the governing body (SM), a board characteristic information, has appeared in the predictor set of all the other 3 response variables. This implies, the number of members in such role has a notable impact in characterizing the firm's performance in terms of Profit Margin, Operating Margin and Return on Equity. The number of external members and the Balance Ratio also appear in the predictor sets for Operating Margin and Return on Equity, implying stronger effect of board characteristics on these two performance measures.

In the second step of model development, we determine the parameters of the linear regression models relating each of the response variables with the predictor set determined in the previous step. We consider only the three response variables influenced by board characteristics. Thus, we derive coefficients for the following 3 linear models:

Figure 3. Research framework utilized in analysis

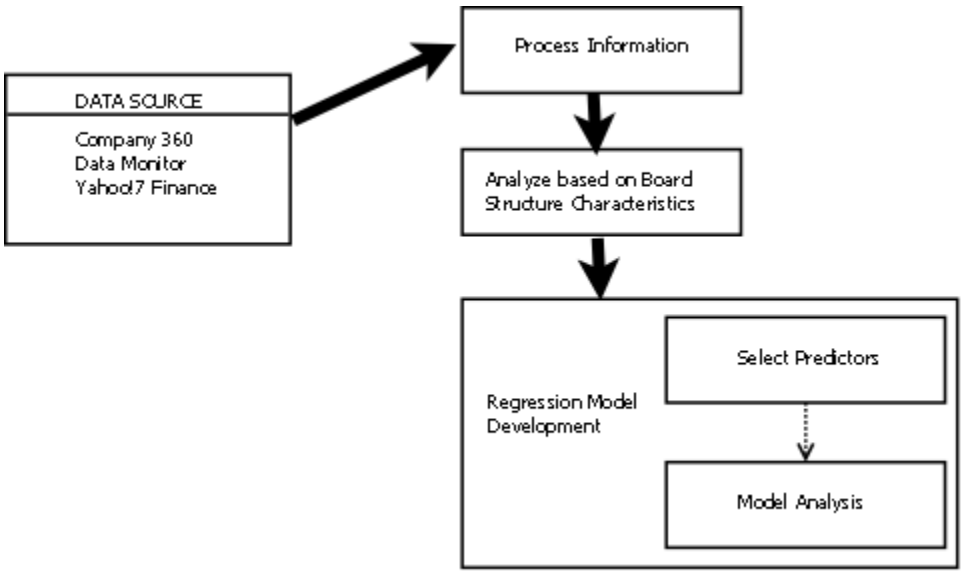
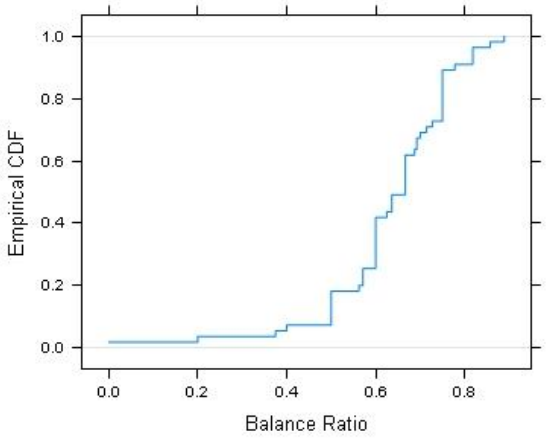
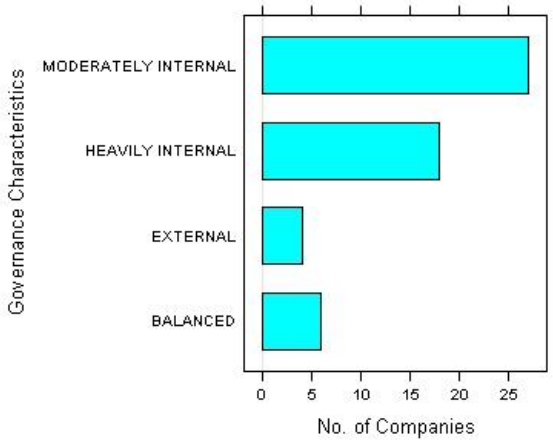


