THE IMPACT OF INTELLECTUAL CAPITAL DISCLOSURE ON COST OF CAPITAL: EVIDENCE FROM MALAYSIA

LEE YEE MEEI

MASTER OF BUSINESS ADMINISTRATION

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF ACCOUNTANCY AND MANAGEMENT

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Lee Yee Meei

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By

Lee Yee Meei

This research project is supervised by:

Dr. Pok Wei Fong
Assistant Professor
Department of Economics
Faculty of Accountancy and Management

DECLARATION

I hereby declare that:

(1) This Research Project is the end result of my own work and that due acknowledgement has been given in the references to all sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

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Name of Student : Lee Yee Meei

Student ID : 17UKM01521

Signature :

Date : 19 APRIL 2019

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DEDICATION

This dissertation is specially dedicated to:

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My family, friends, and loved one

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AICPA	American Institute of Certified Public Accountants
CAPM	Capital Asset Pricing Model
CIMA	Chartered Institute of Management Accountants
FASB	Financial Accounting Standard Board
FRS	Financial Reporting Standards
GISC	Global Industry Classification Standard
IASB	International Accounting Standards Board
IC	Intellectual Capital
ICD	Intellectual Capital Disclosure
IFAC	International Federation of Accountants
IPO	Initial Public Offerings
R&D	Research and Development

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ABSTRACT

This study examined the association between intellectual capital disclosure (ICD) and cost of capital, namely cost of equity and cost of debt. Although theoretical arguments would suggest a negative relationship, prior empirical studies testing this relationship provided mixed findings. This study investigated this relationship on a sample of 130 Malaysian companies for the 2017 financial year. In addition, the moderating effect of technological intensity on the ICD-cost of capital relationship was also investigated. A manual content analysis was conducted on companies' annual reports. Four different measures for ICD were used to test for the robustness of results. Multiple regressions models were then run to test the hypotheses.

Findings from several tests provided inconclusive results on the ICD-cost of capital relationship. Contrary to predictions, the cost of equity was found to be marginally and positively related to the level of ICD, external capital disclosure and human capital disclosure. However, these findings were not supported by the robustness testing performed using different ICD measures. Besides, the regression models using the first and second ICD measure indicated that internal capital disclosure was significantly and negatively related to cost of debt. This finding was however, not supported by the regression model using the fourth ICD measure.

Whilst no moderating effect of technological intensity was found on the ICD-cost of equity relationship, this study revealed that the technological intensity has a moderating effect on the relationship between ICD and cost of debt whereby for high-tech firms, the cost of debt increases when there is an increase in the level of ICD and disclosure of all 3 IC components, namely internal capital disclosure, external capital disclosure and human capital disclosure.

CHAPTER 1

INTRODUCTION

1.0 Introduction

This study aims to examine the association between intellectual capital disclosure (ICD) and cost of capital, namely cost of equity and cost of debt. This study provides some important and valuable insights into this field since prior empirical studies testing this relationship provide mixed findings. A brief background and problem statement to the area of research relevant to this study are presented in this chapter. The research questions and research objectives that are aimed to be addressed are also discussed followed by the hypotheses development. Lastly, this chapter outlines the significance of this study.

1.1 Research Background

The terms “intangible assets” and “intellectual capital” have been used interchangeably. It includes management process, corporate culture, customer satisfaction, employee work-related process and charismatic leadership (Lev, 2001). Intangible assets are the important drivers of economic activity as there has been a progressive movement toward a knowledge-based, fast-changing and technology intensive economy. There is also increasing evidence that the drivers of value creation in modern competitive environments lie in a firm's intellectual capital (IC) rather than its physical and financial capital. Hence, in order to maintain the firm’s competitive position, there is a growing need to make investments in IC such as human resources, research and development (R&D), and information technology (Cañibano, Garcia-Ayuso, & Sánchez, 2000).

However, the value of IC might be underestimated as it is not reflected in the accounting financial statements due to the restrictive accounting criteria for the recognition of assets (Cañibano et al., 2000). Hence, voluntary intellectual capital disclosure (ICD) serves as an influential supplement to financial statements. In terms of ICD, there is no legal or generally accepted accounting principles requirement in Malaysia for public companies to disclose information relating to IC. As such, disclosure of IC information by companies in Malaysia is on a voluntary basis. ICD in Malaysia is highly qualitative, narrative in nature and that there are increasing intangible assets that represent 44 percent of the corporate market value in the Malaysian market (Abdifatah & Nazli, 2012). Other than that, there is an increasing trend of ICD by Malaysian companies with external capital being the most disclosed category (Abdifatah & Nazli, 2012, Too & Somasundram, 2010).

On the other hand, cost of capital is one of the criteria to evaluate investment decisions. It is the expected rate of return that suppliers of the capital require to provide funds for a particular investment (Pratt & Grabowski, 2008). Better understanding of cost of capital estimate helps a firm in making informed pricing decision on sales and purchase and comparing one investment opportunity against another, thereby improving its daily financial decisions (Pratt & Grabowski, 2008). Voluntary ICD is important as it could convey to investors the wealth creation potential of firms, enhancing the process of valuing firms by investors and underwriters. As such, the question of whether firms that need external funding either through equity or debt could enjoy lower cost of capital, namely cost of equity and cost of debt by disclosing more intellectual capital information is important to be addressed.

1.2 Problem Statement

Due to the existence of restrictive accounting criteria for the recognition of assets and their valuation, the IC investments are not reflected in the balance sheet (Cañibano et al., 2000). The value of IC might be underestimated, especially for technology intensive firms. As a result, the usefulness and the relevance of financial statements have been challenged. Several research studies have presented evidence regarding the lack of relevance of accounting (Amir & Lev, 1996; Eccles & Mavrinac, 1995; Lev & Zarowin, 1999). This deficiency in the reporting of IC-related information gives rise to the growing information asymmetry between informed and uninformed investors (Singh & Van der Zahn, 2008). For this reason, greater investigation and understanding of voluntary intellectual capital disclosure (ICD) is important as it serves as an influential supplement to financial statements, which can enhance the process of valuing firms by investors and underwriters.

Whether improved disclosure benefits firms in terms of lower cost of capital is an important, debatable, and controversial question. It has sparked researchers' interest in investigating the relationship between the disclosure level and the cost of capital. Most of these prior studies provide inconclusive results and mainly focus on general disclosure. Few studies have directly examined the relationship between voluntary ICD and cost of capital.

In addition, most of the prior studies investigated developed countries. To the best of the researcher's knowledge, the relationship between ICD and cost of capital has not been investigated within a Malaysia context. Malaysia, as an emerging market offers its unique characteristics in terms of reporting regulation.

Accordingly, this study which is conducted within a Malaysia context, examines the impact of the ICD level on the cost of equity and cost of debt capital. The variation in the effect of the ICD level on the cost of equity and cost of debt capital for high technology (high-tech) firms and low technology (low-tech) firms will also be investigated. In other words, this study involves investigation of the moderating effect of technology intensity on the ICD–cost of capital relationship.

1.3 Research Questions

The research questions that are aimed to be addressed in this study are as follows:

i. Does the level of ICD influence the firm's cost of equity?
ii. Does the level of disclosure in each of the three IC categories, i.e. internal capital, external capital and human capital influence the firm's cost of equity?
iii. Does the level of ICD influence the firm's cost of debt?
iv. Does the level of disclosure in each of the three IC categories, i.e. internal capital, external capital and human capital influence the firm's cost of debt?
v. Does the relationship between the level of ICD and the cost of equity differ for high-tech firms and low-tech firms?
vi. Does the relationship between the level of ICD and the cost of debt differ for high-tech firms and low-tech firms?

1.4 Research Objectives

The objectives of the study are as follows:

i. To investigate the relationship of ICD and cost of equity.
ii. To investigate the relationship of ICD and cost of debt.
iii. To examine the moderating effect of technological intensity on the relationship of ICD and cost of equity.
iv. To examine the moderating effect of technological intensity on the relationship of ICD and cost of debt.

1.5 Hypotheses of the Study

H_1: The level of ICD is negatively associated with the cost of equity.

H_2: The level of disclosure in each category of IC is negatively associated with the cost of equity.

H_{2a}: The level of internal capital disclosure is negatively associated with the cost of equity.

H_{2b}: The level of external capital disclosure is negatively associated with the cost of equity.

H_{2c}: The level of human capital disclosure is negatively associated with the cost of equity.

H_3: The level of ICD is negatively associated with the cost of debt.

H_4: The level of disclosure in each category of IC is negatively associated with the cost of debt.

H_{4a}: The level of internal capital disclosure is negatively associated with the cost of debt.

H_{4b}: The level of external capital disclosure is negatively associated with the cost of debt.

H_{4c}: The level of human capital disclosure is negatively associated with the cost of debt.

H_5: Technological intensity has a moderating effect on the relationship between ICD and cost of equity.

H_6: Technology intensity has a moderating effect on the relationship between the level of disclosure in each category of IC and cost of equity.

H_{6a}: Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of equity.

H_{6b}: Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of equity.

H_{6c}: Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of equity.

H_7: Technological intensity has a moderating effect on the relationship between ICD and cost of debt.

H_8: Technology intensity has a moderating effect on the relationship between the level of disclosure in each category of IC and cost of debt.

H_{8a}: Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of debt.

H_{8b}: Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of debt.

H_{8c}: Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of debt.

1.6 Significance of the Study

The growing importance of IC, the aforementioned inconclusive prior studies' results and the lack of literature that directly investigates ICD–cost of capital relationship are the motives for conducting this study, which will provide some important and valuable insights into this field.

Understanding the relationship between the level of ICD and the cost of capital is of significant interest to investors and managers. If the relationship were understood, a manager would be able to evaluate the cost and benefit of ICD. The study also breaks down the category of intellectual capital disclosures into three components to give managers further insight into which disclosures to focus on. Therefore, this proposed study is of value to both investors and managers as it will help them to further understand the relationship so that better decisions can be made.

Furthermore, an understanding of the impact of ICD on the cost of capital could be useful to regulatory authorities. It would then be possible to more easily select an

appropriate course of action when setting up or modifying existing regulations regarding the disclosure of IC.

To the best of the researcher's knowledge, the relationship between ICD and cost of capital has not been investigated within a Malaysia context. This study is the first to examine it, thereby adding an additional piece to the global jigsaw of ICD practices.

1.7 Overview

The remainder of the dissertation is structured as follows: Chapter 2 provides an overview of the pertinent literature, sets out the conceptual framework and introduces the hypotheses that are tested. Chapter 3 explains the method in which this study's data was gathered and also how this data was tested to reach conclusions derived from the hypotheses. Chapter 4 discusses the descriptive results of the data obtained and the results from the testing of the hypotheses. Finally, Chapter 5 concludes the dissertation, discusses the limitations of the study and provides some possible directions for future research in this area.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter reviews prior literature regarding intellectual capital (IC). Specific focus is on how previous literature defines and classifies IC and disclosures in Malaysia. Theoretical reasoning of how disclosure lowers cost of capital is given. Results of prior empirical studies investigating the relationship of disclosure and cost of capital are reviewed, followed by the discussion on the IC disclosure for high-tech and low-tech firms. Lastly, this chapter outlines the hypotheses of this study as well as the conceptual framework.

2.1 Definition and Classification of IC

IC has been defined in various ways. IC is described by the International Federation of Accountants (IFAC) as "the total stock of capital or knowledge-based equity that the company possesses" (as cited in Sonnier, 2008, p. 706). Another comprehensive definition of IC is offered by the Chartered Institute of Management Accountants (CIMA) (2001) as "the possession of knowledge and experience, professional knowledge and skill, good relationships, and technological capacities, which when applied will give organisations competitive advantage" (as cited in Li, Pike, & Haniffa, 2008, p. 137).

There is also no agreement on exactly what the components of IC are, although there are attempts by researchers to identify the components. Most commonly, IC is classified into three categories: internal/structural capital, external/relational capital

and human capital/employee competence. A popular tripartite framework developed by Sveiby (1997) categorises IC into internal, external and employee competence. This framework was modified by Guthrie, Petty, Yongvanich, and Ricceri (2004) and the modified version was used in this study. The three categories are discussed below.

2.1.1 Internal/Structural Capital

Structural capital is defined as the knowledge that stays within the firm at the end of the working day, including the organizational routines, procedures, systems and cultures (Oliveira, Rodrigues, & Craig, 2006). The IFAC suggests that structural capital be subdivided into two components (Sonnier, 2008). Firstly, intellectual property includes legally protected rights such as patents, copyrights and trade secrets (Sonnier, 2008). Secondly, the infrastructure assets consist of "systems and processes used in the organisation's day-to-day activities, values that guide the behaviour of individuals and of the entire organisation, and innovative projects that have been undertaken" (Guthrie, Petty, Yongvanich, & Ricceri, 2003, p. 23). This includes management philosophy, corporate culture, management policies and procedures.

2.1.2 External/Relational Capital

Relational capital is defined as "the ability of an organisation to interact positively with business community members to motivate the potential for wealth creation by enhancing human and structural capital" (Nazari & Herremans, 2007, p. 597). It looks at the external relationships that the firm develops with those with whom it interacts, such as customers, suppliers, governmental bodies or R&D partners.

2.1.3 Human Capital/Employee Competence

Human capital refers to the skills, knowledge, experience and innovativeness of the firm's employees. It involves factors such as education, training, work-related knowledge and entrepreneurial spirit. Human capital is particularly important in

determining a firm's knowledge creation capacity and the success of a firm's external relationship with stakeholders (Guthrie et al., 2003). Unlike internal capital, which is owned by firms and stays within firms at the end of the working day, human capital cannot be "owned" by the organisation, but only "possessed" for the period of time the individual is working for the company (Guthrie et al., 2003).

2.2 Measurement and Reporting of IC

There is great controversy over the measurement of IC, when it should be capitalised and expensed, and where in the financial statements the information should be disclosed (Cañibano et al., 2000). In most cases, IC investments are not reflected in the financial statements due to the existence of restrictive accounting criteria for the recognition of assets and their valuation (Cañibano et al., 2000). Consequently, studies consistently find significant gaps between the accounting book value of organisations and their market value (Cuganesan, Petty, & Finch, 2005).

The deficiency of the current method of accounting for intangible assets has been recognised by some professional accounting associations such as American Institute of Certified Public Accountants (AICPA), 1994; International Accounting Standards Board (IASB), 2000; IFAC, 1998; Financial Accounting Standards Board (FASB), 2001 (as cited in Oliveira et al., 2006). The IFAC, 1998 concluded that "the current accounting model does not adequately capture the value of intellectual capital nor represent them in a concise, meaningful format" (as cited in Sonnier, 2008, p.712).

Voluntary disclosure of IC information is considered to be crucial in solving the alleged problems of traditional financial reporting. The US FASB has responded by encouraging firms to voluntarily disclose information regarding their intangibles in order to provide more transparency and promote greater understanding among investors (Oliveira et al., 2006; Sonnier, 2008). However, the FASB acknowledged that "individual companies will need to determine their own appropriate, relevant, and useful voluntary disclosures" (Sonnier, 2008, p. 712).

The extent and content of information disclosed voluntarily in annual reports has been surveyed by some studies and overriding conclusions have been derived. Firstly, there is no consistent framework for external reporting of IC; secondly, the IC information reported by companies is generally presented in a narrative or descriptive way (Oliveira et al., 2006).

2.3 Cost of Capital

Capital means funds that firms use. Firms raise capital by issuing stocks or by borrowing. All capital raised has a cost as suppliers of the capital, such as investors or lenders demand compensation for their contributions of funds (Gallagher & Andrew, 2007). As such, cost of capital is the expected rate of return that suppliers of the capital require to provide funds for a particular investment (Pratt & Grabowski, 2008). In other words, cost of capital is "the return a company must promise in order to get capital from the market" (Pratt & Grabowski, 2008, p. 3).

Cost of capital includes cost of equity capital and cost of debt capital. Cost of equity capital occurs when firms raise capital by issuing stocks and it is the rate of return that investors expect from their investment (Gallagher & Andrew, 2007). Equity capital providers or often called the investor will get a return from their investment in the form of dividends or capital gains. The risk perception of investors is reflected in the cost of equity. Being risk-adverse, if the risk of an investment is perceived to be high, the minimum rate of return demanded by investors will also be high. The investors might sell their stocks which can cause the stock price down if the required return is not realized (Gallagher & Andrew, 2007). Cost of equity is also an important and effective factor in most of the financial management decisions including capital budgeting decisions, setting optimal structure of capital regarding long-term lease or the replacement of bonds and working capital management.

On the other hand, cost of debt capital occurs when firms raise capital by borrowing money. Debt providers or usually called creditors will get return in the form of

interest as a compensation for any risk exposure that comes with lending to firms. The interest rate of the borrowing determines the cost of debt (Gallagher & Andrew, 2007).

2.4 Disclosures in Malaysia

In terms of intellectual capital disclosure (ICD), there is no legal or generally accepted accounting principles requirement in Malaysia for public companies to disclose information relating to IC. The closest discussion regarding the treatment of IC is covered in Financial Reporting Standards (FRS)138 (Intangible Assets) adopted by Malaysian Accounting Standard Board. According to FRS138, for an item to be included as an intangible asset, it must be identifiable, controllable and able to obtain the future economic benefit. Many intangible assets do not meet the definition of intangible assets as their expected future economic benefits are not controllable and thus, they do not appear in the financial reports (Too & Somasundram, 2010). Examples of intellectual capital elements that do not appear in financial reports are employee skills, training management, technical talent, customer relationship and loyalty. As such, disclosure of IC information by Malaysian companies is on a voluntary basis.

Prior studies examining the ICD practices in Malaysia include Goh and Lim (2004) which explored the annual reports of the largest 20 companies in Malaysia and revealed that the ICD is highly qualitative and that external capital disclosure is the most disclosed category. Salamudin, Bakar, Ibrahim and Hassan (2010) found that there is a positive trend in intangible assets development in Malaysia, consistent with those of advanced markets such as the US, Europe and Australia and such assets represent 44 percent of the corporate market value in the Malaysian market. Other than that, Abdifatah and Nazli (2012) and Too and Somasundram (2010) also revealed an increasing trend of ICD by Malaysian companies with external capital being the most disclosed category. To date, there has not been any study that examines the relationship between ICD practices and cost of capital in Malaysia.

2.5 Theoretical Reasoning of How Disclosure Lowers Cost of Equity

Generally, theoretical research supports a negative relationship between the level of disclosure and the cost of equity, and provides two related thrusts. The first is that greater disclosure enhances stock market liquidity, thereby reducing the cost of equity, either through reduced transaction costs or increased demand for a firm's securities (Botosan, 1997). This strand of reasoning argues that more disclosure reduces investor uncertainty and attracts more long-term investors (Poshakwale & Courtis, 2005). Market price and marketability of the stock will be positively influenced, thus lowering the cost of equity. This stream of research includes Amihud and Mendelson (1986), Diamond and Verrecchia (1991), and Welker (1995).