Figure 4. (a) Empirical Cumulative Distribution Function (CDF) for *Balance Ratio* (*BR*);
(b) Number of companies grouped by board governance characteristics (as per Eq. 2);
(c) Summary statistics for *Balance Ratio*



(a)



(b)

Minimum	1st Quartile	Median	Mean	Standard Deviation	3rd Quartile	Maximum
0.00	0.59	0.67	0.63	0.15	0.75	0.89

(c)

Table 4. Variables considered as control variables (predictors) and response variables (predictand) in regression model along with the symbols used to denote in subsequent analysis

Control Variables		Response Variables	
Variable	*Symbol*	*Variable*	*Symbol*
Market Capitalization (normalized)	*MCap*	Profit Margin	*PM*
No. of Employees (normalized)	*NEmp*	Operating Margin	*OM*
No. of Executive Board Members (normalized)	*EB*	Return on Assets	*RA*
No. of Non Executive Board Members (normalized)	*NEB*	Return on Equity	*RE*
No. of Senior Management Members (normalized)	*SM*		
Total Board Size (normalized)	*BS*		
Balance Ratio	*BR*		
Price/Sales Ratio	*PbS*		
Price/Book Ratio	*PbB*		
Enterprise Value/Revenue	*EVbR*		
Enterprise Value/EBITDA	*EVbE*		
Revenue Per Share	*RvS*		
Quarterly Revenue Growth	*QR*		
Net Income Avl to Common (normalized)	*NI*		
Current Ratio	*CR*		
Total Cash (normalized)	*TC*		
Total Debt (normalized)	*TD*		
Total Debt/Equity	*TDbE*		
Book Value Per Share (normalized)	*BvS*		
Operating Cash Flow (normalized)	*OC*		
Levered Free Cash Flow (normalized)	*LC*		
52 Weeks Percentage Change in Share Price	*SP*		

Table 5. Statistical significance test outcomes; '*' indicates that the median for first group is significantly less than that for the second group

	EXTERNAL + BALANCED *MODERATELY INTERNAL*	*EXTERNAL + BALANCED* *HEAVILY INTERNAL*	*MODERATELY INTERNAL* *HEAVILY INTERNAL*
Profit Margin	insignificant	significant (90%) *	insignificant
Operating Margin	significant (95%) *	significant (95%) *	insignificant
Return on Assets	significant (95%) *	significant (95%) *	insignificant
Return on Equity	insignificant	insignificant	insignificant

Table 6. Important predictors based on Akaike's Information Criteria in linear predictive models for the response variables

Initial Predictors	Response Variable	Final Predictors
NEmp, EB, NEB, SM, BS, MCap, PbS, PbB, EVbR, EVbE, RvS, QR, NI, TC, TDbE, TD, CR, BvS, OC, LC, SP, BI	*PM*	*SM, PbS, PbB, RvS, QR, NI, TD, BvS, SP*
	OM	*NEB, SM, MCap, PbB, EVbR, TDbE, CR, BI*
	RA	*MCap, PbS, PbB, EVbR, RvS, QR, NI, TC, BvS, OC, SP*
	RE	*NEB, SM, PbB, RvS, QR, NI, TD, BvS, OC, LC, SP, BI*

Profit Margin is found to be related with the number of senior management personnel, along with two valuation information (Price/Sales Ratio, Price/Book Ratio), all income information (Revenue Per Share, Quarterly Revenue Growth, Net Income Avl to Common), two balance sheet information (Total Debt, Book Value Per Share) and 52 weeks change in share price. The model is as follows:

$$PM = \alpha_1 SM + \alpha_2 PbS + \alpha_3 PbB + \alpha RvS + \alpha_5 QR + \alpha_6 NI + \alpha_7 TD + \alpha_8 BvS + \alpha_9 SP + \beta \quad (3)$$

Operating Margin is found to be related with three board characteristics (number of senior management and non-executive personnel, balance ratio) along with three valuation information (Market Capitalization, Price/Book Ratio, Enterprise Value/Revenue) and two balance sheet information (Total Debt/Equity, Current Ratio) and 52 week change in share price. The model is as follows:

$$OM = \gamma_1 NEB + \gamma_2 SM + \gamma_3 MCap + \gamma_4 PbB + \gamma_5 EVbR + \gamma_6 TDbE + \gamma_7 CR + \gamma_8 BI + \delta \quad (4)$$

Return on Equity is related with three board characteristics (number of senior management and non-executive personnel, balance ratio) along with one valuation information (Price/Book Ratio), all income information (Revenue Per Share, Quarterly Revenue Growth, Net Income Avl to Common), two balance sheet information (Total Debt, Book Value Per Share), both the cash flow information

(Operating Cash Flow, Levered Free Cash Flow) and 52 weeks change in share price. The model is as follows:

$$RE = \eta_1 NEB + \eta_2 SM + \eta_3 PbB + \eta_4 RvS + \eta_5 QR + \eta_6 NI + \eta_7 TD + \eta_8 BvS + \eta_9 OC + \eta_{10} LC + \eta_{11} SP + \eta_{12} BI + \zeta \quad (5)$$

For each of these models, the parameters are learnt using the Ordinary Least Squares strategy implemented in R (R Development Core Team, 2011). The coefficients determined are respectively as shown in Table 7, 8 and 9. The tables also report the standard error, t-statistics and p-value associated with each of the coefficient estimates. We observe that:

For Profit Margin model (Eq. 3, Table 7), of the 10 estimates, 8 are significant at the 90% confidence level. Particularly noticeable is the p-value associated with the Price/Sales Ratio. The corresponding coefficient estimate is significant at 99.9% confidence level, implying that Price/Sales Ratio impose a significant contribution in characterizing Profit Margin. Revenue Per Share, Net Income Avl to Common and Total Debt are also significant at 99% confidence level, while 52 weeks change in share price is significant at 95% confidence level. The only board characteristic in the model, the number of senior management members (SM), is significant at the 90% confidence level. The multiple R-squared value for the model is 0.752, implying that 75.2% variance in the dependent variable (Profit Margin) is explained by the estimated model.

For Operating Margin model (Eq. 4, Table 8), a notable observation is all the estimates are significant at 95% confidence level, with the estimates for Market Capitalization, and Enterprise Value/
Revenue significant at 99.9% confidence, and Total Debt/Equity and Price/Book Ratio significant at 99% confidence levels. The estimates of all the three board characteristics (number of senior management members, number of non-executive personnel, and Balance Ratio) are significant at the 95% confidence level. We further observe that the multiple R-squared value for the model is 0.927, implying that 92.7% variance in the dependent variable (Operating Margin) is explained by the estimated model.

Table 7. Estimates for the linear predictive model of profit margin (PM) as in Eq. 3

Variable	Coefficients (β, α_1, α_2, . . . , α_9)	Std. Error	t-statistics	Prob. (>|t|)
(Intercept)	12.1694	6.9141	1.76	0.0880 ^
SM	8.2775	4.7115	1.76	0.0885 ^
PbS	-19.5626	3.0726	-6.37	3.8e-07 ***
PbB	4.5075	3.0476	1.48	0.1489
RvS	-20.2346	5.9977	-3.37	0.0020 **
QR	0.0929	0.0468	1.98	0.0559 ^
NI	23.6806	6.5925	3.59	0.0011 **
TD	-0.2508	0.0895	-2.80	0.0085 **
BvS	11.0220	6.8011	1.62	0.1149
SP	0.1837	0.0727	2.53	0.0167 *
Multiple R-squared: 0.752				