The second suggests that greater disclosure reduces the estimation risk arising from investors' estimates of the parameters of a share's return or payoff distribution (Botosan, 1997). Investors use disclosed information to predict future return in determining the present value of their investments. Greater uncertainty exists regarding the "true" parameters when information is low. If the estimation risk is non-diversifiable, investors require compensation for this additional element of risk. Disclosure would help to decrease this information uncertainty and reduce the estimation risk, thereby decreasing the cost of equity. In addition, with lower uncertainty, investors would be willing to accept lower dividend pay-outs (Poshakwale & Courtis, 2005). This lower dividend stream translates into a lower cost of equity for the firm because of a lower risk premium expected by investors. This stream of research includes Barry and Brown (1985), Coles, Loewenstein, and Suay (1995) and Klein and Bawa (1976).

The theoretical reasoning is relevant for IC disclosure (Mangena, Pike, & Li, 2010). The degree of information asymmetry between firms and investors is expected to be higher for IC investment than asymmetry related to other types of investments (physical and financial assets) since IC is more unique compared to physical and financial assets (Aboody & Lev, 2000). Furthermore, IC reporting is not regulated like the other types of investments and hence it is not fully captured in firms' financial

reports (Francis & Schipper, 1999). The scarce public information about IC investment creates complication for investors in valuing firm.

As such, ICD should lead to a reduced cost of equity (Lev, 2001). It provides investors with further sight of the firm's future and value creation processes (Mangena et al., 2010). Such understanding improves capital market efficiency, which reduces investor uncertainty, thereby reducing the cost of equity (Lev & Zarowin, 1999).

2.6 Theoretical Reasoning of How Disclosure Lowers Cost of Debt

The theoretical reasoning of how disclosure lowers cost of debt is that lenders and underwriters, when lending money to companies, consider a firm's disclosure policy in their estimate of default risk (Sengupta, 1998). Past corporate disclosures help lenders and underwriters assess whether a firm is withholding adverse information. Firms that consistently make timely and informative disclosures are generally perceived to have a lower possibility of withholding value-relevant unfavourable information, and thus a lower risk premium is charged, thereby reducing cost of debt.

2.7 Empirical Studies

2.7.1 General Disclosure and Cost of Equity

There is a large body of literature available regarding the relationship between the disclosure level and the cost of equity. Lang and Lundholm (1993), for instance, discovered that there is a positive correlation between the disclosure level and the accuracy of analyst earnings forecasts. Less dispersion among individual analyst forecasts and lower volatility in forecast revisions, reduce the cost of equity. Some research investigated this association by examining bid-ask spreads. As an example, Welker (1995) examined the relation between disclosure policy and liquidity in equity markets by using bid-ask spreads as the empirical measure of market liquidity. The

results are consistent with the notion that a well-regarded disclosure policy reduces information asymmetry and hence, increases liquidity in equity markets.

Poshakwale and Courtis (2005), who also documented the negative association between disclosure and cost of equity, further revealed that disclosures about risk management practices seems to most influence the reduction in cost of equity. Eaton, Nofsinger, and Weaver (2007) extended the literature by providing evidence on the relationship between disclosure level and cost of equity in an international setting. Using an international asset pricing model, they discovered that listing firms experience a decrease in both disclosure risk and systematic risk, thus a lower cost of equity.

In a Malaysia context, Mohd. Razali, Brahmana and Sinnasamy (2016) investigated the relationship between information disclosure and cost of equity by using all Malaysian listed companies excluding the finance, services, and utilities companies over 3 years period of 2010-2012. Their findings suggest that companies should disclose more information for better cost of capital as higher level of disclosure might discount the company's cost of equity capital.

In spite of the fact that general research finds a negative association between disclosure level and cost of equity, some studies show that this negative relationship holds only under certain conditions. Botosan (1997), for example, found a negative relationship between cost of equity and disclosure only for firms that attract low analyst following. This study found no evidence of this relationship for firms with a high analyst following. The author concluded that public disclosure plays a more significant role for firms with low analyst following than those with high analyst following.

It is noteworthy that some studies even show that the cost of equity is positively related to disclosure. To illustrate, Botosan and Plumlee (2002) found that the cost of equity decreases with the annual report disclosure level but increases with the level of timely disclosures. They concluded that aggregating across different disclosure types results in a loss of information. Other than that, whilst a negative relationship was

found between cost of capital and financial disclosures, Richardson and Welker (2001) documented a positive association between costs of equity with social disclosures.

Furthermore, the AICPA (1994) argued that the available evidence does not adequately conclude the hypothesised negative relationship between the level of information disclosure and the cost of equity (as cited in Poshakwale & Courtis, 2005). The justification is that more frequent disclosure tends to increase stock price volatility and increase the cost of equity capital. This argument was supported by empirical evidence, for example, Bushee and Noe (2000), showing that higher level of disclosure attracts transient traders who trade aggressively, thereby increasing the volatility and adversely influencing the cost of equity.

2.7.2 IC Disclosure and Cost of Equity

Studies that have explicitly examined the cost of capital effects of information asymmetry of IC investments and found negative ICD-cost of capital relationship include Orens et al. (2009), Mangena et al. (2010) and Barus and Siregar (2014). Orens et al. (2009) empirically examined the impact of web-based IC reporting on a firm's value, information asymmetry, cost of equity and cost of debt. They employed a content-analysis on corporate web-sites of 267 listed firms from four continental European countries (Belgium, France, Germany and the Netherlands) on the presence of IC information. Time-lagged models were used in this study and the results show that cross-sectional differences in the extent of ICD are positively associated with firm value, and that greater ICD in continental Europe is associated with lower information asymmetry, lower cost of equity and lower cost of debt.

In a study published by The Institute of Chartered Accountants of Scotland, Mangena et al. (2010) investigated the relationship between ICD and the cost of equity by conducting content analysis on annual reports of 126 UK listed firms. The results of this study indicate that the higher level of ICD reduces cost of equity. They also find that the disclosure of each component in intellectual capital, namely human capital, structural capital and relational capital has negative effect on cost of equity. The

results of this study further suggest that cost of equity benefits from improved ICD is greater in IC-intensive sectors.

Similarly, Barus and Siregar (2014) studied the ICD-cost of equity relationship on 80 technology intensive firms and ICD-cost of debt relationship on 50 technology intensive firms in Indonesia. They found that ICD has a negative effect on cost of equity but does not have any significant effect on cost of debt.

There are also studies that show significant negative relationship between ICD and cost of equity holds only under certain condition. Kristandl and Bontis (2007) examined the effects of ICD on cost of equity by classifying voluntary disclosure into historical information and forward-looking information. Content analysis was conducted on annual reports of 95 listed companies from Austria, Germany, Sweden and Denmark. An expected negative relationship was found between the level of forward-oriented (IC) information and cost of equity, and an unexpected positive relationship was found between the level of historical (financial) information and cost of equity.

In a related work, Boujelbene and Affes (2013) conducted a study on the impact of ICD on cost of equity capital in a French context. Annual reports of 102 French listed companies was analysed manually by content analysis. It provided evidence that ICD has a significantly negative association with cost of equity capital within the whole sample and within the traditional sector but negative relationship was not found for the high-tech industries. Besides, this study documented a significant and negative association between ICD with its two components (human capital, structural) and the cost of equity. However, the negative impact of the relational capital disclosure was not found.

On the other hand, Singh and Van der Zahn (2008) found unexpected positive relationship between ICD and cost of capital whilst Lee, Whiting and Wynn-Williams (2011) found no significant ICD-cost of capital relationship. Singh and Van der Zahn (2008) investigated the association between under-pricing and ICD amongst Singapore initial public offerings (IPOs). Instead of conventional modes of investors' communication, i.e. annual reports, prospectuses of 444 IPOs listing on Singapore

Stock Exchange were examined. Their findings show an unexpected positive association. However, a conclusion is yet to be drawn on whether IC information has positive effect on the cost of equity as under-pricing in IPOs was used instead of the cost of equity directly (Mangena et al., 2010). Lee, Whiting, & Wynn-Williams (2011) examined the relationship on 70 listed companies in Australia. Content analysis was also conducted on annual reports to ascertain ICD. No significant relationship found between ICD and both cost of equity and cost of debt.

2.7.3 General Disclosure and Cost of Debt

While most empirical studies examine the relationship between disclosure and cost of equity, limited evidence concerning the cost of debt exists. Sengupta (1998) investigated the association of cost of debt and corporate disclosure quality. This paper found that firms with high disclosure quality ratings from financial analysts benefit from a lower effective interest cost of issuing debt, consistent with the argument that timely and detailed disclosure reduces lenders and underwrites' perception of default risk, thereby reducing cost of debt. Nikolaev and Van Lent (2005) who extended the research of Sengupta (1998), confirmed this negative relationship of disclosure and cost of debt.

This is contrary to the results of Wang, O, and Claiborne (2008) who examined voluntary disclosure in the annual reports of Chinese listed firms that issue both domestic and foreign shares. They found no evidence that companies benefit from extensive voluntary disclosure by having a lower cost of debt. Two arguments were provided by the author. The first was that there may be independent variables, such as a firm's need for external financing, which were not controlled for. Second, the underdeveloped debt market in China could have caused the unexpected results.

2.7.4 IC Disclosure and Cost of Debt

There has been limited number of studies that examined the ICD–cost of debt relationship. These include Orens et al. (2009) who found that greater ICD is associated with lower rate of interest paid, i.e. cost of debt. However, Lee et al. (2011) and Barus and Siregar (2014) found that ICD does not have any significant effect on cost of debt.

2.8 High Technology Firms vs. Low Technology Firms

Investors' expectations are said to vary with the industry in which the firm operates. Research indicates that industry type has an impact on the amount of disclosure of IC. For example, Bozzolan, Favotto, and Ricceri (2003) discovered that high-tech companies disclose more IC information compared to low-tech companies. The rationale behind this is that high-tech industries, which invest heavily in IC, face higher future uncertainty, and demand for the ICD is greater for this type of industries, as the ability to forecast results is more difficult.

Meanwhile, Tasker (1998) also indicated that there is a stronger investors' demand of information about R&D firms, compared to non-R&D firms. The level of ICD in high-tech firms and traditional sectors firms has also been compared by Sonnier (2008), who found that high-tech companies have a higher frequency of disclosure than the traditional sectors companies.

More remarkably, prior research indicates that IC intensive or high-tech firms are subject to a higher degree of information asymmetry due to more volatile market values. For example, Aboody and Lev (2000) found that intangibles contribute positively to information asymmetry, particularly amongst R&D intensive firms. Their findings showed that insider gains in R&D intensive firms are substantially larger than insider gains in firms without R&D. R&D intensity is therefore a major contributor to information asymmetry.

Other than that, Hsu and Chang (2011) investigated the relation between the ICD and information asymmetry in high-tech industries. They outlined that, particularly for firms operating in fast-changing and technology-based industries, the information complexity of intangible assets increases the difficulty of forecasting earnings of intangibles-intensive firms and disclosure can increase the transparency of the firms' intangibles. Therefore, ICD can facilitate analysts' forecasting process and reduce analysts' uncertainty in forecasting future earnings. Their findings showed that firms operating in high-tech industries can reduce the information risk if greater comprehensive disclosure on IC is provided. This is consistent with Mangena et al. (2010) who found that cost of equity benefits from enhanced ICD is greater for IC-intensive sectors than for non-IC intensive sectors.

Nonetheless, Boujelbene and Affes (2013) revealed unexpected inconsistent findings where a significantly negative association between ICD and cost of equity capital was found within the whole sample and within the traditional sector but negative relationship was not found for the high-tech industries.

2.9 Hypotheses Development

Prior research provides mixed results on the association between disclosure and cost of capital. Nevertheless, the extant theory strongly argues that disclosure enhances market liquidity, reduces information asymmetry and estimation risk as well as default risk perceived by lenders, which in return reduces both cost of equity and cost of debt (Botosan, 1997, Sengupta, 1998). Therefore, it is hypothesised in this study that:

H_1: The level of ICD is negatively associated with the cost of equity.

H_2: The level of disclosure in each category of IC is negatively associated with the cost of equity.

H_{2a}: The level of internal capital disclosure is negatively associated with the cost of equity.

H_{2b}: The level of external capital disclosure is negatively associated with the cost of equity.

H_{2c}: The level of human capital disclosure is negatively associated with the cost of equity.

H_3: The level of ICD is negatively associated with the cost of debt.

H_4: The level of disclosure in each category of IC is negatively associated with the cost of debt.

H_{4a}: The level of internal capital disclosure is negatively associated with the cost of debt.

H_{4b}: The level of external capital disclosure is negatively associated with the cost of debt.

H_{4c}: The level of human capital disclosure is negatively associated with the cost of debt.

High-tech firms face greater future uncertainty and have greater demand for IC information (Bozzolan, Favotto, and Ricceri, 2003). Therefore, technology intensity is hypothesised to have a moderating effect on the relationship between the level of ICD and the cost of capital. As such, the fifth and the sixth hypotheses underpinning this study are:

H_5: Technological intensity has a moderating effect on the relationship between ICD and cost of equity.

H_6: Technology intensity has a moderating effect on the relationship between the level of disclosure in each category of IC and cost of equity.

H_{6a}: Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of equity.

H_{6b}: Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of equity.

H_{6c}: Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of equity.

H_7: Technological intensity has a moderating effect on the relationship between ICD and cost of debt.

H_8: Technology intensity has a moderating effect on the relationship between the level of disclosure in each category of IC and cost of debt.

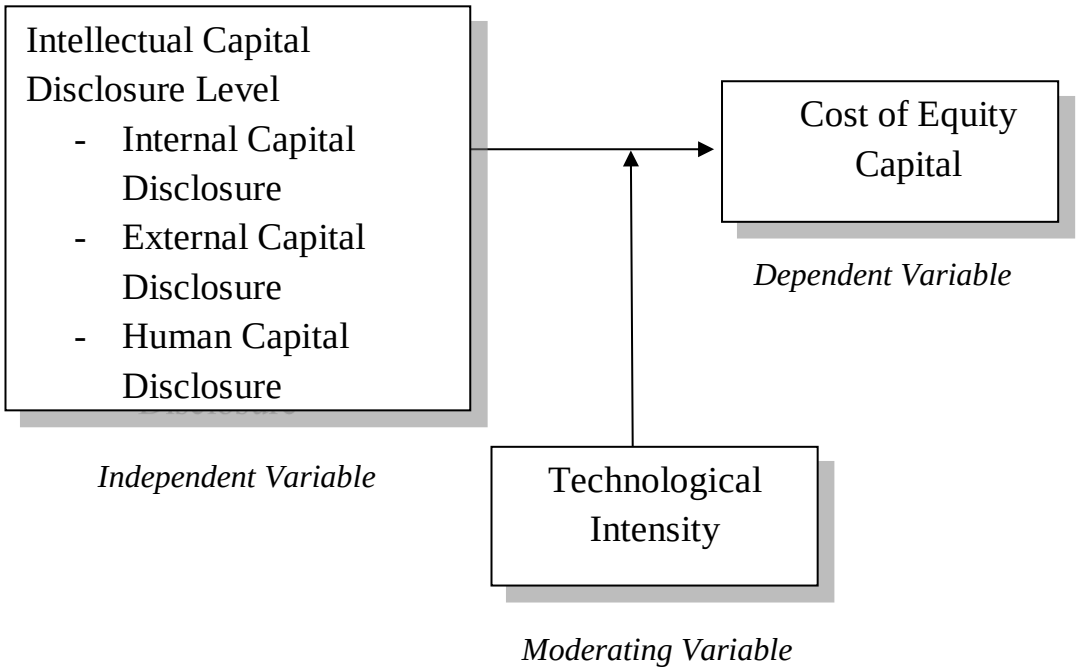
H_{8a}: Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of debt.

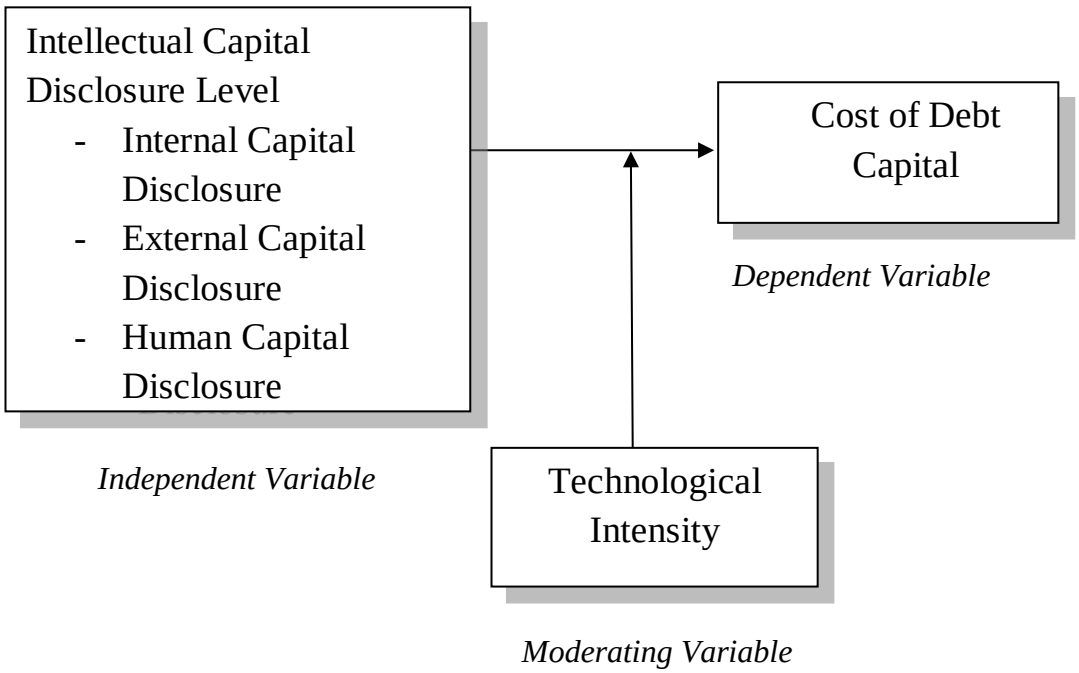
H_{8b}: Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of debt.

H_{8c}: Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of debt.

2.10 Conceptual Framework

The conceptual framework of this study is presented below. It depicts the relationship between independent variable and dependent variables as well as the effect of the moderating variable.





CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

The data collection method and measurement of dependent, independent, and control variables are explained in this chapter. The statistical analyses that were employed are also presented.

3.1 Sample and Data Source Selection

This study was conducted within a Malaysia context. The data used in this study was obtained from the Bloomberg database and annual reports of a sample of 130 listed companies on the main market of Bursa Malaysia. Even though the sample size is relatively small, this limitation is deemed to be unavoidable for this type of study due to the limited timeframe for the manually content analysis. Furthermore, as mentioned in Section 2.7.2, the sample size of previous similar studies examining annual reports is ranging from 70 to 126. Thus, the sample size of 130 for this study is similar to or slightly higher than those of previous similar studies.

The selection of the firms is as follows. As at 17 June 2018, the latest number of firms listed on the main market of Bursa Malaysia was 801 (Bursa Malaysia, n.d.). Since financial firms' financing decisions are affected by somewhat different factors than those of non-financial firms (Sengupta, 1998), all financial firms from the list were excluded from this study. Financial firms are banks, diversified financials, insurances, and real estate companies as classified under the Global Industry Classification Standard (GICS). This is consistent with Orens et al. (2009). The remaining

companies were then be classified as either high-tech intensive industries, low-tech intensive industries, or an undefined group using the GICS as mentioned in the Section 3.4. After collecting all the data needed, companies with missing data were further eliminated from this study as some companies do not have certain financial data available from the Bloomberg database. For high-tech intensive industries, there were only 50 companies with complete data available and all these 50 companies were included in the sample. Meanwhile, 80 firms from the low-tech group were randomly chosen to form a sample of 130 companies for use in this study.