***p < 0:001,** p < 0:01,*p < 0:05,^p < 0:1

Table 8. Estimates for the linear predictive model of operating margin (*OM*) as in Eq. 4

Variable	Coefficients (δ, γ_1, γ_2, . . . , γ_8)	Std. Error	t-statistics	Prob. (>|t|)
(Intercept)	282.83	92.46	3.06	0.00418 **
NEB	40.75	18.77	2.17	0.03661 *
SM	40.10	17.76	2.26	0.03008 *
MCap	51.14	10.93	4.68	4.0e05 ***
PbB	17.75	6.02	2.95	0.00555 **
EVbR	8.89	1.97	4.51	6.6e05 ***
TDbE	35.12	9.48	3.70	0.00071 ***
CR	16.38	6.18	2.65	0.01188 *
BI	321.50	140.26	2.29	0.02785 *
Multiple R-squared: 0.927				

***p < 0:001,** p < 0:01,*p < 0:05,^p < 0:1

For *Return on Equity* model (Eq. 5, Table 9), of the 13 estimates, 11 are significant at the 90% confidence level. Estimates for *Price/Book Ratio*,*Net Income Avl to Common* and both the cash flow information (*Operating Cash Flow*,*Levered Free Cash Flow*) are significant at 99.9% confidence level, while Total Debt and 52 weeks change in share price (*SP*) are significant at 99% confidence level. Thus, these variables have a strong influence in characterizing Return on Equity. Of the three board characteristics in the model, estimates for both the number of senior

management members and number of non-executive personnel are significant at 95% confidence, while *Balance Ratio* is significant at 90% confidence levels. The multiple R-squared value for the model is 0.882, implying that 88.2% variance in the Return on Equity is explained by the estimated model.

We explore the model analysis further by taking advantage of a recently proposed robust method to conceptualize the relative importance of the predictors in a linear regression model. The method, termed *CAR* (Zuber and Strimmer, 2010, 2011), decomposes the variance explained by the model into relative contribution for each of the predictors, and also group correlated and down-weigh contrasting explanatory variables, resulting in a robust canonical reordering of the predictors. Table 10 reports the relative importance for the predictors for each of the response variables.

We observe that the number of senior management members in the internal governing body has at least 2% importance in characterizing all the three linear models. The model for *Profit Margin* comprises only this board characteristic variable in its set of predictors and the relative importance of this control variable is 14%. The importance of the other two board characteristics in the other two models, however, are negligible, with *Balance Ratio* having more influence than the number of non-executive members.

Overall, the outcomes indicate that, for the publicly listed Australian IT companies, the number of members in the senior management role have greater influence on firm performance than the board composition structure. Further, the number of non-executive members has very minor influence. The results are consistent with the analysis outcomes in Section 5.2, and we attribute the characteristics of these outcomes to the dynamic properties of the IT industrial sector.