3.2 Independent Variable

3.2.1 Source of Independent Variable Data

Annual reports from the 130 companies in the sample were used as the source of raw data for this study. From the preceding discussion on the ICD literature, it can be deduced that annual reports are commonly utilized in analysing the disclosure level. Thus, the use of annual reports in this study is consistent with the previous studies of this nature, such as Bozzolan et al. (2003), Guthrie and Petty (2000) and Oliveira et al. (2006). Using annual reports is appropriate as there is a positive correlation between the information disclosed using the annual report of a company and information disclosed using other forms of media (Lang & Lundholm, 1993). Moreover, annual reports are the main communication channel used for communicating IC information (Sujan & Abeysekera, 2007). As such, information that was disclosed by other means, such as on the company website was not included in this study.

The analysis was limited to one year; this is justifiable since companies keep their disclosure levels relatively constant over time (Botosan, 1997). The 130 companies' annual reports published in 2016 were used, as the most up-to-date data for cost of capital (dependent variable) and some control variables were in 2017, and the ICD has to be from the year before for the measurement of dependent variables. The annual reports were retrieved and downloaded from the website of Bursa Malaysia.

3.2.2 Content Analysis

Content analysis were undertaken in this study to measure the independent variable, i.e. the ICD level, as disclosure literature has shown its suitability for disclosure-related questions (Kristandl & Bontis, 2007). Content analysis is "a method of codifying the text of writing into various groups or categories based on selected criteria, assuming that frequency indicates the importance of the subject matter" (Guthrie et al., 2004, p. 285). The use of content analysis is consistent with previous ICD studies such as Bozzolan et al. (2003), Guthrie and Petty (2000) and Oliveira et al. (2006).

Content analysis were conducted manually on the 2016 annual reports of each of the companies. Manual analysis was chosen because electronic analysis has underlying problems with synonyms and words with multiple meanings. For example, the word "patients" could be used by a pharmaceuticals firm to mean "customers", the word "passengers" could be used by an airline company to mean "customers" and the term "distribution agreement" mentioned in the annual report could mean distribution channel. All these IC items will not able to be captured if the electronic method is used. This point is supported by Beattie and Thomson (2007) who outlined these problems and argued that expanding the number of keywords would not eliminate the issues.

In this study, the checklist of IC information was the one used in Guthrie et al. (2004) as shown in Table 3.1. This IC framework contains 18 attributes over the three categories: internal capital, external capital and human capital. This study focused only on voluntary disclosure because there would not be differences in compulsory disclosure by firms (Mangena et al., 2010). The content analyses were conducted in conjunction with the explanatory notes of Guthrie et al. (2003) as shown in the Appendix E.

Table 3.1: Intellectual Capital Framework

Internal Capital	External Capital	Human Capital
1. Intellectual Property	7. Brands	14. Employee
2.Management Philosophy	8. Customers	15. Education
3. Corporate Culture	9. Customer Satisfaction	16. Training
4. Management Processes	10. Company Names	17. Work-related Knowledge
5. Info/Network Systems	11. Distribution Channels	18. Entrepreneurial Spirit
6. Financial Relations	12. Business Collaboration	
	13. Licensing Agreements	

Note: From Guthrie, J., Petty, R., Yongvanich, K., & Ricceri, F. (2004). Using content analysis as a research method to inquire into intellectual capital reporting. *Journal of Intellectual Capital, 5*(2), 282-293.

The whole annual report was analysed for content except for some sections where voluntary ICD is unlikely to take place, such as financial reports. The unit of analysis that was chosen as the basis for the coding in this study was sentences; this is because sentences is the most reliable unit of analysis which could provide complete, reliable and meaningful data for further analysis (Milne & Adler, 1999). Pictures and graphs were excluded from content analysis as there are complications in attempting to quantify the impact that picture and graphs have (Guthrie et al., 2004). Furthermore, Guthrie et al. (2004) claimed that some pictures cannot deliver the intended message without the surrounding text.

Each sentence was given a four-digit code. The first digit of 0 or 1 indicated whether the sentence was an ICD or not. The second digit indicated, if the sentence was initially coded 1, which category it belonged in: internal, external, or human capital. If the sentence was about IC, the third digit indicated which IC attribute was disclosed (i.e. 1 through to 18). The fourth digit indicated whether the sentence disclosed was qualitative or quantitative information (coded 1 and 2 respectively).

3.2.3 Intellectual Capital Disclosure Measures

Based on the measure used in Whiting and Miller (2008), the ICD measure calculated from the content analysis for each company was the percentage of ICD by an organisation in the annual report. It was calculated by dividing the number of sentences that contain an ICD by the total number of sentences in the annual report. This measure represents a frequency measure, where the repetitive messages in the annual report are all recorded. It indicates the importance of, or attention to, an attribute appearing in a message (Steenkamp & Northcott, 2007). This measure is called the first ICD measure hereafter.

Figure 3.1: First ICD Measure

$$\text{ICD} = \frac{\textit{\# of IC Disclosure Sentences}}{\textit{Total \# of Sentences}}$$

Note: From Whiting, R. H., & Miller, J. C. (2008). Voluntary disclosure of intellectual capital in New Zealand annual reports and the "hidden value". *Journal of Human Resource Costing & Accounting, 12*(1), 26-50.

3.2.3.1 Robustness Testing – Using Different ICD Measures

As the measure of ICD has some subjectivity, three other different measures were calculated to enable robustness testing. Firstly, ICD was measured by a sum of the number of sentences in the annual reports that include an ICD. This measure is called second ICD measure hereafter and it is based on the measure used in Whiting and Miller (2008).

Secondly, an IC score was calculated by multiplying each disclosure by the quantitative/qualitative score (i.e. if an ICD was quantitative, then that disclosure was worth 2 and if it was qualitative, then it was worth 1). The sum of all the disclosure scores in the annual report gave an IC score. This measure is called third ICD measure hereafter. It was also used in Whiting and Miller (2008) and Oliveira et al. (2006).The second and the third ICD measures also represent frequency measures.

Figure 3.2: Third ICD Measure

ICD = *(# of qualitative IC disclosures x 1) + (# of quantitative IC disclosures x 2)*

Note: From Whiting, R. H., & Miller, J. C. (2008). Voluntary disclosure of intellectual capital in New Zealand annual reports and the "hidden value". *Journal of Human Resource Costing & Accounting, 12*(1), 26-50.

The third robustness test focused on the presence or absence of the IC attribute. A particular item was awarded one if it was disclosed and zero if it was not disclosed. The level of disclosure for each company was then calculated by dividing the sum of disclosures (all the ones) by the total number of items scored (total count of all the ones and zeros). This measure is called the fourth ICD measure hereafter and it is based on the measure used in Mangena et al. (2010). The measurement of the three IC category disclosures can be seen in Appendix F.

3.2.4 Content Analysis Stability and Reliability

The major underlying weakness of content analysis is the subjectivity involved in coding (Guthrie et al., 2004). Milne and Adler (1999) pointed out that the validity and reliability of both the data and the instrument are necessary in order to draw valid inferences from content analysis. Hence, rigorous stability and validity testing were undertaken and tested using Krippendorff's alpha. The formula of Krippendorff's Alpha is shown in Figure 3.3. A α of +0.75 is deemed to be a minimum acceptable standard of reliability (Milne & Adler, 1999).

Figure 3.3: Krippendorff's Alpha

Krippendorff's Alpha: $\alpha = 1 - (D_o / D_e)$

Where:

- *D_o is the observed disagreement; and*
- *D_e is the disagreement one would expect when the coding of units is attributable to chance rather than to the properties of these units.*

Note: From Krippendorff, K. (1980). *Content analysis:an introduction to its methodology.* Beverly Hills Sage Publications.

Firstly, an initial training period was spent analysing five annual reports for ICD in conjunction with the explanatory notes of Guthrie et al. (2003) as shown in Appendix E. A number of decision rules were developed after the training as follows:

i. Only voluntary intellectual capital disclosures were recorded.
ii. Repetitive messages were all recorded.
iii. When there were two IC items appear in a sentence, the first IC item was recorded.
iv. One bullet point was regarded as one sentence.
v. Pictures, table, graph, and endnote were excluded due to the complications in attempting to quantify the impact they have.
vi. Sentences beside pictures or graph were excluded, as it is too difficult to decide the order of the sentences, which disable the reliability and stability testing.
vii. Some parts of annual reports were excluded as they were mandatory disclosures or contained only general information. The excluded parts are as follows:
    - Details of Board and executive team members
    - Corporate governance section
    - Sustainability section
    - Corporate directory
    - Auditor's independence declaration

- All financial report, for example, income statement, balance sheet, and notes to the financial statements.
- Auditor's report
- Shareholder information
- Glossary
- Director's report that merely talks about the director information, director remuneration and etc.

To test for stability of content analysis, a test-retest procedure was used. After twenty annual reports were analysed, the five annual reports that were initially coded were recoded by the author. After the entire 130 annual reports in the sample were analysed, these initial five annual reports were again recoded, and compared to the initial coding.

For reliability testing, an outside person coded the initial five annual reports using the same four-digit coding system. This second coder's coding was tested against the author's coding. Krippendorff's alphas were then calculated for both stability and reliability testing.

3.3 Dependent Variables

3.3.1 Cost of Equity

There is no consensus in the literature on the best measurement of cost of equity. There are two classes of measurement developed in the literature (Botosan, 2006). The first one uses predetermined priced risk factors to yield cost of equity, for instance, the Capital Asset Pricing Model (CAPM) (Botosan, 2006).

The second class of measurement uses share price and analysts' earnings forecasts to calculate the internal rate of return to estimate cost of equity (Botosan, 2006). An example of this class of measurement is the price-earnings growth (PEG) model used by Mangena et al. (2010).

In this study, the price-earnings growth (PEG) model based on Mangena et al. (2010) from the second class of methods was initially in the plan to calculate the cost of equity. However, after attempting to get the data from the Bloomberg terminal, this method cannot be used because the PEG model requires the data of analysts' forecast of earnings which is not available for most of the Malaysian listed companies. This is consistent to a survey by Abdul Samad and Shaharuddin (2009) on 83 Malaysian firms that found that majority of Malaysian firms are more inclined to use the CAPM to estimate cost of equity.

As such, following Botosan (2000) and Boujelbene & Affes (2013), this study turned to the CAPM model. The data of cost of equity calculated based on the CAPM model was sourced from the Bloomberg Terminal. According to the CAPM model, the cost of equity equals the risk-free rate plus a risk premium as shown in the Figure 3.4 below.

Figure 3.4: Cost of Equity Measure

$K_e = rf + b\,[E(Rm) - rf]$

Where:

K_e	=	Cost of equity capital of the firm
rf	=	Risk-free rate
b	=	Beta
E(Rm)	=	Expected market return
R(Rm) - rf	=	Risk premium

Note: From Boujelbene, M. A., & Affes, H. (2013). The impact of intellectual capital disclosure on cost of equity capital: A case of French firms. *Journal of Economics, Finance and Administrative Science , 18* (34), 45-53.

3.3.2 Cost of Debt

Consistent with the data source of cost of equity, the data of cost of debt was also retrieved from the Bloomberg Terminal. The cost of debt from the Bloomberg database was measured as follows.

Figure 3.5: Cost of Debt Measure

K_d = [(STD*Pre-Tax Cost of STD) * (LTD*Pre-Tax Cost of LTD) / Total Debt] * (1- Tax Rate)

Where:

K_d	=	Cost of debt of the firm
STD	=	Short-term financial debt
LTD	=	Long-term financial debt

Note: From Bloomberg Finance L.P. (2013, July 5). Help Page: Weighted Average Cost of Capital (WACC). *University of Leicester.* Retrieved January 25, 2019, from: https://staffblogs.le.ac.uk/socscilibrarians/files/2013/05/wacc_help.pdf

3.4 Moderating Variable

3.4.1 Technological Intensity

Companies in the sample were classified into different sectors using the Global Industry Classification Standard (GICS). GICS codes with eight digits were used. Then, the sectors were classified into technological intensity categories by referring to prior literature in this area. As no one classification dominates the literature, this study amalgamated several researchers' classifications as shown in Appendix A. As there were some conflicting classifications from the literature, each of the GICS sectors were classified into high-tech, low-tech and an undefined group as can be seen in Appendix B, Appendix C and Appendix D. Those sectors in the undefined group are those that gain no classification consensus from prior studies, and those that were too difficult to classify because prior literature was scarce for those areas. For example, retailing was classified as a low-tech group by Mangena et al. (2010) but was

classified as a high-tech group by Bozzolon et al. (2003). Only firms from the high-tech and low-tech group were chosen to provide some certainty that there are two clearly defined industry groups. The sample companies were given a dummy variable of 1 if they belong to the high-tech group and 0 if they belong to the low-tech group.

3.5 Control Variables

Based on Orens et al. (2009), four control variables were included in the analysis of this study, as discussed below. The measurement and data source of these variables can be seen in Table 3.2.

3.5.1 Firm Size

Cost of capital was found by previous studies to have a negative association with size, as difficulty in monitoring in smaller firms results in a higher level of information asymmetry and a higher cost of capital (Botosan, 1997; Sengupta, 1998).

3.5.2 Leverage

High leverage indicates higher risk (Sengupta, 1998). Therefore, a positive association between leverage and cost of capital is expected.

3.5.3 Systematic Risks

A positive association between cost of equity and systematic risks is expected since Botosan (1997), by using beta coefficients as a proxy, demonstrated this positive association. All control variables mentioned in this section were used in the analysis for cost of equity and cost of debt, except for systematic risk which was controlled for in the analysis for cost of equity only.

3.5.4 Earnings Variability

As earnings variability indicates higher uncertainty about the persistence of future earnings (Jaggi & Jain, 1998; Graham et al., 2005 as cited in Orens et al., 2009), a positive relationship between this variable and cost of capital is expected.

Table 3.2: Measurement and Data Source of Control Variables

Variables	Measurement	Data Source
Size	Logarithm of total assets in 2016	Bloomberg
Leverage	Total debt 2016 scaled by total assets 2016	Bloomberg
Systematic risk	Beta coefficient 2016	Bloomberg
Earnings variability	Logarithm of the percentage change in earnings per share between 2016 and 2015	Bloomberg

3.6 Statistical Tests

3.6.1 Correlations

Correlations were conducted to check whether the three IC category disclosures were related to each other. The non-parametric correlation test, Spearman's rho, was used due to the non-normal nature of data. Secondly, Spearman's rho correlations were conducted on ICD–cost of equity and ICD–cost of debt relationships to give a general indication of relationships.

3.6.2 Mann-Whitney U test

The equivalent non-parametric test to Independent-groups t-test, namely Mann–Whitney U test was conducted to check whether dependent variables, independent variables and control variables are significantly different between high-tech and low-tech firms.

3.6.3 Multiple Regression Analyses

Multiple regression models were used to test for the hypothesised relationships. These models were based on Orens et al. (2009) models with some modifications. The purpose of using time-lagged models is to ensure that cost of capital captures the lagged effect of independent variables and control variables. Followings are the 16 statistical models for hypotheses testing.

3.6.3.1 Multiple Regression Model to test Hypothesis 1

Equation (1):

$K_{e\,t+1} = \alpha + \beta_1 ICD_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + \beta_5 SR_t + e$

Where:

K_e = cost of equity

ICD = intellectual capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.2 Multiple Regression Model to test Hypothesis 2(a)

Equation (2):

$K_{e\,t+1} = \alpha + \beta_1 IC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + \beta_5 SR_t + e$

Where:

K_e = cost of equity

IC = internal capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.3 Multiple Regression Model to test Hypothesis 2(b)

Equation (3):

$K_{e\,t+1} = \alpha + \beta_1 EC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + \beta_5 SR_t + e$

Where:

K_e = cost of equity

EC = external capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.4 Multiple Regression Model to test Hypothesis 2(c)

Equation (4):

$K_{e\,t+1} = \alpha + \beta_1 HC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + \beta 5\, SR_t + e$

Where:

K_e = cost of equity

HC = human capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.5 Multiple Regression Model to test Hypothesis 3

Equation (5):

$K_{d\ t+1} = \alpha + \beta_1 ICD_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + e$

Where:

K_d = cost of debt

ICD = intellectual capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.6 Multiple Regression Model to test Hypothesis 4(a)

Equation (6):

$K_{d\ t+1} = \alpha + \beta_1 IC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + e$

Where:

K_d = cost of debt

IC = internal capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.7 Multiple Regression Model to test Hypothesis 4(b)

Equation (7):

$K_{d\ t+1} = \alpha + \beta_1 EC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + e$

Where:

K_d = cost of debt

EC = external capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.8 Multiple Regression Model to test Hypothesis 4(c)

Equation (8):

$K_{d\ t+1} = \alpha + \beta_1 HC_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 EV_t + e$

Where:

K_d = cost of debt

HC = human capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.9 Multiple Regression Model to test Hypothesis 5

Equation (9):

$$K_{e\ t+1} = \alpha + (\beta_1 + \beta_2 T)\ ICD_t + \beta_3 T_t + \beta_4 SIZE_t + \beta_5 LEV_t + \beta_6 EV_t + \beta_7 SR_t + e$$

Where:

K_e = cost of equity

T = 1 for a high-tech firm

T = 0 for a low-tech firm

ICD = intellectual capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.10 Multiple Regression Model to test Hypothesis 6(a)

Equation (10):

$$K_{e\ t+1} = \alpha + (\beta_1 + \beta_2 T)\ IC_t + \beta_3 T_t + \beta_4 SIZE_t + \beta_5 LEV_t + \beta_6 EV_t + \beta_7 SR_t + e$$

Where:

K_e = cost of equity

T = 1 for a high-tech firm

T = 0 for a low-tech firm

IC = internal capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.11 Multiple Regression Model to test Hypothesis 6(b)

Equation (11):

$$K_{e\ t+1} = \alpha + (\beta_1 + \beta_2 T)\ EC_t + \beta_3\ T_t + \beta_4\ SIZE_t + \beta_5\ LEV_t + \beta_6\ EV_t + \beta_7\ SR_t + e$$

Where:

K_e = cost of equity

T = 1 for a high-tech firm

T = 0 for a low-tech firm

EC = external capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.12 Multiple Regression Model to test Hypothesis 6(c)

Equation (12):

$$K_{e\ t+1} = \alpha + (\beta_1 + \beta_2 T)\ HC_t + \beta_3\ T_t + \beta_4\ SIZE_t + \beta_5\ LEV_t + \beta_6\ EV_t + \beta_7\ SR_t + e$$

Where:

K_e = cost of equity

T = 1 for a high-tech firm

T = 0 for a low-tech firm

HC = human capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

SR = systematic risk

Note: Developed for this study.

3.6.3.13 Multiple Regression Model to test Hypothesis 7

Equation (13):

$K_{d\ t+1} = \alpha + (\beta_1 + \beta_2\ T)\ ICD_{\ t} + \beta_3\ T_{\ t} + \beta_4\ SIZE_{\ t} + \beta_5\ LEV_{\ t} + \beta_6\ EV_{\ t} + e$

Where:

K_d = cost of debt

T = 1 for a high-tech firm

T = 0 for a low-tech firm

ICD = intellectual capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.14 Multiple Regression Model to test Hypothesis 8(a)

Equation (14):

$K_{d\ t+1} = \alpha + (\beta_1 + \beta_2\ T)\ IC_{\ t} + \beta_3\ T_{\ t} + \beta_4\ SIZE_{\ t} + \beta_5\ LEV_{\ t} + \beta_6\ EV_{\ t} + e$

Where:

K_d = cost of debt

T = 1 for a high-tech firm

T = 0 for a low-tech firm

IC = internal capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.15 Multiple Regression Model to test Hypothesis 8(b)

Equation (15):

$K_{d\ t+1} = \alpha + (\beta_1 + \beta_2\ T)\ EC_t + \beta_3\ T_t + \beta_4\ SIZE_t + \beta_5\ LEV_t + \beta_6\ EV_t + e$

Where:

K_d = cost of debt

T = 1 for a high-tech firm

T = 0 for a low-tech firm

EC = external capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

3.6.3.16 Multiple Regression Model to test Hypothesis 8(c)

Equation (16):

$K_{d\ t+1} = \alpha + (\beta_1 + \beta_2\ T)\ HC_t + \beta_3\ T_t + \beta_4\ SIZE_t + \beta_5\ LEV_t + \beta_6\ EV_t + e$

Where:

K_d = cost of debt

T = 1 for a high-tech firm

T = 0 for a low-tech firm

HC = human capital disclosure index score

SIZE = firm size

LEV = leverage

EV = earnings variability

Note: Developed for this study.

CHAPTER 4

RESEARCH RESULTS

4.0 Introduction

This chapter provides the results from the statistical analysis discussed in the previous chapter. Some data were calculated by Microsoft Excel software and the results were analysed by the statistical software "IBM SPSS Statistics (SPSS)". The tests conducted in this study include stability and reliability test, normality testing, descriptive analysis, Correlation Analysis, Mann-Whitney U Test, Multiple Regression Analysis and robustness testing.

4.1 Content Analysis Stability and Reliability

The results of stability and reliability testing are displayed in Table 4.1. Krippendorff's alpha for the initial five content analyses is 0.88 at the ICD level when considering whether the sentence was an ICD or not, 0.83 at the category level and 0.83 at the total element level, highlighting a degree of agreement above the minimum level of acceptance. After the entire 130 annual reports in the sample were analysed, the initial five annual reports were again recoded, and compared to the initial coding. Once again, the stability of coding is above the minimum acceptable level, with alphas of 0.84 at the ICD level, 0.79 at the category level and 0.80 at the element level. This shows that the coding was being carried out consistently over time.

For reliability testing, the second coder's coding was tested against the author's coding. Krippendorff's alphas at ICD level, category level and total element level are

all above the minimum threshold of acceptance. They are 0.88, 0.76 and 0.77 respectively.

Overall, all Krippendorff's alphas are well above the minimum standard. Hence, the stability and the reliability of the content analysis in this study are deemed to be satisfactory.

Table 4.1: Krippendorff's Alpha Summary for Stability and Reliability Testing

Krippendorff's Alpha						
ICD	**Category of IC**	**Type of Internal Capital**	**Type of External Capital**	**Type of Human Capital**	**Quantitave or Qualitative**	**Total Element**
Initial Stability testing						
0.880	0.828	0.896	0.849	0.904	0.884	0.834
Post- Test Stability testing						
0.840	0.794	0.792	0.852	0.902	0.845	0.800
Reliability testing						
0.880	0.760	0.897	0.847	0.904	0.884	0.767

Note: Developed for this study.

4.2 Assessing Normality

Since the sample size of the study is more than one hundred, only the Kolmogorov-Smirnov was used to check for the data normality. The significance level of the total ICD is more than 0.05, therefore normality is assumed. In contrast, all three IC category disclosure, both dependent variables and all control variables are not normally distributed since their significance levels are less than 0.05. The results are presented in Table 4.2 as follows.

Table 4.2: Normality Testing for Independent, Dependent and Control Variables

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total ICD	.043	130	.200*	.990	130	.507
Internal Capital Disclosure	.089	130	.014	.934	130	.000
External Capital Disclosure	.109	130	.001	.896	130	.000
Human Capital Disclosure	.151	130	.000	.840	130	.000
Cost of Equity	.082	130	.032	.977	130	.027
Cost of Debt	.115	130	.000	.931	130	.000
Size	.094	130	.007	.960	130	.001
Leverage	.125	130	.000	.918	130	.000
Systematic Risk	.099	130	.003	.961	130	.001
Earnings Variability	.103	130	.002	.941	130	.000

Note: Developed for this study.

4.3 Descriptive Statistics

4.3.1 IC Disclosure Scores

The results from the content analysis show that there was a total of 4455 sentences from the 130 annual reports that disclose information about intellectual capital. As shown in Table 4.3, internal capital disclosure was the most disclosed category (39.5%), followed by external capital disclosure (35.5%) and human capital disclosure (25%). Consistent with Goh and Lim (2004) who examined annual reports of Malaysian companies for ICD, the content analysis of this study also showed that the ICD in Malaysia is highly qualitative. There were only 58 (1.3%) out of 4455 ICD sentences that provide quantitative information about intellectual capital while 98.7% of the ICD sentences were of qualitative nature.

Table 4.3: Summary of Content Analysis

	Number of Sentences	Percentage
Category of ICD		
Internal Capital Disclosure	1760	39.5%
External Capital Disclosure	1581	35.5%
Human Capital Disclosure	1114	25%
Total ICD	***4455***	***100%***
Type of Information		
Qualitative	4397	98.7%
Quantitative	58	1.3%
Total ICD	***4455***	***100%***

Note: Developed for this study.

As illustrated in Table 4.4 below, the mean score for the internal capital disclosure is the highest of the three categories, at 12.75%, again, suggesting that firms disclose more information on the internal capital compared to the other two categories. The standard deviations are high as one company had only one ICD, while some companies had over one hundred disclosures.

Table 4.4: Descriptive Statistics for ICD Scores

Statistics	Total ICD	Internal Capital Disclosure	External Capital Disclosure	Human Capital Disclosure
Mean	31.12%	12.75%	9.80%	8.57%
Median	30.43%	11.74%	7.98%	7.06%
Std dev	12.80%	8.32%	7.09%	6.21%
1st Quartile	21.63%	7.01%	4.82%	4.22%
3rd Quartile	40.66%	16.76%	13.28%	10.77%

Note: Developed for this study.

Spearman's rho correlations were also conducted. A non-parametric correlation test was chosen as Table 4.2 shows that internal capital disclosure, external capital disclosure and human capital disclosure violate the normality assumption. The results as shown in Table 4.5 reveal that all p-values are higher than 0.05, indicating that all three IC category disclosures are not correlated to each other.

Table 4.5: Spearman's rho Correlations for Three IC Category Disclosure

Spearman's rho				
		Internal Capital Disclosure	**External Capital Disclosure**	**Human Capital Disclosure**
Internal Capital Disclosure	**Correlation Coefficient**	1.000	.084	.131
	Sig. (1-tailed)	.000	.170	.069
	N	130	130	130
External Capital Disclosure	**Correlation Coefficient**	.084	1.000	.123
	Sig. (1-tailed)	.170	.000	.082
	N	130	130	130
Human Capital Disclosure	**Correlation Coefficient**	.131	.123	1.000
	Sig. (1-tailed)	.069	.082	.000
	N	130	130	130

Note: Developed for this study.

The descriptive statistics for ICD scores by high-tech and low-tech firms were also conducted and the summary is presented in Table 4.6 below. Consistent with prior studies (Bozzolan et al., 2003; Mangena et al., 2010; Sonnier, 2008), high-tech firms appear to provide greater levels of ICD than low-tech firms. The mean values of Total ICD and the three IC category disclosures are higher for high-tech firms than for low-tech firms.

Table 4.6: Descriptive Statistics for ICD Scores by High and Low-tech Firms

Statistics	Total ICD	Internal	External	Human
High-Tech Firms (n=50)				
Mean	34.99%	13.22%	13.39%	8.38%
Median	34.57%	13.63%	12.20%	6.77%
Std dev	12.46%	7.88%	7.86%	5.46%
1st Quartile	26.50%	7.68%	7.81%	4.07%
3rd Quartile	46.29%	16.95%	18.16%	10.00%
Low-Tech Firms (n=80)				
Mean	28.71%	12.45%	7.56%	8.70%
Median	28.06%	11.34%	6.25%	7.36%
Std dev	12.49%	8.63%	5.54%	6.67%
1st Quartile	19.58%	6.70%	3.69%	3.64%
3rd Quartile	37.09%	16.93%	10.76%	11.56%

Note: Developed for this study.

4.3.2 Cost of Equity

Table 4.7 shows that the mean value of cost of equity across all firms is 7.57%. This is consistent with Abdul Samad and Shaharuddin (2009) who found that cost of equity reported by Malaysian firms is between 4 to 8%.

Besides, the higher mean value for high-tech firms suggests that high-tech firms have higher cost of equity than low-tech firms. This is consistent with the results from the Mann–Whitney U test as illustrated in Table 4.10 that show significant difference in cost of equity between high-tech and low-tech firms.

4.3.3 Cost of Debt

As shown in Table 4.7, the mean value of cost of debt is 2.77%. The mean values for both high-tech and low-tech firms are similar. This is consistent with the Mann–Whitney U test reported in Table 4.10 that also indicates no difference in cost of debt between high-tech and low-tech.

Table 4.7: Descriptive Statistics for Dependent variables (Cost of Equity and Cost of Debt)

	Mean	Median	Std Dev	25th Quartile	75th Quartile
Cost of Equity					
All firms (n=130)	7.57%	7.20%	1.93%	6.06%	8.91%
High-tech firms (n=50)	7.95%	7.84%	2.04%	6.40%	9.66%
Low-tech firms (n=80)	7.33%	7.02%	1.83%	5.85%	8.33%
Cost of Debt					
All firms (n=130)	2.77%	3.17%	1.67%	1.40%	4.11%
High-tech firms (n=50)	2.81%	3.18%	1.68%	1.30%	4.10%
Low-tech firms (n=80)	2.74%	3.17%	1.68%	1.73%	4.17%

Note: Developed for this study.

4.3.4 Control Variables

The summary of descriptive statistic for all control variables are presented in Table 4.8 as follows. The mean values of leverage are similar for both high-tech and low-tech firms. Firm size, on the other hand, appears to be larger for low-tech firms, whilst systematic risk and earning variability are higher for high-tech firms.

Table 4.8: Descriptive Statistic for Control Variables

		Size	Leverage	Systematic Risk	Earnings Variability
All firms (n=130)					
Mean		6.380	0.185	0.401	-0.694
Median		6.140	0.148	0.315	-0.754
Std. Deviation		1.568	0.161	0.823	1.929
Percentiles	**25**	5.288	0.040	-0.091	-1.653
	75	7.361	0.305	0.798	0.182
High-tech firms (n=50)					
Mean		6.068	.182	.417	-.728
Median		5.924	.116	.482	-.658
Std. Deviation		1.633	.181	.799	1.828
Percentiles	**25**	5.046	.033	.033	-1.785
	75	6.719	.310	.798	.185
Low-tech firms (n=80)					
Mean		6.576	.186	.391	-.673
Median		6.336	.165	.185	-.823
Std. Deviation		1.504	.148	.843	2.000
Percentiles	**25**	5.548	.045	-.137	-1.652
	75	7.618	.299	.843	.184

Note: Developed for this study.

4.4 Correlation Analysis

Correlation analysis was performed using the non-parametric Spearman's rho test due to the non-normal nature of the data. As displayed in Table 4.9, all p-values are higher than 0.05, there are no significant correlations between ICD and cost of equity, nor, in three separate tests, between the three components of ICD and cost of equity. This indicates a rejection of Hypothesis 1 and Hypothesis 2.

In terms of the correlation between ICD and cost of debt, Spearman's rho analysis again shows no significant correlation, indicating that Hypothesis 3 and Hypothesis 4 are not supported. These two hypotheses were further tested by multiple regression analysis.

Table 4.9: Spearman Correlations for Independent and Dependent Variables

Type of Disclosure	Cost of Equity		Cost of Debt	
	Value	P-value	Value	P-value
Total ICD	0.064	0.469	-0.072	0.415
Internal Capital Disclosure	-0.025	0.778	-0.167	0.058
External Capital Disclosure	0.099	0.262	0.054	0.539
Human Capital Disclosure	0.062	0.486	0.039	0.659

Note: Developed for this study.

4.5 Mann-Whitney U Test

Due to the non-normality of the data, this study draws conclusion from the Mann–Whitney U test results instead of independent-groups t-test. As illustrated in Table 4.10, the Mann–Whitney U test results show that the Total ICD and external capital disclosure are significantly different between high-tech and low-tech firms (at the 1% significance level). However, there is no significant difference between high-tech and low-tech firms for internal capital disclosure and human capital disclosure.

For dependent variables, cost of equity is different between high-tech and low-tech firms at the 10% significance level while there is no significant difference between high-tech and low-tech firms for cost of debt.

Among all control variables, only firm size is found to be significantly different between high-tech and low-tech firms (at the 5% significance level).

Table 4.10: Mann–Whitney U Test for Independent, Dependent and Control variables

Variables	Low-tech		High-tech		Mann-Whitney U		
	Mean	Std. Deviation	Mean	Std. Deviation	Z -score	Significance	
Total ICD	.287	.125	.350	.125	-2.644	.008	***
Internal Capital Disclosure	.124	.086	.132	.079	-.967	.334	
External Capital Disclosure	.076	.055	.134	.079	-4.755	.000	***
Human Capital Disclosure	.087	.0667	.084	.055	-.199	.843	
Cost of Equity	7.330	1.828	7.945	2.044	-1.795	.073	*
Cost of Debt	2.742	1.676	2.811	1.683	-.266	.790	
Size	6.576	1.504	6.068	1.633	-2.082	.037	**
Leverage	.186	.148	.182	.181	-.694	.488	
Systematic Risk	.391	.843	.417	.799	-1.134	.257	
Earnings Variability	-.673	2.000	-.728	1.828	-.014	.989	

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.6 Multiple Regression Analysis

4.6.1 Assumption Testing

There are several assumptions that underpin the use of regression analysis. Before multiple regressions were conducted, these assumptions were tested.

Firstly, this study meets the first requirement that there are at least five times more cases than independent variables. The sample size is 130 and there are one independent variable and 4 control variables.

Secondly, there were several extreme values. The data was re-checked. Extreme values were deemed to be valid and due to the large differences in the denominator and numerator variables. Therefore, considering this and the small sample size of this study, extreme values were not deleted in further analyses.

Thirdly, to test for multicollinearity, tolerance and VIF statistics were examined. Multicollinearity is indicated if tolerance value is 0.01 or less and VIF greater than 10 (Meyers, Gamst, & Guarino, 2006). The examination of the VIFs as reported in Appendix K indicated that each independent variable's tolerance value is more than 0.01 and all VIFs are considerably under ten. Therefore, multicollinearity is not a concern in this study, satisfying the assumption of non-multicollinearity.

Finally, the model's residuals were tested and reported in Appendix G to Appendix J. From the scatterplot of residuals against predicted values, there is no clear relationship between the residuals and the predicted values, satisfying the assumption of linearity. The assumption of normality of residuals is proved to be met through the normal plot of regression standardised residuals. Besides, all the Durbin-Watson statistics as shown in Table 4.11 to Table 4.22 are approximately 2, which is consistent with the assumption of independence of residuals.

Overall, the requirement of ratio of cases to independent variables, the assumption of non-multicollinearity, and the assumption of linearity, normality and the independence of residuals are not violated.

4.6.2 Regression Results

Multiple regression models were run according to the models stated in Section 3.6.3 and they were repeated with three other different ICD measures for robustness testing. As a result, a total of 52 multiple regression models had been run. The results are displayed and discussed as follows.

H_1: The level of IC disclosure is negatively associated with the cost of equity.

As displayed in Table 4.11, total ICD and all the control variables explain 49.3% of the variation in cost of equity. Systematic risk appears to be the most significant driver. The regression analysis reveals surprising insights. Contrary to the expectation, the total ICD has a marginally significant positive relationship with cost of equity (at the 10% significance level). Therefore, Hypothesis 1 is not supported. When the level of ICD increases by 1%, the cost of equity increases by 1.705%.

With regard to control variables, only systematic risk appears to have significant positive relationship with cost of equity (at the 1% significance level), where cost of equity is increasing with higher systematic risk.

H_2: The level of IC disclosure in each category of IC is negatively associated with the cost of equity.

H_{2a}: The level of internal capital disclosure is negatively associated with the cost of equity.
H_{2b}: The level of external capital disclosure is negatively associated with the cost of equity.
H_{2c}: The level of human capital disclosure is negatively associated with the cost of equity.

Regression analysis was also run with the three IC category disclosures as the independent variables to give further insight into the ICD–cost of equity relationship and the results are shown in Table 4.11. Each IC category disclosure and the control variables explain 48.1%, 49.2% and 49.2% of the variation in cost of equity respectively.

Internal capital disclosure appears to have no significant impact on cost of equity. Surprisingly, cost of equity is positively and significantly, related to external capital disclosure and human capital disclosure (at the 10% significance level). Therefore, Hypotheses 2a, 2b, 2c are not supported. When the level of external capital disclosure

and the level of human capital disclosure increase by 1%, the cost of equity increases by 2.942% and 3.381% respectively.

With regard to control variables, again, systematic risk is the only control variable that has significant positive relationship with cost of equity (at the 1% significance level).

Table 4.11: Multiple Regression Results for Hypothesis 1, 2a, 2b and 2c Using First ICD Measure

Statistics	Variable	Hypothesis 1	Hypothesis 2a	Hypothesis 2b	Hypothesis 2c
Dependent Variable: Cost of Equity					
Unstandardized Coefficients	(Constant)	6.536***	7.018***	6.846***	6.632***
	Intellectual Capital Disclosure	1.705*	-	-	-
	Internal Capital Disclosure	-	.064	-	-
	External Capital Disclosure	-	-	2.942*	-
	Human Capital Disclosure	-	-	-	3.381*
	Firm Size	.003	.013	-.003	.032
	Leverage	-.737	-.818	-.815	-.872
	Earnings Variability	.043	.051	.061	.048
	Systematic Risk	1.613***	1.601***	1.614***	1.588***
R Square		0.493	.481	.492	.492
F Value		24.136	22.943	24.014	24.036
Durbin Watson		2.049	1.991	2.050	2.030

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

H_3: The level of IC disclosure is negatively associated with the cost of debt

The regression model testing Hypothesis 3 as shown in Table 4.12 reveals the expected negative relationship between Total ICD and cost of debt, but it is not significant. Hypothesis 3 is therefore not supported. Regarding the control variables, none of the control variables are significantly related to cost of debt. The Total ICD and the control variable only explain 3.8% of the variation in cost of debt.