6. Conclusion

This article has related the board characteristics of publicly listed Australian IT companies to the firms' performance. Four performance measures: *Profit Margin*, *Operating Margin*, *Return on Assets* and *Return on Equity* have been considered. *Balance Ratio*, a proposed statistic reflecting the weight of internal management personnel in the governing body, has been utilized in categorizing the chosen companies. Performance difference among the groups have been examined. The results reveal that companies with higher degree of board independence (i.e., *EXTERNAL* and *BALANCED* companies, as defined in Section 5.1) have performed significantly worse than companies with more internal control (i.e., *MODERATELY INTERNAL* and *HEAVILY INTERNAL* companies, as defined in Section 5.1) in terms of *Operating Margin* and *Return on Assets*. Also, in terms of *Profit Margin*, the *EXTERNAL* and *BALANCED* companies have performed significantly worse (at 90% confidence level) than the *HEAVILY INTERNAL* companies. The results, therefore, reflect that increased presence of external auditors negatively affect the performance of Australian publicly listed IT companies. It is notable that, this result also coincides with similar outcomes from investigations carried out for firms at different sectors within the Australian context (as highlighted in Section 2).The article, further, relates the firm performance measures to the board characteristics (in terms of board composition and *Balance Ratio*) and other information through a set of linear regression models. As there are a number of predictors, a model selection strategy based on Akaike's Information Criteria has been performed and the performance measures that are parametrically related to the board composition and *Balance Ratio* have been considered. Based on this, parametric linear model for the *Profit Margin*, *Operating Margin*, and *Return on Equity* have been developed. Relative importances of the predictors in the final models have also been analyzed. The analysis reveals that the number of personnel in *Senior Management* role is a considerable board characteristic factors in all the regression models. The number of independent members and the *Balance Ratio*, however, have negligible impact. The other board characteristics like the number of executive board members and the total board-size do not appear as significant predictors in any of the models. The analysis results again highlight the limited impact of board independence on firm performance for the publicly listed Australian companies. We presume that the dynamic nature of IT sector, that requires rapid decision making in a fast changing operational environment and are well-suited for internally controlled business operations, have caused these outcomes.

Table 9. Estimates for the linear predictive model of return on equity (RE) as in Eq. 5

Variable	Coefficients (ζ, η_1, η_2, . . . , η_{12})	Std. Error	t-statistics	Prob. (>|t|)
(Intercept)	155.4315	61.0776	2.54	0.01613 *
NEB	-26.6372	11.7698	-2.26	0.03077 *
SM	25.8928	9.8971	2.62	0.01362 *
PbB	-13.7644	1.3682	-10.06	2.8e-11 ***
RvS	7.9115	5.7534	1.38	0.17895
QR	-0.0753	0.0593	-1.27	0.21401
NI	38.2189	6.2183	6.15	8.1e-07 ***
TD	-0.5347	0.1864	-2.87	0.00737 **
BvS	-13.4692	7.7499	-1.74	0.09214 ^
OC	42.9309	11.8045	3.64	0.00099 ***
LC	-59.6697	14.8107	-4.03	0.00034 ***
SP	0.2464	0.0798	3.09	0.00424 **
BI	-183.2472	93.8199	-1.95	0.05988 ^
Multiple R-squared: 0.882				

***p < 0:001,** p < 0:01,*p < 0:05,^p < 0:1

Table 10. Relative importance for the predictors in the linear regression models

Response Variable	Relative Importance		Proportion of Variance Explained (%)
	Control Variable	Importance (%)	
PM	*SM*	14.51	75.20
	PbS	34.89	
	PbB	2.18	
	RvS	1.98	
	QR	0.18	
	NI	28.84	
	TD	1.40	
	BvS	5.69	
	SP	10.34	
OM	*NEB*	0.01	92.75
	SM	2.00	
	MCap	5.47	
	PbB	29.45	
	EVbR	51.99	
	TDbE	10.08	
	CR	0.47	
	BI	0.54	
RE	*NEB*	0.002	88.20
	SM	5.92	
	PbB	48.48	
	RvS	3.96	
	QR	4.48	
	NI	20.16	
	TD	0.10	
	BvS	0.81	
	OC	2.76	
	LC	3.33	
	SP	9.82	
	BI	0.18	

The results suggest that there exist no convincing evidence of a strong positive and significant relationship between independent directors and corporate performance in IT sector in Australia. Our finding is consistent with a number of other Australia studies such as Lawrence and Stapledon (1999) who argue that more independent board members could perform some functions better but possibly destroy value in many other ways; resulting no net benefit to the company in terms of better monitoring, quick response and/or effective decision making. It could also be argued that fast growing companies in IT may benefit from lower proportion of independent directors but with higher number of senior management and executives who can facilitate quick decision making and provide expert advice in a short period of time. As opposed to this, Bhagat and Black (1998) note that low-growing companies may require high proportion of independent director to control abuses related to free cash flow by executives and to ensure that such funds are reinvested back into the company.

Overall, the article has contributed an understanding of the impact of governing board composition and structure on performance for the publicly listed Australian companies. In a later research, we expect to investigate the negative or

limited influence of board independence on performance for companies within this sector in further details.

References

1. Abidin, Z. Z., Kamal, N. M. and Jusoff, K. (2009), "Board structure and corporate performance in Malaysia", *International Journal of Economics and Finance*, Vol. 1, pp. 150–164.
2. Adams, R. B. and Ferreira, D. (2009), "Women in the boardroom and their impact on governance and performance", *Journal of Financial Economics*, Vol. 94, pp. 291–309.
3. Aggarwal, R., Erel, I., Stulz, R. M. and Williamson, R. (2007), *Do US firms have the best corporate governance? a cross-country examination of the relation between corporate governance and shareholder wealth*, National Bureau of Economic Research.
4. Ahmed, K., Hossain, M. and Adams, M. B. (2006), "The effects of board composition and board size on the informativeness of annual accounting earnings", *Corporate Governance: An International Review*, Vol. 14, pp. 418–431.
5. ASXCGC (2007), *Corporate Governance Principles and Recommendations with 2010 Amendments*, 2nd edn, ASX Corporate Governance Council.
6. Avison, D. and Wilson, D. (2002), "IT Failure and the Collapse of One Tel", *Information Systems: The e-Business Challenge*, pp. 31–46.
7. Bai, C. E., Liu, Q., Lu, J., Song, F. M. and Zhang, J. (2004), "Corporate governance and market valuation in china", *Journal of Comparative Economics*, Vol. 32, pp. 599–616.
8. Bello, D. A. (2011), "Corporate failure: Accounting and auditing resolution", *SSRN eLibrary*. URL: *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1947369*.
9. Bhagat, S. and Black, B. (1998), "The uncertain relationship between board composition and firm performance", in Hopt, K J, Kanda, H, Roe, M J, Wymeersch, E, and Prigge, S, eds, *Comparative Corporate Governance: The State of the Art and Emerging Research*, Oxford University Press: Oxford, pp 281-306.
10. Bhagat, S. and Black, B. (2001), "The non-correlation between board independence and long-term firm performance", *Journal of Corporation Law*, Vol. 27, pp. 231–273.
11. Black, B. and Kim, W. (2011), "The effect of board structure on firm value: A multiple identification strategies approach using Korean data", *Journal of Financial Economics*. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=968287
12. Bowen, W. G. (1994), *Inside the boardroom: Governance by directors and trustees*, Wiley.
13. Brigham, E.F. and Houston, J.F. (2009), *Fundamentals of financial management*, South-Western Cenage Learning.
14. Bris, A. (2010), "THE LEHMAN BROTHERS CASE: a corporate governance failure, not a failure of financial markets", *IMD Report*. URL: *http://www.imd.org/research/challenges/upload/TC039-10PDF.pdf*.