H_4: The level of IC disclosure in each category of IC is negatively associated with the cost of debt.

H_{4a}: The level of internal capital disclosure is negatively associated with the cost of debt.

H_{4b}: The level of external capital disclosure is negatively associated with the cost of debt.

H_{4c}: The level of human capital disclosure is negatively associated with the cost of debt.

Breaking down the ICD category into the three components as reported in Table 4.12, each IC category disclosure and the control variables only explain 6.4%, 3.0% and 3.0% of the variation in cost of debt respectively. However, internal capital disclosure has a significant negative relationship with cost of debt (at the 5% significance level), whilst the other two category disclosures show no relationship with cost of debt. Therefore, Hypothesis 4a is supported while Hypothesis 4b and 4c are rejected. When the level of internal capital disclosure increases by 1%, the cost of debt decreases by 3.812%. Regarding the control variables, none of the control variables are significantly related to cost of debt.

Table 4.12: Multiple Regression Results for Hypothesis 3, 4a, 4b and 4c Using First ICD Measure

Statistics	Variable	Hypothesis 3	Hypothesis 4a	Hypothesis 4b	Hypothesis 4c
Dependent Variable: Cost of Debt					
Unstandardized Coefficients	(Constant)	2.065***	2.142***	1.681***	1.620**
	Intellectual Capital Disclosure	-1.206			
	Internal Capital Disclosure		-3.812**		
	External Capital Disclosure			.563	
	Human Capital Disclosure				.837
	Firm Size	.153	.165	.144	.151
	Leverage	.608	.437	.665	.654
	Earnings Variability	.014	.035	.010	.007
R Square		.038	.064	.030	.030
F Value		1.230	2.145	.966	.979
Durbin Watson		2.057	2.012	2.067	2.069

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

H_5: Technological intensity has a moderating effect on the relationship between ICD and cost of equity.

As summarized in Table 4.13, compared to the first regression model that tests Hypothesis 1, the R^2 in the regression model increases slightly from 49.3% to 51.2% after adding the industry effect and the interaction terms. However, the interaction term of technology intensity with Total ICD are not significantly related to cost of equity. Therefore, Hypothesis 5 is not supported. Technological intensity has no moderating effect on the relationship between ICD and cost of equity.

H_6: Technological intensity has a moderating effect on the relationship between the level of disclosure in each category of IC and cost of equity.

H_{6a}: Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of equity.

H_{6b}: Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of equity.

H_{6c}: Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of equity.

As shown in Table 4.13, the interaction terms of technology intensity with the other three category disclosures (T* Internal Capital disclosure, T* External Capital disclosure and T* Human Capital disclosure) are not significantly related to cost of equity even though all the R^2 increase slightly as compared to previous models to 50.3%, 50.8% and 51.7% respectively. This indicates that Hypothesis 6 is not supported. Technological intensity has no moderating effect on the relationship between cost of equity and the other three components disclosures.

Table 4.13: Multiple Regression Results for Hypothesis 5, 6a, 6b and 6c Using First ICD Measure

Statistics	Variable	Hypothesis 5	Hypothesis 6a	Hypothesis 6b	Hypothesis 6c
Dependent Variable: Cost of Equity					
Unstandardized Coefficients	(Constant)	6.067***	6.575***	6.418***	6.095***
	Intellectual Capital Disclosure (ICD)	1.911			
	Internal Capital Disclosure (IC)		.118		
	External Capital Disclosure (EC)			3.334	
	Human Capital Disclosure (HC)				4.249*
	T x ICD	-1.885			
	T x IC		-.860		
	T x EC			-3.431	
	T x HC				-2.192
	Technology Intensity (T)	1.135	.713	.858*	.808*
	Firm Size	.043	.052	.038	.072
	Leverage	-.855	-.944	-.904	-.999
	Earnings Variability	.057	.060	.063	.059
	Systematic Risk	1.603***	1.579***	1.595***	1.575***
R Square		.512	.503	.508	.517
F Value		18.293	17.654	18.017	18.662
Durbin Watson		1.972	1.927	1.970	1.976

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

H_7: Technological intensity has a moderating effect on the relationship between ICD and cost of debt.

For the ICD–cost of debt relationship, the R^2 increases from 3.8% to 10.3% when the technology effect and the interaction terms are added as shown in Table 4.14. The interaction term of technology intensity with Total ICD is significantly related to cost of debt (at 1% significance level). Therefore, Hypothesis 7 is supported. Technological intensity has a moderating effect on the relationship between ICD and cost of debt. For high-tech firms, when the level of ICD increases by 1%, the cost of debt increases by 6.861%.

H_8: Technological intensity has a moderating effect on the relationship between the level of disclosure in each category of IC and cost of debt.

H_{8a}: Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of debt.

H_{8b}: Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of debt.

H_{8c}: Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of debt.

Table 4.14 indicates that the interaction term of technology intensity with human capital disclosure is significantly related to cost of debt (at the 5% significance level), whilst the interaction terms of technology intensity with the other two category disclosures show no relationship with cost of debt. Therefore, Hypotheses 8a and 8b are not supported, whilst Hypothesis 8c is supported. Technology intensity has no moderating effect on the relationship of internal capital disclosure and cost of debt, nor on the relationship between external capital disclosure and cost of debt. Meanwhile, technology intensity has a moderating effect on the relationship between human capital disclosure and cost of debt. For high-tech firms, when the level of human capital disclosure increases by 1%, the cost of debt increases by 11.22%.

Table 4.14: Multiple Regression Results for Hypothesis 7, 8a, 8b and 8c Using First ICD Measure

Statistics	Variable	Hypothesis 7	Hypothesis 8a	Hypothesis 8b	Hypothesis 8c
Dependent Variable: Cost of Debt					
Unstandardized Coefficients	(Constant)	2.855***	2.277***	1.852***	1.856**
	Intellectual Capital Disclosure (ICD)	-4.013***			
	Internal Capital Disclosure (IC)		-5.921***		
	External Capital Disclosure (EC)			-2.817	
	Human Capital Disclosure (HC)				-2.407
	T x ICD	6.861***			
	T x IC		6.060		
	T x EC			5.347	
	T x HC				11.224**
	Technology Intensity (T)	-2.006**	-.595	-.404	-.803
	Firm Size	.142	.175*	.151	.146
	Leverage	.557	.383	.627	.681
	Earnings Variability	-.007	.028	.006	-.016
R Square		.103	.088	.042	.068
F Value		2.347	1.967	.897	1.484
Durbin Watson		2.000	1.958	2.076	2.059

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7 Robustness Testing Results

4.7.1 Test Hypothesis 1 Using Different ICD Measures

Regression models results using the second, third and fourth ICD measures to test Hypothesis 1 are illustrated in Table 4.15. All these three regression models have similar R^2, which are 48.1%, 48.1% and 48.3% respectively. In contrast to the results from regression model using the first ICD measure, no significant association between Total ICD and cost of equity is found. But, consistent with the model using first ICD measure, systematic risk appears to be the only control variable that has significant positive relationship with cost of equity (at the 1% significance level).

Table 4.15: Multiple Regression Results for Hypothesis 1 Using Different ICD Measures

Statistics	Variable	Second ICD Measure	Third ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Equity				
Unstandardized Coefficients	(Constant)	7.003***	6.997***	6.951***
	Intellectual Capital Disclosure	-.001	-.001	.597
	Firm Size	.020	.022	-.014
	Leverage	-.834	-.837	-.739
	Earnings Variability	.052	.051	.047
	Systematic Risk	1.602***	1.602***	1.604***
R Square		.481	.481	.483
F Value		22.951	22.955	23.157
Durbin Watson		1.990	1.990	2.021

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7.2 Test Hypothesis 2 Using Different ICD Measures

Regression models results using the second and fourth ICD measures to test Hypothesis 2 are illustrated in Table 4.16. ICD is not broken down into three category disclosures using the third ICD measurement as this was not in the initial plan and therefore, the information was not collected during the process.

Each IC category disclosure and the control variables explain similar percentage of the variation in cost of equity, which is about 48% for all regression models using both second and fourth ICD measure.

In contrast to the results from regression model using the first ICD measure, significant relationship between any of the three components disclosures and cost of equity are not found from the regression models using the second and the fourth ICD measures. However, systematic risk continues to appear to be the only significant driver at 1% significance level.

Table 4.16: Multiple Regression Results for Hypothesis 2 Using Different ICD Measures

Hypo-thesis	Statistics	Variable	Second ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Equity				
2a	**Unstandardized Coefficients**	(Constant)	6.952***	6.874***
		Internal Capital Disclosure	-.004	.893
		Firm Size	.035	-.027
		Leverage	-.871	-.610
		Earnings Variability	.053	.043
		Systematic Risk	1.609***	1.613***
	R Square		.482	.489
	F Value		23.043	23.742
	Durbin Watson		1.988	2.030
2b	**Unstandardized Coefficients**	(Constant)	7.001***	7.026***
		External Capital Disclosure	-.001	-.023
		Firm Size	.020	.015
		Leverage	-.830	-.822
		Earnings Variability	.051	.052
		Systematic Risk	1.601***	1.601***
	R Square		.481	.481
	F Value		22.952	22.943
	Durbin Watson		1.990	1.990
2c	**Unstandardized Coefficients**	(Constant)	7.051***	6.990***
		Human Capital Disclosure	.006	.190
		Firm Size	.001	.004
		Leverage	-.796	-.781
		Earnings Variability	.051	.050
		Systematic Risk	1.599***	1.604***
	R Square		.482	.481
	F Value		23.033	22.991
	Durbin Watson		1.997	2.002

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7.3 Test Hypothesis 3 Using Different ICD Measures

As seen in Table 4.17, regression model results using the second, third and fourth ICD measure to test Hypothesis 3 show similar results to that of the first ICD measure. All the three regression models have similar R^2, which are 3.2%, 3.2% and 3.0% respectively. There is no significant relationship between Total ICD and cost of debt. All the control variables also are not significantly associated with cost of debt.

Table 4.17: Multiple Regression Results for Hypothesis 3 Using Different ICD Measures

Statistics	Variable	Second ICD Measure	Third ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Debt				
Unstandardized Coefficients	(Constant)	1.610**	1.611**	1.693***
	Intellectual Capital Disclosure	-.002	-.002	.182
	Firm Size	.178	.177	.138
	Leverage	.606	.608	.690
	Earnings Variability	.009	.008	.007
R Square		.032	.032	.030
F Value		1.037	1.034	.957
Durbin Watson		2.054	2.054	2.075

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7.4 Test Hypothesis 4 Using Different ICD Measures

As shown in Table 4.18, when the second ICD measure was used, one of the IC components, namely internal capital disclosure has a significant negative relationship with cost of debt (at the 10% significance level), whilst the other two category disclosures show no relationship with cost of debt. When the level of internal capital disclosure increases by 1 score, the cost of debt decreases by 0.19%. Regarding the control variables, firm size appears to be 5% significantly and positively related to cost of debt in the regression model testing the relationship between internal capital disclosure and cost of debt.

Meanwhile, using the fourth ICD measure, no significant associations are found between the three components disclosures and cost of debt, nor between any of the control variables and cost of debt.

Table 4.18: Multiple Regression Results for Hypothesis 4 Using Different ICD Measures

Hypo-thesis	Statistics	Variable	Second ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Debt				
4a	**Unstandardized Coefficients**	(Constant)	1.385**	1.678***
		Internal Capital Disclosure	-.019*	.219
		Firm Size	.246**	.137
		Leverage	.435	.716
		Earnings Variability	.017	.006
	R Square		.058	.030
	F Value		1.911	.970
	Durbin Watson		1.991	2.082
4b	**Unstandardized Coefficients**	(Constant)	1.739***	1.713***
		External Capital Disclosure	.001	.082
		Firm Size	.141	.143
		Leverage	.673	.665
		Earnings Variability	.009	.008
	R Square		.030	.029
	F Value		.951	.950
	Durbin Watson		2.070	2.071
4c	**Unstandardized Coefficients**	(Constant)	1.748***	1.711***
		Human Capital Disclosure	.007	.029
		Firm Size	.131	.145
		Leverage	.698	.671
		Earnings Variability	.007	.008
	R Square		.031	.029
	F Value		1.010	.948
	Durbin Watson		2.083	2.070

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7.5 Test Hypothesis 5 Using Different ICD Measures

Table 4.19 reports regression models result using the second, third and fourth ICD measures to test Hypothesis 5. Consistent with the results in Section 4.6.2, none of the interaction terms are significantly related to cost of equity. Hypothesis 5 is therefore not supported again. Technological intensity has no moderating effect on the relationship between cost of equity and Total ICD. However, the systematic risk continues to be 1% significantly and positively associated to cost of equity.

Table 4.19: Multiple Regression Results for Hypothesis 5 Using Different ICD Measures

Statistics	Variable	Second ICD Measure	Third ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Equity				
Unstandardized Coefficients	(Constant)	6.380***	6.373***	6.426***
	Intellectual Capital Disclosure (ICD)	-.001	-.001	.707
	Technology Intensity (T)	.772**	.777**	.874
	T x ICD	-.003	-.003	-.748
	Firm Size	.088	.089	.033
	Leverage	-.971	-.967	-.857
	Earnings Variability	.060	.059	.058
	Systematic Risk	1.572***	1.571***	1.579***
R Square		.507	.507	.505
F Value		17.925	17.950	17.757
Durbin Watson		1.917	1.915	1.946

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7.6 Test Hypothesis 6 Using Different ICD Measures

Using the second and fourth ICD measure to test Hypothesis 6 as shown in Table 4.20, the same results like the regression model using the first ICD measure are revealed. The interaction terms of technology intensity with the other three category disclosures (T* Internal Capital disclosure, T* External Capital disclosure and T* Human Capital disclosure) are not significantly related to cost of equity. This indicates that Hypothesis 6 is not supported. Technological intensity has no moderating effect on the relationship between cost of equity and the other three components disclosures. Again, the systematic risk continues to be the only significant driver, where it is 1% significantly and positively associated to cost of equity in all the regression models involved.

Table 4.20: Multiple Regression Results for Hypothesis 6 Using Different ICD Measures

Hypo-thesis	Statistics	Variable	Second ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Equity				
6a	**Unstandardized Coefficients**	(Constant)	6.431***	6.643***
		Internal Capital Disclosure (IC)	-.008	.336
		Technology Intensity (T)	.639*	.185
		T x IC	.000	.954
		Firm Size	.093	.015
		Leverage	-1.035	-.751
		Earnings Variability	.061	.045
		Systematic Risk	1.593***	1.596***
	R Square		.506	.512
	F Value		17.883	18.267
	Durbin Watson		1.911	1.963
6b	**Unstandardized Coefficients**	(Constant)	6.328***	6.267***
		External Capital Disclosure (EC)	.005	.667
		Technology Intensity (T)	.867***	1.284***
		T x EC	-.016	-2.079
		Firm Size	.086	.069
		Leverage	-.928	-.831
		Earnings Variability	.058	.066
		Systematic Risk	1.554***	1.572***
	R Square		.512	.514
	F Value		18.257	18.452
	Durbin Watson		1.939	1.895
6c	**Unstandardized Coefficients**	(Constant)	6.557***	6.521***
		Human Capital Disclosure (HC)	.011	.233
		Technology Intensity (T)	.707**	.699
		T x HC	-.014	-.217
		Firm Size	.043	.043
		Leverage	-.905	-.897
		Earnings Variability	.058	.057
		Systematic Risk	1.576***	1.581***
	R Square		.504	.503
	F Value		17.718	17.664
	Durbin Watson		1.936	1.936

Note: Developed for this study. ***= Significance at the 1% level ** = Significance at the 5% level * = Significance at the 10% level

4.7.7 Test Hypothesis 7 Using Different ICD Measures

Table 4.21 shows the regression model results to test Hypothesis 7 using second, third and fourth ICD measure. Consistent with the first ICD measure, all the interaction terms of technology intensity with Total ICD appear to have 1% significant relationship with cost of debt using second, third and fourth ICD measure, supporting Hypothesis 7. Technological intensity has a moderating effect on the relationship between ICD and cost of debt for high-tech firms. Using the second ICD measure, when the level of ICD increases by 1 score, the cost of debt increases by 0.023%. Using the third ICD measure, when the level of ICD increases by 1 score, the cost of debt increases by 0.022%. Meanwhile, using the fourth ICD measure, when the level of ICD increases by 1%, the cost of debt increases by 4.866%.

Table 4.21: Multiple Regression Results for Hypothesis 7 Using Different ICD Measures

Statistics	Variable	Second ICD Measure	Third ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Debt				
Unstandardized Coefficients	(Constant)	1.502**	1.479**	2.481***
	Intellectual Capital Disclosure (ICD)	-.022***	-.021***	-2.232*
	Technology Intensity (T)	-.465	-.443	-1.738**
	T x ICD	.023***	.022***	4.866***
	Firm Size	.280**	.281**	.153
	Leverage	.100	.083	.471
	Earnings Variability	.012	.011	-.011
R Square		.092	.091	.091
F Value		2.087	2.043	2.047
Durbin Watson		2.051	2.052	2.084

Note: Developed for this study. *** = Significance at the 1% level; ** = Significance at the 5% level; and * = Significance at the 10% level.

4.7.8 Test Hypothesis 8 Using Different ICD Measures

The regression model results to test Hypothesis 8 using second and fourth ICD measure are summarized in Table 4.22. In contrary to the results using the first ICD measure, regression model using second measure reveals that the interaction terms of technology intensity with internal capital disclosure and external capital disclosure are significantly related to cost of debt (at 5% and 10% significance level respectively). For high-tech firms, when the level of internal capital disclosure increases by 1 score, the cost of debt increases by 0.043%, whilst when the level of external capital disclosure increases by 1 score, the cost of debt increases by 0.037%.

On the other hand, regression model using fourth ICD measure also shows that interaction terms of technology intensity with internal capital disclosure and external capital disclosure are significantly related to cost of debt (at 10% and 5% significance level respectively). For high-tech firms, when the level of internal capital disclosure increases by 1%, the cost of debt increases by 2.638%, whilst when the level of external capital disclosure increases by 1%, the cost of debt increases by 3.2%.

For the relationship between human capital disclosure and cost of debt, the interaction term of technology intensity with human capital disclosure is not significantly related to cost of debt when second ICD measure was used. However, using fourth ICD measure, the results shows similar results with the first ICD measure, where the interaction term of technology intensity with human capital disclosure has 1% significant association with cost of debt, showing that technological intensity has a moderating effect on the relationship between human capital disclosure and cost of debt for high-tech firms where cost of debt increases by 3.488%, when the level of human capital disclosure increases by 1%.

Table 4.22: Multiple Regression Results for Hypothesis 8 Using Different ICD Measures

Hypo-thesis	Statistics	Variable	Second ICD Measure	Fourth ICD Measure
Dependent Variable: Cost of Debt				
8a	**Unstandardized Coefficients**	(Constant)	1.411**	2.011***
		Internal Capital Disclosure (IC)	-.045***	-1.007
		Technology Intensity (T)	-.316	-.919
		T x IC	.043**	2.638*
		Firm Size	.288**	.152
		Leverage	.025	.668
		Earnings Variability	.017	-.006
	R Square		.108	.059
	F Value		2.485	1.278
	Durbin Watson		1.982	2.106
8b	**Unstandardized Coefficients**	(Constant)	1.553**	2.105***
		External Capital Disclosure (EC)	-.032	-1.546
		Technology Intensity (T)	-.172	-.865
		T x EC	.037*	3.200**
		Firm Size	.209*	.152
		Leverage	.403	.465
		Earnings Variability	.007	.000
	R Square		.056	.064
	F Value		1.219	1.407
	Durbin Watson		2.108	2.087
8c	**Unstandardized Coefficients**	(Constant)	1.786***	2.361***
		Human Capital Disclosure (HC)	-.024	-1.287*
		Technology Intensity (T)	-.213	-1.483**
		T x HC	.042	3.488***
		Firm Size	.157	.133
		Leverage	.590	.567
		Earnings Variability	.008	-.008
	R Square		.048	.092
	F Value		1.040	2.079
	Durbin Watson		2.096	2.054

Note: Developed for this study. ***= Significance at the 1% level ** = Significance at the 5% level * = Significance at the 10% level

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 Introduction

This chapter discusses and concludes the results presented in Chapter 4. The implication and limitations of this study are also discussed, and finally the potential for future research is suggested.

5.1 Discussion on Major Findings

Multiple regression results using the main ICD measure and the three other different ICD measures for robustness testing as presented in the section above are summarized in Table 5.1below.

Table 5.1: Summary of the Hypotheses Testing Results

Hypotheses	**Decision**			
	Using First ICD Measure	**Using Second ICD Measure**	**Using Third ICD Measure**	**Using Fourth ICD Measure**
H_1: The level of ICD is negatively associated with the cost of equity.	**Not Supported** ***(There is significant positive relationship instead.)*** β = 1.705 p-value = 0.081 (p < 0.10)	**Not Supported** β = -0.001 p-value = 0.886 (p > 0.10)	**Not Supported** β = -0.001 p-value = 0.857 (p > 0.10)	**Not Supported** β = 0.597 p-value = 0.458 (p > 0.10)

Hypotheses	Decision			
	Using First ICD Measure	**Using Second ICD Measure**	**Using Third ICD Measure**	**Using Fourth ICD Measure**
H_{2a}: The level of internal capital disclosure is negatively associated with the cost of equity.	**Not Supported** β = 0.064 p-value = 0.966 (P > 0.10)	**Not Supported** β = -0.004 p-value = 0.611 (p > 0.10)	-	**Not Supported** β = 0.893 p-value = 0.152 (p > 0.10)
H_{2b}: The level of external capital disclosure is negatively associated with the cost of equity.	**Not Supported** ***(There is significant positive relationship instead.)*** β = 2.942 p-value = 0.098 (p < 0.10)	**Not Supported** β = -0.001 p-value = 0.877 (p > 0.10)	-	**Not Supported** β = -0.023 p-value = 0.974 (p > 0.10)
H_{2c}: The level of human capital disclosure is negatively associated with the cost of equity.	**Not Supported** ***(There is significant positive relationship instead.)*** β = 3.381 p-value = 0.094 (p < 0.10)	**Not Supported** β = 0.006 p-value = 0.628 (p > 0.10)	-	**Not Supported** β = 0.190 p-value = 0.724 (p > 0.10)
H_3: The level of ICD is negatively associated with the cost of debt.	**Not Supported** β = -1.206 p-value = 0.297 (P > 0.10)	**Not Supported** β = -0.002 p-value = 0.556 (p > 0.10)	**Not Supported** β = -0.002 p-value = 0.563 (p > 0.10)	**Not Supported** β = 0.182 p-value = 0.848 (p > 0.10)
H_{4a}: The level of internal capital disclosure is negatively associated with the cost of debt.	**Supported** β = -3.812 p-value = 0.033 (p < 0.05)	**Supported** β = -0.19 p-value = 0.055 (p < 0.10)	-	**Not Supported** β = 0.219 p-value = 0.766 (p > 0.10)

Hypotheses	Decision			
	Using First ICD Measure	**Using Second ICD Measure**	**Using Third ICD Measure**	**Using Fourth ICD Measure**
H_{4b}: The level of external capital disclosure is negatively associated with the cost of debt.	**Not Supported** β = 0.563 p-value = 0.789 (P > 0.10)	**Not Supported** β = 0.001 p-value = 0.900 (P > 0.10)	-	**Not Supported** β = 0.082 p-value = 0.920 (p > 0.10)
H_{4c}: The level of human capital disclosure is negatively associated with the cost of debt.	**Not Supported** β = 0.837 p-value = 0.727 (P > 0.10)	**Not Supported** β = 0.007 p-value = 0.621 (P > 0.10)	-	**Not Supported** β = 0.029 p-value = 0.964 (p > 0.10)
H_5: Technological intensity has a moderating effect on the relationship between ICD and cost of equity.	**Not Supported** β = -1.885 p-value = 0.359 (P > 0.10)	**Not Supported** β = -0.003 p-value = 0.662 (P > 0.10)	**Not Supported** β = -0.003 p-value = 0.648 (p > 0.10)	**Not Supported** β = -0.748 p-value = 0.612 (p > 0.10)
H_{6a}:Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of equity.	**Not Supported** β = -0.860 p-value = 0.784 (P > 0.10)	**Not Supported** β = 0.000 p-value = 0.988 (P > 0.10)	-	**Not Supported** β = 0.954 p-value = 0.418 (p > 0.10)
H_{6b}:Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of equity.	**Not Supported** β = -3.431 p-value = 0.369 (P > 0.10)	**Not Supported** β = -0.016 p-value = 0.349 (P > 0.10)	-	**Not Supported** β = -2.079 p-value = 0.108 (p > 0.10)
H_{6c}:Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of equity.	**Not Supported** β = -2.192 p-value = 0.618 (P > 0.10)	**Not Supported** β = -0.014 p-value = 0.581 (P > 0.10)	-	**Not Supported** β = -0.217 p-value = 0.835 (p > 0.10)
H_7: Technological intensity has a moderating effect on the relationship between ICD and cost of debt.	**Supported** β = 6.861 p-value = 0.005 (p < 0.01)	**Supported** β = -0.022 p-value = 0.007 (p < 0.01)	**Supported** β = 0.022 p-value = 0.007 (p < 0.01)	**Supported** β = 4.866 p-value = 0.005 (p < 0.01)

Hypotheses	Decision			
	Using First ICD Measure	**Using Second ICD Measure**	**Using Third ICD Measure**	**Using Fourth ICD Measure**
H_{8a}:Technological intensity has a moderating effect on the relationship between internal capital disclosure and cost of debt.	**Not Supported** β = 6.060 p-value = 0.101 (P > 0.10)	**Supported** β = 0.043 p-value = 0.014 (p < 0.05)	-	**Supported** β = 2.638 p-value = 0.063 (p < 0.10)
H_{8b}:Technological intensity has a moderating effect on the relationship between external capital disclosure and cost of debt.	**Not Supported** β = 5.347 p-value = 0.245 (P > 0.10)	**Supported** β = 0.037 p-value = 0.075 (p < 0.10)	-	**Supported** β = 3.200 p-value = 0.040 (p < 0.05)
H_{8c}:Technological intensity has a moderating effect on the relationship between human capital disclosure and cost of debt.	**Supported** β = 11.224 p-value = 0.033 (p < 0.05)	**Not Supported** β = 0.042 p-value = 0.157 (P > 0.10)	-	**Supported** β = 3.488 p-value = 0.005 (p < 0.01)

Note: Developed for this study.

5.1.1 Relationship between Intellectual Capital Disclosure and Cost of Equity

The first hypothesis underpinning this study examined the association between ICD and cost of equity, whilst the second hypothesis investigated the association between each IC component and cost of equity. Several of the different tests performed revealed different results; some provided significant and unexpected positive relationship (but the evidence is marginal) while some revealed non-significant findings. Hypothesis 1 and 2 are not supported. The inconclusive results found from different tests in this study confirmed the noise in measurement of ICD (Botosan, 2006). Moreover, the AICPA (1994) argued that the available evidence does not adequately establish the hypothesised negative relationship between the level of information disclosure and the cost of equity (as cited in Poshakwale & Courtis, 2005). The justification is that more frequent disclosure tends to increase stock price volatility and increase the cost of equity capital. This argument was supported by empirical evidence, for example, Bushee and Noe (2000), showing that higher level of

disclosure attracts transient traders who trade aggressively, thereby increasing the volatility and adversely influencing the cost of equity.

Furthermore, the unexpected marginally significant and positive associations that were found between total ICD and cost of equity, external capital disclosure and cost of equity; and human capital disclosure and cost of equity when the first ICD measure was used are in consistence with Richardson and Welker (2001) who documented a positive association between costs of equity with social disclosures. The social disclosure studied by Richardson and Welker (2001) includes human resources, community, and relationship with stakeholders such as governments, suppliers and customers which are similar to the ICD in this study. Richardson and Welker (2001) provided several possible explanations on this unexpected positive associations. Firstly, there could be a consistent bias where firms that experience higher than average social costs tend to disclose more positive information for self-promotion but under-report negative social effects. Secondly, it may be that social responsibility investments by firms are consistently negative present value projects, increasing the overall risk of the firm.

5.1.2 Relationship between Intellectual Capital Disclosure and Cost of Debt

The third and fourth hypotheses investigated the relationship between ICD and cost of debt. The regression models using the first main ICD measure and all other 3 different ICD measures consistently reveal non-significant relationship between ICD and cost of debt, external capital disclosure and cost of debt; and human capital disclosure and cost of debt. In other words, Hypothesis 3, Hypothesis 4b, and Hypothesis H4c are not supported unanimously using all different ICD measures.

Nonetheless, different tests performed in this study revealed inconclusive results for internal capital disclosure–cost of debt relationship. The internal capital disclosure was found to have a significant negative relationship with cost of debt using the main ICD measure and second ICD measure in this study. While the negative relationship is significantly strong using the first ICD measure which is at the 5% significance

level, the relationship is found to be relatively weak using the second ICD measure which is only at a statistical significance level of 10%.

This generally non-significant results are consistent with the study conducted in China by Wang et al. (2008) but is contrary to the significant negative results found in the United States (U.S.) firms by Sengupta (1998). A possible reason could be that the debt market in Malaysia is not as developed as in the U.S. and the Malaysian central government uses debt in its fiscal policy to exercise macro-control (Yeah, 2018). According to Wang et al. (2008), under this kind of economy, a Malaysian firm's debt obligations might not be a complete reflection of its financing needs guided by the market mechanism.

Besides, Barus and Siregar (2014) who also found that ICD does not have any significant effect on cost of debt argue that not all information disclosed in the annual reports can be used by lenders. When estimating any default risk, lenders tend to focus on the firm's credit eligibility, namely character, capability, collateral, condition of economy and capital as well as the history of loan rather than the information disclosed in the annual report (Sudarmadji & Sularto, 2007, as cited in Barus & Siregar, 2014, p. 342).

In addition, the difference in disclosure environment was also documented by Zhang and Ding (2006) as one of the possible reasons causing the mixed results in disclosure–cost of capital literature. Another possible reason for this study's mixed results could be that other important explanatory variables were not included as control variables since all R squares for regression models examining cost of debt are ranging from 3.0% to 10.8% only. This argument is similar to that of Wang et al. (2008) and Lee et al. (2011).

5.1.3 Moderating Effect of Technology Intensity on Relationship between Intellectual Capital Disclosure and Cost of Equity

The fifth and the sixth hypotheses examined the moderating effect of technology intensity on the ICD-cost of equity relationship. None of the analyses support these two hypotheses. The technology intensity has no moderating effect on the relationship between ICD and cost of equity nor the relationship between the level of disclosure in any IC components and cost of equity. These are quite unexpected as the Mann–Whitney U test results show that the Total ICD and external capital disclosure are significantly different between high-tech and low-tech firms (at the 1% significance level), whilst the cost of equity is different between high-tech and low-tech firms at the 10% significance level.

This finding is consistent with Lee et al. (2011) who also found no moderating effect of technology intensity on the ICD-cost of equity relationship. The rejection of these hypotheses could be due to the way industries were classified in this study. There is no consensus in prior studies regarding the industry classification. A reasonable effort has been undertaken in this study to classify each industry. Even so, there may be better ways of industry classification.

5.1.4 Moderating Effect of Technology Intensity on Relationship between Intellectual Capital Disclosure and Cost of Debt

Lastly, the seventh and eighth hypotheses examined the moderating effect of technology intensity on the ICD-cost of debt association. All the regression models using all four different ICD measures unanimously reveal that the interaction term of technology intensity with Total ICD appears to have significant relationship with cost of debt. Hypothesis 7 is therefore supported. Technological intensity has a moderating effect on the relationship between ICD and cost of debt whereby for high-tech firms, the cost of debt increases when the level of ICD increases.

For the three components of ICD, several tests with different ICD measures provide different results. Regression models using second and fourth measure reveal that the technology intensity has a moderating effect on the relationship of internal capital disclosure with cost of debt and the relationship of external capital disclosure with cost of debt whereby the cost of debt is positively related to internal capital disclosure and external capital disclosure for high-tech firms.

On the other hand, the regression models using the first ICD measure and the fourth ICD show that technological intensity has a moderating effect on the relationship between human capital disclosure and cost of debt. The results show that for high-tech firms, when the level of human capital disclosure increases, the cost of debt increases.

The inconclusive results found from different tests could be due to the noise in measurement of ICD (Botosan, 2006) and the way industries were classified as mentioned above.

5.2 Implication of the Study

This study, being the first to investigate the ICD–cost of capital relationship in Malaysia, has implications for various parties. Firstly, it contributes to various literature including the accounting, finance and intellectual capital body of knowledge. This contribution is important given the growing significance of intellectual capital to a firm's sustainable competitive advantage. It offers important insights on the moderating effect of technology intensity on the ICD-cost of capital relationship which was not concentrated by many prior studies. The findings imply a possible need to rethink the general reasons and incentives underlying why firms may or may not be disclosing non-financial information such as that related to intellectual capital. Furthermore, this study examined the ICD using four different ICD measurement and inconclusive results were revealed, implying the noise in measurement of ICD which could be a possible reason to the mixed results from the prior disclosure-cost of capital literature.

Besides, the findings provided valuable insights to the regulators and policymakers. With sufficient understanding of the intellectual capital disclosure in Malaysia, regulators may avoid impose unnecessary costs on issuers on mandatory reporting. Moreover, since there is a restrictive accounting standard specifically pertaining to the ICD, this study provides some insights to the policymakers towards the needs to design guidelines or prescribe reporting standards for ICD to meet the needs of the investors or lenders by enhancing comparability in ICD by Malaysia firms.

In addition, the findings of this study have implications for the management of firms in evaluating the cost and benefit of ICD. For example, the finding of this study that internal capital disclosure is significantly and negatively related to cost of debt (when the first and second ICD measures were used) can provide insight to management of firms especially in their processes of achieving their goal of competitive advantage. Nevertheless, managers for high-tech firms should be cautious as the benefit of reduced cost of debt from increased disclosure on internal capital disclosure does not apply for high-tech firms as the findings indicate that for high-tech firms, the cost of debt increases when there is an increase in the level of ICD and disclosure of all 3 IC components.

5.3 Limitations

The small sample size of this study is the first limitation. The sample size of 130 firms is only a small proportion (i.e. 16%) of all 801 listed companies on Bursa Malaysia as at 17 June 2018. Zhang and Ding (2006) documented that findings on disclosure-cost of capital association could only be suggestive due to the small sample size. However, this limitation is deemed to be unavoidable for this dissertation due to the limited timeframe and the manually intensive nature of ICD data collection.

In the context of ICD measurement, content analysis involves the application of personal judgement, and thus subjectivity issues arise. The possibility of errors remains even though every effort has been made in this study to minimise the error.

Other than that, the method used in classifying the industry might not be perfect in capturing the real effect of industry. There may be better ways of industry classification.

Lastly, only one disclosure channel which is annual reports being used in this study. While annual reports are the main communication channel between firms and stakeholders, there is a possibility that the information in annual reports could have been made known via other channels, limiting its usefulness to stakeholders (Mangena et al., 2010).

5.4 Suggestions for Future Research

As no conclusive results could be found to support most of the hypotheses in this study, further research is warranted.

Future research may benefit from the development of an improved measure of cost of equity and cost of debt. Other important explanatory variables could also be controlled for, such as the need for external financing.

In terms of ICD measurement, other disclosure communication channels, such as companies' websites could be examined. An IC coding instrument with clear definition of IC attributes and categories could be enhanced or developed.

An investigation of the ICD–cost of capital relationship could be conducted by repeating the analyses at a later or earlier financial year to see if the results are any different from that of the 2017 analysis.

Lastly, future studies would benefit from constructing a better industry classification method. A larger sample size could also be employed.

5.5 Conclusion

There have been several ICD studies on Malaysian organisations. Nevertheless, the relationship of ICD and cost of capital has not yet been examined within a Malaysian context. This study has analysed the ICD practices of Malaysian companies by employing manual content analysis and has provided an investigation of the relationship between ICD and cost of capital. Due to the subjectivity underlying content analysis, further robustness testing has been performed by using different ICD measurements.

Using the first main ICD measure, the cost of equity was found to be marginally and positively related to the level of ICD, external capital disclosure and human capital disclosure. However, these findings were not supported by the robustness testing performed using different ICD measures.

In addition, the regression model using the first main ICD measure indicates that internal capital disclosure was significantly and negatively related to cost of debt. This finding is supported by the regression model using the second ICD measure. Nevertheless, the benefit of reduced cost of debt via increased disclosure on internal capital disclosure does not apply for high-tech firms as this study also revealed that the technological intensity has a moderating effect on the relationship between ICD and cost of debt whereby for high-tech firms, the cost of debt increases when there is an increase in the level of ICD and disclosure of all 3 IC components, namely internal capital disclosure, external capital disclosure and human capital disclosure.

Overall, multiple regression models run using different ICD measurement provided inconclusive results on the association of ICD and cost of capital as suggested by the extant theory. Other than the possible abovementioned reasons, the limitations of the study which are outlined in Section 5.3 may have also contributed to the lack of conclusive results.

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APPENDICES

Appendix A: Industry Classification from Previous Literature

Prior Studies	High tech	Low-tech
Mangena et al. (2010)	IC intensive sectors: Biotech and pharmaceuticals, IT, business service providers, telecommunications, banks and insurance, ***media*** and ***publishing***, aerospace and defence, chemicals, and electronic and electrical equipment.	Non-IC intensive sectors: ***Real estate***, mining, ***retailing***, engineering, food and beverages, and utilities.
Sonnier (2008)	High-technology firms: Professional, scientific and technical services; internet service providers, web search portals and data processing services; and internet publishing and broadcasting.	Traditional sector firms: Construction, textile mills, textile product mills, apparel manufacturing, wood product manufacturing, paper manufacturing, ***machinery manufacturing***, ***transportation equipment manufacturing***, furniture manufacturing.
Bozzolan et al. (2003)	High-tech industries: Internet providers, biotechnology, entrainment, internet, IT distribution, high-tech manufacturing, ***media***, ***retail***, software, system integration and telecommunication, web services.	Traditional industries: Food, automobile, chemical, building, electronics, manufacturing, **media**, oil, utilities, textiles and clothing, tourism and leisure.
Sujan and Abeysekera (2007)	Knowledge based and service firms: Banks, insurance, ***real estate***, media and telecommunication.	Other: Materials, energy, ***retail***.
Oliveira et al. (2006)	High technological intensity firms: Manufacturers of chemical products; electronic, communication, computing, and ***transport machinery and equipment***.	Low technological intensity firms: All other industries that are not considered high technological intensive.