15. Cagan, M. and Shank, P.T. (2009), *Financial Words You Should Know: Over 1,000 Essential Investment, Accounting, Real Estate, and Tax Words*, Adams Media Corp.
16. Chamberlain, T. W. (2010), "Board composition and firm performance: Some Canadian evidence", *International Advances in Economic Research*, Vol. 16, pp. 421–422.
17. Charny, D. (1998), "The German corporate governance system", *Columbia Business Law Review*, pp. 145–166.
18. Chen, R., Dyball, M. C. and Wright, S. (2009), "The link between board composition and corporate diversification in Australian corporations", *Corporate Governance: An International Review*, Vol. 17, pp. 208–223.
19. Christensen, J., Kent, P. and Stewart, J. (2010), "Corporate governance and company performance in Australia", *Australian Accounting Review*, Vol. 20, pp. 372–386.
20. Datamonitor (2011), Software in Australia, Technical Report 0125-0381. URL: *www.datamonitor.com.*
21. Duchin, R., Matsusaka, J. G. and Ozbas, O. (2010), "When are outside directors effective?", *Journal of Financial Economics*, Vol. 96, pp. 195–214.
22. Easterbrook, F. H. and Fischel, D. R. (1996), *The Economic Structure of Corporate Law*, Harvard University Press.
23. Fischel, D. R. and Easterbrook, F. (1991), *The Economic Structure of Corporate Law*, Cambridge, Mass., Harvard University Press.
24. Fleming, G. (2003), "Corporate governance in Australia", *Agenda*, Vol. 10, pp. 195–212.
25. Frick, B. and Bermig, A. (2010), "Board size, board composition, and firm performance: Empirical evidence from Germany", *SSRN eLibrary*. URL: *http:// http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1623103.*
26. Goswami, O. (2002), "Corporate governance in India", *Taking Action Against Corruption in Asia and the Pacific*, pp. 85–106.
27. Guest, P. M. (2009), "The impact of board size on firm performance: evidence from the UK", *The European Journal of Finance*, Vol. 15, pp. 385–404.
28. Hermalin, B. E. and Weisbach, M. S. (1988), "The determinants of board composition", *The RAND Journal of Economics* , pp. 589–606.
29. Holmstrom, B. and Kaplan, S. N. (2003), "The state of U.S. corporate governance: What's right and what's wrong?", *Journal of Applied Corporate Finance*, Vol. 15 (3), pp. 8–20.
30. HSCE (2010), "Inquiry into raising the level of productivity growth in the Australian Economy", *Report, House Standing Committee on Economics, Parliament of the Commonwealth of Australia*. URL: *http://www.aph.gov.au/house/committee/economics/productivity/Report/Final%20Report.pdf.*
31. Husted, B. W. and Serrano, C. (2002), "Corporate governance in Mexico", *Journal of Business Ethics*, Vol. 37, pp. 337–348.
32. Jensen, M. (1989), "Eclipse of the public corporation", *Harvard Business Review (Sept.-Oct. 1989)*. URL: *http://hbr.org/1989/09/eclipse-of-the-public-corporation/ar/1*.
33. Jensen, M. (1993), "The modern industrial