Prior Studies	High tech	Low-tech
	Knowledge intensive services: Post and telecommunication, financial intermediation, renting and business activities, education services, and health social services.	
Brennan (2001)	Technology and people-oriented companies: Manufacturer of advanced products, Pharmaceutical, software, and recruitment firms, supplier of data processing facilities, and auctioneers.	-

Note. Words underlined show the contradicting views of prior studies in industry classification.

Appendix B: Classification of GICS Sectors by Technological Intensity – High-tech Industries

High-Tech Intensive Industries					
Industry Group		**Industry**		**Sub-Industry**	
1510	Materials	**151010**	Chemicals	**15101010**	Commodity Chemicals
				15101020	Diversified Chemicals
				15101030	Fertilizers & Agricultural Chemicals
				15101040	Industrial Gases
				15101050	Specialty Chemicals
2010	Capital Goods	**201010**	Aerospace & Defense	**20101010**	Aerospace & Defense
		201040	Electrical Equipment	**20104010**	Electrical Components & Equipment
				20104020	Heavy Electrical Equipment
2020	Commercial & Professional Services	**202020**	Professional Services	**20202010**	Human Resource & Employment Services
				20202020	Research & Consulting Services
2530	Consumer Services	**253020**	Diversified Consumer Services	**25302010**	Education Services
				25302020	Specialized Consumer Services
3510	Health Care Equipment & Services	**351010**	Health Care Equipment & Supplies	**35101010**	Health Care Equipment
		351020	Health Care Providers & Services	**35101020**	Health Care Supplies
				35102010	Health Care Distributors

High-Tech Intensive Industries					
Industry Group		**Industry**		**Sub-Industry**	
				35102015	Health Care Services
				35102020	Health Care Facilities
				35102030	Managed Health Care
		351030	Health Care Technology	**35103010**	Health Care Technology
3520	Pharmaceuticals, Biotechnology & Life Sciences	**352010**	Biotechnology	**35201010**	Biotechnology
		352020	Pharmaceuticals	**35202010**	Pharmaceuticals
		352030	Life Sciences Tools & Services	**35203010**	Life Sciences Tools & Services
4510	Software & Services	**451010**	Internet Software & Services	**45101010**	Internet Software & Services
		451020	IT Services	**45102010**	IT Consulting & Other Services
				45102020	Data Processing & Outsourced Services
		451030	Software	**45103010**	Application Software
				45103020	Systems Software
				45103030	Home Entertainment Software
4520	Technology Hardware & Equipment	**452010**	Communications Equipment	**45201020**	Communications Equipment
		452020	Computers & Peripherals	**45202010**	Computer Hardware
				45202020	Computer Storage & Peripherals
		452030	Electronic Equipment, Instruments &	**45203010**	Electronic Equipment & Instruments

High-Tech Intensive Industries					
Industry Group		**Industry**		**Sub-Industry**	
			Components		
				45203015	Electronic Components
				45203020	Electronic Manufacturing Services
				45203030	Technology Distributors
		452040	Office Electronics	**45204010**	Office Electronics
4530	Semiconductors & Semiconductor Equipment	**453010**	Semiconductors & Semiconductor Equipment	**45301010**	Semiconductor Equipment
				45301020	Semiconductors
5010	Telecommunication Services	**501010**	Diversified Telecommunication Services	**50101010**	Alternative Carriers
				50101020	Integrated Telecommunication Services
		501020	Wireless Telecommunication Services	**50102010**	Wireless Telecommunication Services

Note: Developed for this study.

Appendix C: Classification of GICS Sectors by Technological Intensity - Low-tech Industries

Low-Tech Intensive Industries					
Industry Group		**Industry**		**Sub-Industry**	
1010	Energy	**101010**	Energy Equipment & Services	**10101010**	Oil & Gas Drilling
				10101020	Oil & Gas Equipment & Services
		101020	Oil, Gas & Consumable Fuels	**10102010**	Integrated Oil & Gas
				10102020	Oil & Gas Exploration & Production
				10102030	Oil & Gas Refining & Marketing
				10102040	Oil & Gas Storage & Transportation
				10102050	Coal & Consumable Fuels
1510	Materials	**151020**	Construction Materials	**15102010**	Construction Materials
		151030	Containers & Packaging	**15103010**	Metal & Glass Containers
				15103020	Paper Packaging
		151040	Metals & Mining	**15104010**	Aluminium
				15104020	Diversified Metals & Mining
				15104030	Gold
				15104040	Precious Metals & Minerals
				15104050	Steel
		151050	Paper & Forest Products	**15105010**	Forest Products
				15105020	Paper Products
2030	Transportation	**203010**	Air Freight & Logistics	**20301010**	Air Freight & Logistics
		203020	Airlines	**20302010**	Airlines
		203030	Marine	**20303010**	Marine
		203040	Road & Rail	**20304010**	Railroads
				20304020	Trucking
		203050	Transportation Infrastructure	**20305010**	Airport Services
				20305020	Highways & Railtracks
				20305030	Marine Ports & Services
2520	Consumer Durables &	**252010**	Household Durables	**25201020**	Home Furnishings

	Apparel				
				25201030	Homebuilding
				25201040	Household Appliances
				25201050	Housewares & Specialties
		252020	Leisure Equipment & Products	**25202010**	Leisure Products
				25202020	Photographic Products
		252030	Textiles, Apparel & Luxury Goods	**25203010**	Apparel, Accessories & Luxury Goods
				25203020	Footwear
				25203030	Textiles
2530	Consumer Services	**253010**	Hotels, Restaurants & Leisure	**25301010**	Casinos & Gaming
				25301020	Hotels, Resorts & Cruise Lines
				25301030	Leisure Facilities
				25301040	Restaurants
3010	Food & Staples Retailing	**301010**	Food & Staples Retailing	**30101010**	Drug Retail
				30101020	Food Distributors
				30101030	Food Retail
				30101040	Hypermarkets & Super Centres
3020	Food, Beverage & Tobacco	**302010**	Beverages	**30201010**	Brewers
				30201020	Distillers & Vintners
				30201030	Soft Drinks
		302020	Food Products	**30202010**	Agricultural Products
				30202030	Packaged Foods & Meats
		302030	Tobacco	**30203010**	Tobacco
3030	Household & Personal Products	**303010**	Household Products	**30301010**	Household Products
		303020	Personal Products	**30302010**	Personal Products
5510	Utilities	**551010**	Electric Utilities	**55101010**	Electric Utilities
		551020	Gas Utilities	**55102010**	Gas Utilities
		551030	Multi-Utilities	**55103010**	Multi-Utilities
		551040	Water Utilities	**55104010**	Water Utilities
		551050	Independent Power Producers & Energy Traders	**55105010**	Independent Power Producers & Energy Traders

Note: Developed for this study.

Appendix D: Classification of GICS Sectors by Technological Intensity -Undefined group

Undefined Group					
Industry Group		**Industry**		**Sub-Industry**	
2010	Capital Goods	**201020**	Building Products	**20102010**	Building Products
		201030	Construction & Engineering	**20103010**	Construction & Engineering
		201050	Industrial Conglomerates	**20105010**	Industrial Conglomerates
		201060	Machinery	**20106010**	Construction & Farm Machinery & Heavy Trucks
				20106020	Industrial Machinery
		201070	Trading Companies & Distributors	**20107010**	Trading Companies & Distributors
2020	Commercial & Professional Services	**202010**	Commercial Services & Supplies	**20201010**	Commercial Printing
				20201050	Environmental & Facilities Services
				20201060	Office Services & Supplies
				20201070	Diversified Support Services
				20201080	Security & Alarm Services
2510	Automobiles & Components	**251010**	Auto Components	**25101010**	Auto Parts & Equipment
				25101020	Tires & Rubber
		251020	Automobiles	**25102010**	Automobile Manufacturers
				25102020	Motorcycle Manufacturers
2520	Consumer Durables & Apparel	**252010**	Household Durables	**25201010**	Consumer Electronics
2540	Media	**254010**	Media	**25401010**	Advertising
				25401020	Broadcasting
				25401025	Cable & Satellite
				25401030	Movies & Entertainment
				25401040	Publishing
2550	Retailing	**255010**	Distributors	**25501010**	Distributors
		255020	Internet & Catalogue	**25502010**	Catalogue Retail

	Retail		
		25502020	Internet Retail
255030	Multiline Retail	**25503010**	Department Stores
		25503020	General Merchandise Stores
255040	Specialty Retail	**25504010**	Apparel Retail
		25504020	Computer & Electronics Retail
		25504030	Home Improvement Retail
		25504040	Specialty Stores
		25504050	Automotive Retail
		25504060	Home furnishing Retail

Note: Developed for this study.

Appendix E – "Definitions and Examples of Intellectual Capital Elements in the Coding Instrument" (Guthrie, et al., 2003, pp. 24-33)

THE IC FRAMEWORK

The IC frameworks represent the coding schema to classify information. The use of a framework in the coding of the annual reports allows researchers to identify how IC components are visualised, valued and understood within the organisation. For the framework to be effective in classifying information, the main IC categories and elements that play a critical role in the value creating potential of organisations have to be identified. As discussed above, within the IC literature most of the commonly used frameworks (Brooking, 1996; Sveiby, 1997; Edvinsson and Malone, 1997) identify three value relevant IC categories: internal capital: external capital; and human capital. Each category is then split into elements (19).

In the following paragraphs a description of each category as well as definitions and examples of the included elements will be provided.

8.1.1. Internal Capital

Internal capital includes properties derived from the mind that has protection in law (*intellectual property*) as well as *infrastructure assets* owned/used by the organisation. The latter consists of: systems and processes used in the organisation's day to day activities; values that guide the behaviour of individuals and of the entire organisation; and innovative projects that have been undertaken (some of which can also be considered as intellectual property). Elements of this category can be developed internally or acquired.

A. Intellectual Property

Intellectual property includes patents, copyrights and trademarks. Each of these will be described below.

A patent it is an exclusive property right granted by the state to its inventor for a limited period that excludes others from copying, making or selling that invention during that time period. It is a 'keep off' sign to others from the inventor (Brooking 1996:36-37), but protecting the invention worldwide can be time consuming and expensive (Lang 2001).

Trade secrets are a viable alternative to patents because patents can be "invented around" at an affordable cost (Brooking 1997:40). However, trade secrets are viable only if technology can be kept as a secret after a production is released to the public (Teece 1986). Where a firm has access to complementary assets unique to the

innovation, the firm can charge a premium for the value they add to the innovation (Edvinsson & Sullivan 1996).

A trademark ™ is non-registered trademark and R is a registered trademark. TM states that the owner believes he or she is the only one using it. Since it is not registered the owner may or may not have the legal right to stop others from using it (Choy 2001:35). Trademarks can be a name, logo, a picture or a combination, and can also be used for associated with the firm or its products. This intellectual line item also includes service marks. Service marks distinguish one service company from another (Brooking 1996:40).

Copyright, as trademark, may or may not be legally protected. The © symbol must be used in some overseas countries to get legal protection, although it is not compulsory in Australia (Choy 2001:35). This legal protection is offered to an expression of an idea, expressed in some tangible form such as in writing, as the protection is not for the idea itself. It can be sold, distributed or licensed to generate wealth (Brooking 1996:38).

An example from annual reports in the sample:

"Amcor Flexible Europe recently announced the first commercial application of Amcor FlexCan™ – a new unique stand-up flexible container, which is easy to open and reclose." (Amcor, 2002:25)

B. Management philosophy

Management philosophy is the way the leaders of an organisation think about the organisation and its employees. The management philosophy has a substantial effect on the organisational culture (Brooking 1996:62), and mission statements can have either a positive or negative impact on performance depending on whether employees remember, understand, commit, and promote its shared values (Bart 2001).

An example from annual reports in the sample:

"We have a very comprehensive approach to "doing the right thing" in the eyes of our peers, customers, shareholders, the community, regulators and the law. We believe that doing the right thing creates a positive work environment and great customer experiences, builds our reputation and relationships and help us to reduce risk." (Westpac, 2002: 46)

C. Corporate culture

Corporate culture comprises of the values, rites and rituals that are recognised and shared by the employees of a company. Examples of types of cultures include: high risk/high reward, family based, team based, customer focussed, etc. (Brooking, 1996, p.67).

An example from annual reports in the sample:

"There is greater recognition for jobs well done. In the past year, 24 of our most dedicated and innovative people were recognised as CSR Heroes" (CSR, 2002:24).

"If there is a challenge now, it is to continue growing while retaining our reputation for service quality and our unique company culture. By focusing on doing what we do well, and doing it more efficiently in more places, we are confident that this balance can be achieved" (St George, 2002: 16

"The Macquarie culture is represented by the way in which we act and work together. The values to which we aspire can be summarised in six principles: integrity; client commitment; strive for profitability; fulfilment of our people; teamwork; highest standards" (Macquarie Bank, 2002: 5)

D. Management processes

Management processes can be defined as any management (but not technological) activity that contributes to the creation of organisational capital (Roos, Roos, Dragonetti & Edvinsson 1997:49). Management mechanisms are put in to place to turn management philosophy into practice, and to implement best practice. Therefore, management processes refers to those mechanisms that implement the management philosophy of the company, including: systems, policies, procedures and staff suggestion boxes. (Brooking, 1996, p.75).

An example from annual reports in the sample:

"We have had health and safety related key performance indicators for some time but now, for the first time, business risk management targets will form part of management's personal performance measurement" (Brambles,2002: 6)

"Business cells are being benchmarked against good performers in similar businesses, both inside and outside the CSR group. People are being individually assessed against key performance measures" (CSR, 2002: 24)

E. Information and networking systems

Information and networking systems are those both manual and technology-based systems in place to maintain management, share and disseminate information, as well as to network people, in order to gain access to information

Information systems provide the means to implement many management processes. The quality of IT solutions can impact on efficiency, customer care, employee satisfaction etc. (Brooking, 1996, p.75).

Network systems are information systems that have the ability to network with other systems in order to gain access to customers and suppliers and information from other databases (Brooking, 1996, p.77).

Businesses are expected to become increasingly reliant on information systems to capture and report transactions, and also to track, build, and share the collective knowledge of the organisation. However, the challenge is to design performance management systems that include measuring innovation and employee involvement (Stivers et.al. 1997).

An example from annual reports in the sample:

"The implementation of the Bunnings back office systems across the whole network has been successful. Further efficiencies will arise from adopting the Bunnings point of sale system in all Australian stores by November 2002. At the completion of this rollout, all Australian retail stores will be operating on the one technology platform" (Wesfarmers, 2002: 13)

F. Financial relations

Financial relations refer to a relationship between the company and investors, banks and/or other financiers. Favourable relationships are an asset because they can provide the company with financial backing when needed. (Brooking, 1996, p.80).

An example from annual reports in the sample:

"The Nine Network and Macquarie Bank were key supporters of the fund, which will finance various Nine film and television drama projects." (Publishing and Broadcasting Limited, 2002: 30)

8.1.2. External capital

External capital concerns the relationship an organisation has with different external stakeholders (customers, partners and retailers, suppliers, and so forth.). It consists of several elements including: customer, distribution channels, business collaboration, franchising agreements, and so forth. "The tenuous nature of the supplier-firm-customer nexus complicates the measurement process. Hence the economic value of these relationships is at present not determined by any generally accepted definition and measurement system." (Guthrie and Petty, 2001). The management of the relationships with different stakeholders is a critical factor in building a favourable environment in which to exploit the value creating potential of the organization.

G. Brands

Brands are powerful reminders to customers to buy the products and services of one company in preference to another. Brands can be classified as product, service or corporate brands. Product brands are used to distinguish one brand from another, for example, Coca-Cola from Pepsi. A service brand refers to a company's level of service and can be in relation to its quality, efficiency, reliability, or friendliness etc. Corporate brands are where a company name has value in the market place, for example IBM and General Motors (Brooking 1996, p.p. 20-21).

An example from the annual reports in the sample:

"By December 2002 all Hardware houses stores in Australia and New Zealand will carry the Bunnings name. All BBC traditional stores will have been rebranded while the "Benchmark" brand will continue in New Zealand" (Wesfarmers, 2002: 13).

H. Customers

There are several types of customers and some types of customers are typically more valuable than others. Therefore it is important for the organisation to understand the value of its customer base as an asset. Brooking (1996, p.24) identifies five types of customers throughout the sales cycle, they include: suspect, prospect, champion, customer and evangelist. A suspect is a person or organisation, is one that appears to be a target for the products or services of a company. A prospect is a person or organisation that fits a pre-determined formulated profile for a potential customer. A champion is an individual inside the profiled organisation who works to help the sale of an external company's products and services. A customer is an individual who has purchased products or services. An evangelist, the most valuable type of customer, is an individual inside a customer organisation who actively promotes the products and services of the external company.

Other important information when considering customers is: the number of customers (as well as its increase and decrease), and the extent of market share held in relation to the total market share for that product or service. The increase in sales or volume in absolute terms does not indicate the increase in market share or number of customers.

An example from annual reports in the sample:

"With assets of $55 billion and 2.6 million customers, we are placed between the four majors and the country's smaller regional banking groups and enjoy considerable strategic freedom for our future plans" (St George, 2002: 12).

I. Customer satisfaction

Customer satisfaction is the customers' after-purchase judgement or evaluation of a specific product or service. The benefits are associated with increased market share, economic returns, profitability, customer loyalty and less reliance upon price based competition (Stank, Daugherty & Ellinger 1997). Customer satisfaction is related to the customer loyalty (Johanson et. al. 1999). Customer loyalty is that which leads to repeat businesses as a percentage of the customer base (Brooking 1996:26-27). This line item includes both customer satisfaction and customer loyalty. The customer satisfaction has at least one of the three measurable characteristics, they are: loyalty represented by retention rates; increased business by increase in revenue; and insusceptibility to rival's tactics and be price tolerant (Stewart 1997:240). Also customer satisfaction refers to the customers' perception of quality and other attitudes about the company (Sveiby, 1997, p182).

An example from the annual reports in the sample:

"Customer satisfaction measured at 67%, June 2002, up from 40% in 2001-2002" (Telecom, 2002: 13)

J. Company reputation

Company reputation is the image of the firm as perceived by various stakeholders. The resource-based view states that firm's reputation is a resource that leads to competitive advantage. A definition of reputation is that it's the evaluation of a firm by its stakeholders in relation to their affect, esteem and knowledge.

An example from the annual reports in the sample:

"At the end of October our achievements were further recognised with Westpac rated number one among the top 100 companies in Australia in the Good Reputation Index for 2002" (Westpac Bank 2002:15).

K. Distribution channels

Distribution channels are the appropriate mechanisms for getting products and services into the market. They can include direct sales, retail, dealerships, the web etc. (Brooking 1996:30). Distribution channels are one of the key elements to create value in most firms. The relationship between manufacturers and distributors should be interdependent to create value to both parties (Giroud 2000; Saint-Onge 1998).