revolution, exit, and the failure of internal control systems", *Journal of Finance*, Vol. 48, pp. 831–880.
34. John, K. and Senbet, L. W. (1998), "Corporate governance and board effectiveness1", *Journal of Banking & Finance*, Vol. 22, pp. 371–403.
35. Kang, H., Cheng, M. and Gray, S. J. (2007), "Corporate governance and board composition: Diversity and independence of Australian boards", *Corporate Governance: An International Review*, Vol. 15, pp. 194–207.
36. Kirkpatrick, G. (2009), "The corporate governance lessons from the financial crisis", *OECD*. URL: *www.oecd.org/dataoecd/32/1/42229620.pdf*.
37. Larmou, S. and Vafeas, N. (2010), "The relation between board size and firm performance in firms with a history of poor operating performance", *Journal of Management and Governance*, Vol. 14, pp. 61–85.
38. Lau, J., Sinnadurai, P. and Wright, S. (2006), "Corporate governance and CEO dismissal in Australia", *Accounting and Finance Association of Australia and New Zealand (AFAANZ) conference*.
39. Lawrence, J. and Stapledon, G.P. (1999), "Do independent directors add value?", *Report, Centre for Corporate Law and Securities Regulation, University of Melbourne*. URL: *http://cclsr.law.unimelb.edu.au/research-papers/monograph%20series/independent%20directors%20report.pdf*.
40. Legard, D. (2001), "OneTel's failure hits Australian telecom competition", *Computerworld*. URL: *http://www.computerworld.com.au/article/44169/onetel_failure_hits_australian_telecom_competition/*.
41. Lipton, P. (2003), "The demise of HIH: corporate governance lessons", *Keeping Good Companies*, Vol. 55, pp. 273–277.
42. McIntyre, M. L., Murphy, S. A. and Mitchell, P. (2007), "The top team: examining board composition and firm performance", *Corporate Governance*, Vol. 7, pp. 547–561.
43. Oxelheim, L. and Randy, T. (2003), "The impact of foreign board membership on firm value", *Journal of Banking & Finance*, Vol. 27, pp. 2369–2392.
44. Paredes, T. A. (2003), "A Systems Approach to Corporate Governance Reform: Why Importing U.S. Corporate Law Isn't the Answer", *William & Mary Law Review*, Vol. 45, pp. 1055–1157.
45. Pearce, C. L. and Osmond, C. P. (1999), "From workplace attitudes and values to a global pattern of nations: An application of latent class modeling", *Journal of Management*, Vol. 25, pp. 759–778.
46. R Development Core Team (2011), "R: A Language and Environment for Statistical Computing", *R Foundation for Statistical Computing*, Vienna, Austria. URL: *http://www.R-project.org/*.
47. Roche, J. (2005), *Corporate governance in Asia*, Psychology Press.
48. Roe, M. J. (1993), "Some differences in corporate structure in Germany, Japan, and the United States", *The Yale Law Journal*, Vol. 102, pp. 1927–2003.
49. Romano, R. (1993), *The genius of American corporate law*, AEI Press.
50. Setia-Atmaja, L. Y. (2008), "Does board size really matter? Evidence from Australia", *Gadjah Mada International Journal of Business*, Vol. 10, pp. 331–352.
51. Shijun, C. (2008), "Board size and the variability of corporate performance", *Journal of Financial Economics*, Vol. 87, pp. 157–176.
52. Shleifer, A. and Vishny, R. W. (1997), "A survey of corporate governance", *The Journal of Finance*, Vol. LII, pp. 737–783.
53. Thomasson, E. and Koltrowitz, S. (2011), "UBS details rogue trades that lost bank $2.3 billion", *Reuters*. URL: *http://in.reuters.com/article/2011/09/18/idINIndia-59409820110918*.
54. Van der Walt, N., Ingley, C., Shergill, G. S. and Townsend, A. (2006), "Board configuration: are diverse boards better boards?", *Corporate Governance* , Vol. 6, pp. 129–147.
55. Varmuza, K. and Filzmoser, P. (2009), *Introduction to multivariate statistical analysis in chemometrics*, CRC.
56. Venables, W.N. and Ripley, B.D. (2002), *Modern applied statistics with S*, Springer verlag.
57. Wenger, E. and Kaserer, C. (1997), "The German system of corporate governance- a model which should not be imitated", *Working Papers, American Institute for Contemporary German Studies*.
58. Windsor, C. and Cybinski, P. J. (2007), "The link between executive remuneration, firm performance and corporate governance control in non-mandatory corporate governance context: Australian evidence", *AFAANZ conference*, Victoria, Australia. URL: *http://www98.griffith.edu.au/xmlui/handle/10072/32889?show=full*.
59. Wright, S., Camber, R. and Greenwood, C. (2011), "Bank unaware that 'rogue trader' had lost £1.3bn until he blew the whistle on HIMSELF", *Daily Mail*. URL:*http://www.dailymail.co.uk/news/article-2037632/Kweku-Adoboli-Swiss-bank-UBS-unaware-blew.html*.
60. Yahoo!7 (2011), "Finance Help | - SLN2347 - Understanding the Key Statistics page". URL: *http://help.yahoo.com/kb/index?page=content&y=PROD_FIN&locale=en_AU&id=SLN2347*.
61. Zuber, V. and Strimmer, K. (2010), "Variable importance and model selection by decorrelation", *Arxiv preprint arXiv:1007.5516*.
62. Zuber, V. and Strimmer, K. (2011), "High-dimensional regression and variable selection using CAR scores", *Statistical Applications in Genetics and Molecular Biology*, Vol. 10, p. 34.