L. Business collaborations

Business collaborations are a firm's partnership with another firm (Brooking 1996:31). The ability to collaborate easily is an asset as it enables partners to pursue an opportunity together that they may not have been able to pursue independently (Brooking, 1996: 31). Alliances can be equity or non-equity based (Chan, Kensinger, Keown & Martin 1997). An analysis of intangible resources indicate that firms enter into co-operation agreements to establish medium and long-term relations to obtain technology and exchange information (Fernandez, Montes & Vazquez 2000), and by pooling their resources, both small and medium size firms can take advantage from synergy (Chetty & Holm 2000).

An example from the sample annual reports:

"Our focus since august 2001 has been on gaining the full benefits of the merger between Brambles Industries Limited and the support service businesses of GKN plc. The merger produced a high-quality portfolio of businesses with strong growth records, experienced management teams and exciting potential." (Brambles, 2002: 8)

M. Licensing agreements

Licensing agreements give a party the right to sell products, services or technology to other parties as per the conditions set out in the agreement (Brooking 1996:33). They include both licensing and cross-licensing agreements. Cross licensing provide firms active in R&D to protect against inadvertent infringement and the right to use licensee's patents (Grindley & Teece 1998).

Favourable contracts are obtained by a company because of some unique market position they hold. For example, a cut rate advertising price due to the buying power of the biggest spenders on advertising. (Brooking, 1996, p.33).

Licensing agreements encompass agreements which give an external party the right to sell the company's products or services (Brooking, 1996, p.33). A franchising agreement is a contractual license granted by one person (the franchiser) to another (the franchisee) which entitles the franchisee to carry on a particular business using a specific name belonging to the franchiser. The agreement obliges the franchiser to provide the franchisee with assistance in carrying out the business and requires the franchisee to periodically pay the franchiser consideration for the franchise (Brooking, 1996, p.32).

An example from the annual reports in the sample:

"The Lloyd's reform processed markedly during 2002 with the implementation of the franchise model and a series of ancillary changes designed to speed up the modernisation of the market including the structure, accounting practices, and overall performance." (QBE Insurance Group, 2002: 32)

8.1.3. Human Capital

Human capital refers to an individual's education, skill competence, and so forth. The characteristics of human resources are critical in determining the knowledge creation capacity of the organisation as well as the quality and length of the relationships with external stakeholders. From a value-based perspective, they should be measured and placed within the balance sheet (Guthrie and Petty, 2001) but, as in the case of external capital, human capital cannot be "owned" by the organisation even if it is in their "possession" for the period in which the individual is working in the company.

N. Employee

Some argue that employees are the most important assets because knowledge and expertise lies within them (Dzinkowski 1999(a); Lank 1997). A part of the success of knowledge strategy depends on the people in the firm (Morrissey 1998). As firms drive towards a virtual structure, the managers need to follow a different strategy to harness the knowledge of their workforce (Handy 1995).

This concerns employee characteristics that can be grouped into several dimensions a) personal data: employee numbers, gender, and average age; b) economic contribution: value added per expert, revenue per non-administrative staff:

An example from annual reports in the sample:

"ARG employs over 1000 staff. About 850 are located in Western Australia where ARG operates on more than 5.000 kilometres of standard and narrow gauge track." (Wesfarmers, 2002: 25)

O. Education

Education refers to the education received from a formal establishment between the ages of four and eighteen. This refers to the general education a person has received and could be primary or secondary education (Brooking 1996:47-48). It is also the exposure to new knowledge, concepts and ideas in a structured way to increase knowledge or modify attitudes and beliefs (Mayo & Lank 1994: 51). It contains any information discussed other than those shown as measurements in growth/renewal ratios: average education level. Education does not prepare the individual for any job in particular but includes such things as mathematics, history, geography, artistic and creative pursuits etc (Brooking, 1996, p.p.47-48)

Vocational qualifications are designed to provide specific work related skills to an individual for a particular job. Vocational qualifications can be gained in a wide variety of fields including: engineering, accounting, management, computing, hospitality etc (Brooking, 1996, p.48).

An example from annual reports in the sample:

"The agribusiness division's long term future] was highlighted by our recruitment this year of 32 young people with farming background and agricultural qualifications." (National Bank, 2002:28

P. Training

Training refers to programmes designed to foster worker participation in decision making and changes in average years of education of workforce incorporating achievement associated with training programmes. (GRI, 2000, p.34).

An example from annual reports in the sample:

"Cell managers are trained in skills needed to manage key areas: safety, environmental protection, leading and developing people, marketing, strategy finance and operations. Potential cell managers are also being trained, to ensure continuity in managerial succession" (CSR, 2002: 24)

"That's why we have developed a unique workshop and interactive learning experience called "Financial First Steps" to give our new recruits and young staff greater confidence in money matters" (Westpac Bank, 2002:21)

Q. Work-related knowledge

Work-related knowledge refers to the body of knowledge individuals possess about a particular topic (Brooking, 1996, p.41). Work related knowledge frequently comes as a function of understanding and doing a job in a particular field. It comprises three types of knowledge: tacit, explicit and implicit. Tacit knowledge is a special knowledge possessed by individuals but is extremely difficult to explain or document. It is important for organisations to know who has tacit knowledge and ensure that they are treated as a valuable asset to the organisation. Explicit knowledge is well organised in the mind of the individual and may easily be documented as manuals or procedures. Implicit knowledge is knowledge which is hidden in the operating procedures, methods and culture of the company. Identifying and transferring this type of knowledge from one person to another can be very difficult as often the individual is unable to explain why they know that a certain process works (Brooking, 1996:51-52).

Work-related competencies are a merged set of skills, creative profiles, personality attributes and vocational qualifications. Examples of work related competencies include: the ability to design a marketing strategy, the ability to manage a project and the ability to sell a particular product. By focussing on work related competencies instead of jobs, teams of individuals can be pulled together to suit a client need or an emerging market situation (Brooking, 1996: 55-56).

An example from annual reports in the sample:

"The team offered a well balanced mix of financial, technical, marketing, operational and strategic management capabilities that proved invaluable in a year when global steel prices were at, or about, historic lows" (BHP Billiton, 2002:26).

"Many of our experienced staff have learned how to get things done for customers, by bypassing the apparent hurdles and administrative mazes that can get in the way of a speedy solution. They have also developed skill to mix high tech with high touch" (Westpac Bank, 2002:21)

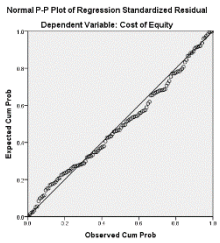
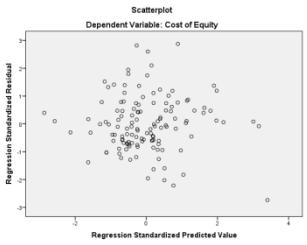
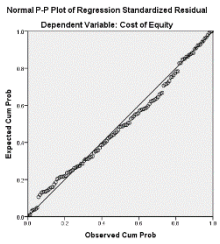
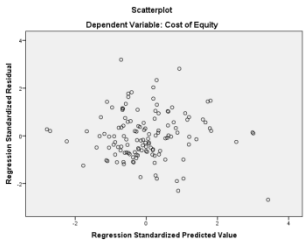
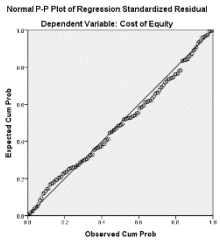
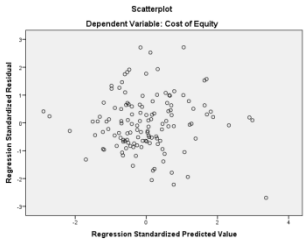
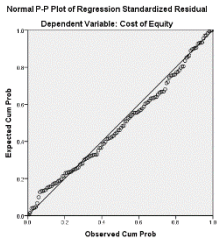
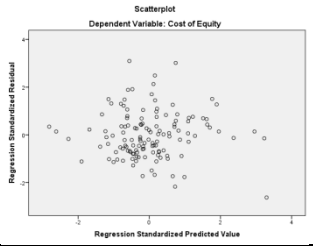
R. Entrepreneurial spirit

There is a direct relationship between how innovative a firm is and its increase in intellectual capital (Brooking 1996:154). Innovation is putting new ideas into practice to achieve commercial success (Molyneux 2000). All innovations are inventions (ASCPA and CMA 1999:70). The best innovators are those who can take an idea in one context and apply into new situations (Hargadon & Sutton 2000). The interpretive process and schemes need to be managed to shape and frame how people make sense of their work (Dougherty 1992).

Appendix F: Measurement of IC Category Disclosure Score

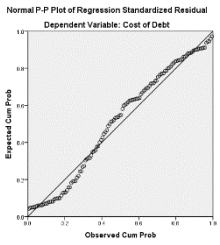
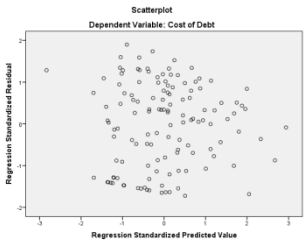
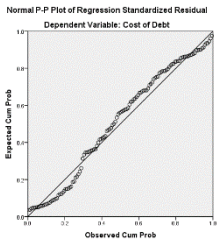
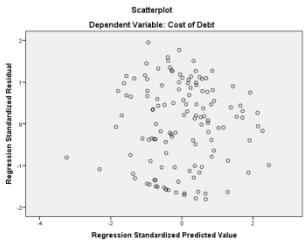
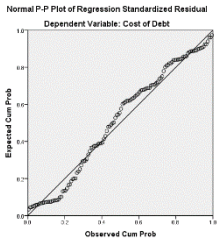
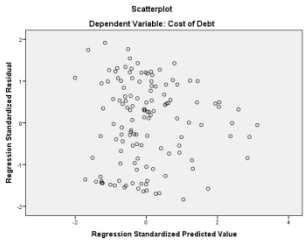
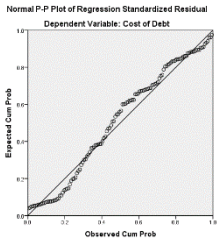
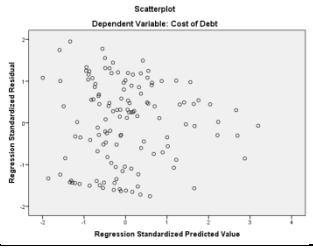
ICD Measure	IC Category Disclosure	Measurement
First ICD Measure (main)	Internal Capital Disclosure	The number of sentences that contain internal capital disclosure scaled by the total number of sentences in the annual report.
	External Capital Disclosure	The number of sentences that contain external capital disclosure scaled by the total number of sentences in the annual report.
	Human Capital Disclosure	The number of sentences that contain human capital disclosure scaled by the total number of sentences in the annual report.
Second ICD Measure	Internal Capital Disclosure	Sum of the number of sentences that include internal capital disclosure.
	External Capital Disclosure	Sum of the number of sentences that include external capital disclosure.
	Human Capital Disclosure	Sum of the number of sentences that include human capital disclosure.
Third ICD Measure	Internal Capital Disclosure	Sum of all quantitative score (worth 2) and qualitative score (worth 1) that include internal capital disclosure.
	External Capital Disclosure	Sum of all quantitative score (worth 2) and qualitative score (worth 1) that include external capital disclosure.
	Human Capital Disclosure	Sum of all quantitative score (worth 2) and qualitative score (worth 1) that include human capital disclosure.
Fourth ICD Measure	Internal Capital Disclosure	Sum of internal capital disclosure (all the ones for internal capital disclosure) scaled by 6 (as there are 6 internal capital attributes).
	External Capital Disclosure	Sum of external capital disclosure (all the ones for external capital disclosure) scaled by 7 (as there are 7 external capital attributes).
	Human Capital Disclosure	Sum of human capital disclosure (all the ones for human capital disclosure) scaled by 5 (as there are 5 human capital attributes).

Appendix G: Assumption of Multiple Regression: Normal Distribution, Linearity & Homoscedasticity for Hypotheses 1 and 2

Hypothesis	Dependent Variable	Independent/ Control Variable	Normal plot of Regression Standardised Residuals	Scatter Plot
1	**Cost of Equity**	- Intellectual Capital Disclosure - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity
2a		- Internal Capital Disclosure - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity
2b		- External Capital Disclosure - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity
2c		- Human Capital Disclosure - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity

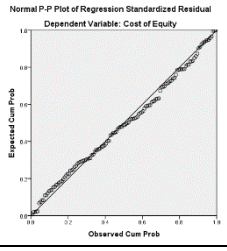
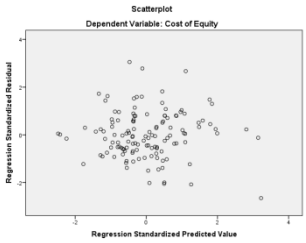
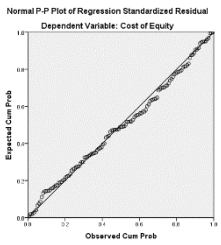
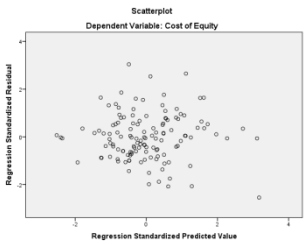
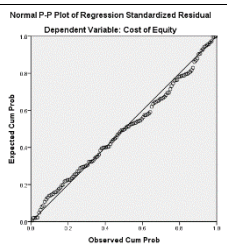
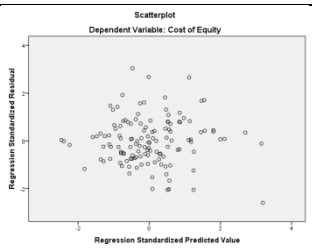
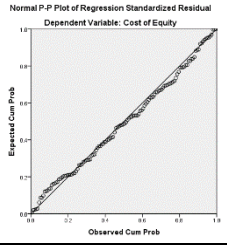
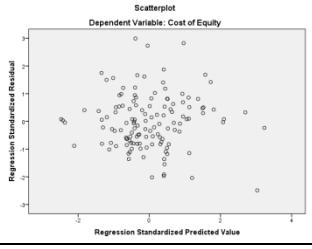
Note: Developed for this study.

Appendix H: Assumption of Multiple Regression: Normal Distribution, Linearity & Homoscedasticity for Hypotheses 3 and 4

Hypothesis	Dependent Variable	Independent/ Control Variable	Normal plot of Regression Standardised Residuals	Scatter Plot
3	**Cost of Debt**	- Intellectual Capital Disclosure - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity
4a		- Internal Capital Disclosure - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity
4b		- External Capital Disclosure - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity
4c		- Human Capital Disclosure - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity

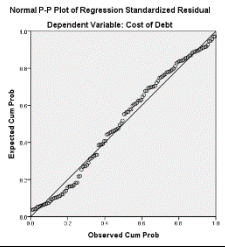
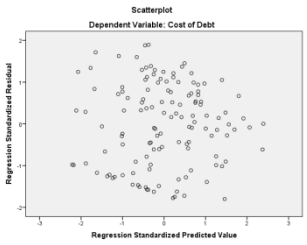
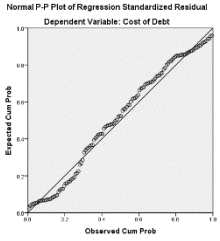
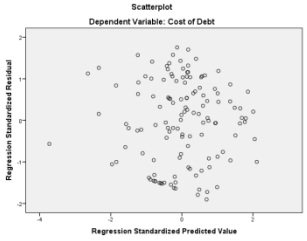
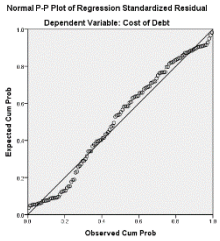
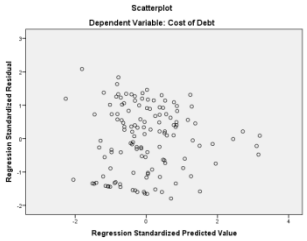
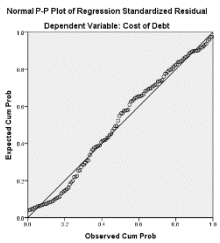
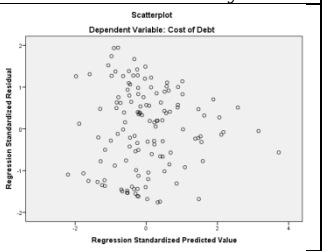
Note: Developed for this study.

Appendix I: Assumption of Multiple Regression: Normal Distribution, Linearity & Homoscedasticity for Hypotheses 5 and 6

Hypo -thesis	Dependent Variable	Independent/ Control/ Moderating Variable	Normal plot of Regression Standardised Residuals	Scatter Plot
5	**Cost of Equity**	- Intellectual Capital Disclosure (ICD) - Technology Intensity (T) - T x ICD - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity
6a		- Internal Capital Disclosure (IC) - Technology Intensity (T) - T x IC - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity
6b		- External Capital Disclosure (EC) - Technology Intensity (T) - T x EC - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity
6c		- Human Capital Disclosure (HC) - Technology Intensity (T) - T x HC - Firm Size - Leverage - Earnings Variability - Systematic Risk		
			Approximately Normal Distribution	Linearity & Homoscedascity

Note: Developed for this study.

Appendix J: Assumption of Multiple Regression: Normal Distribution, Linearity & Homoscedasticity for Hypotheses 7 and 8

Hypothesis	Dependent Variable	Independent/ Control/ Moderating Variable	Normal plot of Regression Standardized Residuals	Scatter Plot
7	**Cost of Debt**	- Intellectual Capital Disclosure (ICD) - Technology Intensity (T) - T x ICD - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity
8a		- Internal Capital Disclosure (IC) - Technology Intensity (T) - T x IC - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity
8b		- External Capital Disclosure (EC) - Technology Intensity (T) - T x EC - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity
8c		- Human Capital Disclosure (HC) - Technology Intensity (T) - T x HC - Firm Size - Leverage - Earnings Variability		
			Approximately Normal Distribution	Linearity & Homoscedascity

Note: Developed for this study.

Appendix K: Checking Multicollinearity

Hypo-thesis	Dependent Variable	Independent Variable	Hypothesis 1		Hypothesis 2a		Hypothesis 2b		Hypothesis 2c	
			Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
2a	Cost of Equity	(Constant)								
		Intellectual Capital Disclosure	.990	1.010	-	-	-	-	-	-
		Internal Capital Disclosure	-	-	.964	1.037	-	-	-	-
		External Capital Disclosure	-	-	-	-	.974	1.026	-	-
		Human Capital Disclosure	-	-	-	-	-	-	.982	1.018
		Firm Size	.806	1.240	.802	1.246	.799	1.251	.798	1.253
		Leverage	.832	1.201	.825	1.212	.835	1.197	.834	1.199
		Earnings Variability	.935	1.070	.914	1.094	.933	1.071	.939	1.065
		Systematic Risk	.928	1.077	.927	1.079	.928	1.078	.928	1.078

Note: 1. Developed for this study.

2. Only tolerance values and VIF scores from the regression model testing H1, H2a, H2b and H2c using the first ICD measure are shown here. Other regression models run in this study show similar tolerance values and VIF scores.

3.*** = Significance at the 1% level

** = Significance at the 5% level

* = Significance at the 10% level