Global Journal of Human Social Science
Interdisciplinary
Volume 13 Issue 1 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-460X & Print ISSN: 0975-587X

# Influence of Fundamental Variables on Corporate Disclosure Via Modified Entropy

By Fouzi Ali Mukhtar & Ravindran Ramasamy
*Sabha University Tun Abdul Razak*

*Abstract -* The use of disclosure index to quantify disclosure level had been widely used in previous studies related to disclosure determinates and disclosure effects. Disclosure indexes rely on totalling items disclosed in an information channel may offer a greater picture about the quantity of information disclosed but little on the quality level, especially when considering that items disclosed may not be consistent from one year to another.The aim of this paper is to introduce an alternative approach to quantify disclosure level through probabilistic measure derived from entropy, named Modified entropy score (MES). A measure which combines both items disclosed and their probability to capture the quality of information disclosed. The introduced measure was compared with previous measure, conventional disclosure score (CDS). The results showed great consistency between the two measures. Disclosure level as measured by both CDS and MES was influenced positively by several firms' fundamental variables including size, age, liquidity and profitability while ownership dispersion showed insignificant effect on disclosure level.

*Keywords : disclosure, annual reports, quantity and quality of disclosure, entropy in disclosure measurement.*

*GJHSS-H Classification : FOR Code: 150303*


*Strictly as per the compliance and regulations of :*

# Influence of Fundamental Variables on Corporate Disclosure Via Modified Entropy

Fouzi Ali Mukhtar [α] & Ravindran Ramasamy [σ]

*Abstract* - The use of disclosure index to quantify disclosure level had been widely used in previous studies related to disclosure determinates and disclosure effects. Disclosure indexes rely on totalling items disclosed in an information channel may offer a greater picture about the quantity of information disclosed but little on the quality level, especially when considering that items disclosed may not be consistent from one year to another.The aim of this paper is to introduce an alternative approach to quantify disclosure level through probabilistic measure derived from entropy, named Modified entropy score (MES). A measure which combines both items disclosed and their probability to capture the quality of information disclosed. The introduced measure was compared with previous measure, conventional disclosure score (CDS). The results showed great consistency between the two measures. Disclosure level as measured by both CDS and MES was influenced positively by several firms' fundamental variables including size, age, liquidity and profitability while ownership dispersion showed insignificant effect on disclosure level.

*Keywords : disclosure, annual reports, quantity and quality of disclosure, entropy in disclosure measurement.*

## I. Introduction

In recent years there have been a number of studies focusing on corporate disclosure (CD). Studies linked disclosure level (DL) to earning qualities and some to organisational characteristics while some went further to assess the effect of CD on cost of equity capital; see(Alsaeed, 2005; Haniffa & Cooke, 2002). Some studies have investigates the DL of private companies and others looked at public sector and non-profit organisations. Different studies had used different communication channels to assess the level of disclosure; studies which looked at information disclosed in annual reports are widely present in previous studies, see (Botosan, 1997; Esa & Mohd Ghazali, 2012; Lopes & de Alencar, 2010; Pratten & Mashat, 2009); while others looked at information available in newspapers, interim reports and firms' websites see: (LaCross & Bernardi, 2006; Suttipun & Stanton, 2012; Trabelsi, Labelle, & Dumontier, 2008).

The majority of information sources are analog by nature. Analog sources include speech, image and telemetry sources. i.e to understand the effect of disclosure on an economic entity or on any economic phenomenon, one would need to measure and quantify the amount of information which is rather hard to measure and cannot be observed directly. The literature on disclosure offers a variety of potential methods to measure DL. Number of words, number of pages and sentences had been used in earlier studies. Recent studies have seen the focus shifted to the use disclosure indexes. However, these measures do have some limitations that will be addressed later in this study. The use of computerized methods to quantify DL such as Grüning (2010) study is also present in the literature; however, these kinds of measurements are rare in the literature due to the sophisticated techniques they employ.

This paper addresses the use of disclosure index as a measure of CD and highlights the drawback of using this method from one angle; the disclosure indexes might be good measure to assess the quantity of DL, however, disclosure indexes may not tell the whole picture behind firm's disclosure. As firms could be disclosing different information from one year to another which cannot be easily captured by totaling several items disclosed in a communication channel. According to Grüning (2010) that there is no generally accepted and broadly applicable measurement technique exists which would allow researchers to evaluate the extent of a company's disclosure.

## II. Significance of the Study

Corporate disclosure and transparencyare particularly important for the investment community, professionals, corporations, standard setters, regulatory bodies and to the economy in general. Economic theory suggests that investors are willing to achieve economic benefits with the possession of superior information. When managers withhold information, investors begin to suspect the performance of the company and may discount its share price (Verrecchia, 1983). Higher level of disclosure reduces information asymmetry and results in lowering the risk level, and as a consequence lowering the cost of equity (Diamond & Varrecchia, 1991). Therefore, higher level of disclosure should be desired by firms rather than being enforced through regulations in the form of mandatory disclosure. According to Leuz and Wysocki (2006), capital markets

*Author α : Department of Accounting, Faculty of Economic and Accounting, Sabha University. PhD student at University Tun Abdul Razak. E-mail : fammukhtar@yahoo.co.uk*

*Author σ : Graduate school of business University Tun Abdul Razak. E-mails : fammukhtar@yahoo.co.uk, ravindran@unirazak.edu.my*

should reward disclosures that are credible and not self-serving. Two phenomena lead to this conclusion: disclosure has a substantial effect on managers' decisions and corporate activities; and a substantial and permanent gap generally exists between company insiders and outsiders (Lev, 1992).

Despite the need for disclosure related studies to investigate different economic phenomenon, there is no single recommended method of which to measure Clearly researches in this field had used institutional disclosure ranking measures such as the one provided by Association for Investment Management and Research (AIMR). However, this ranking is no longer available as AIMR discontinued its operations in 1997, and other countries have never had similar rankings available (Beattie, McInnes, & Fernley, 2004). Later studies had used self-constructed disclosure index. The self-constructed index is being criticized for two reasons: first, they are quantitative in nature and in some cases subjective to the researcher background and to the scoring sheet. As the main idea of which the disclosure indices is being derived from a comparison of the researcher chick list and the existence of a particular item, the researcher then allocate different scores for items based on their existence in the information channel he/she is analysing. Secondly, researchers who used self-constructed disclosure index assume quantity as a proxy for quality (Leuz & Wysocki, 2006).

This paper address some of the limitations of using disclosure indexes which are based on totalling items disclosed as a valid method and introduces an alternative method which relies on both items disclosed and their probabilities.

## III. Literature Review

Several studies focusing on different aspects of CD had been conducted in the past. Some studies focused on the relationship between CD and cost of equity; see (Botosan, 1997; Botosan & Plumlee, 2002; Embong, Mohd-Saleh, & Hassan, 2012; Espinosa & Trombetta, 2007; Kristandl & Bontis, 2007; Lopes & de Alencar, 2010; Welker, 1995). Other studies had focused on specific aspect of information; i.e. Corporate social responsibility (CSR), Corporate environmental disclosure (CED) and so on; see(Amran & Devi, 2007; Esa & Mohd Ghazali, 2012; Mitchell, 1999; Said, Zainuddin, & Haron, 2009; Yip, Chris, & Cahan, 2011). However, different studies had used different methods to measure corporate disclosure level. Some researchers had used number of pages; see (Guthrie & Parker, 1990; Meek, Roberts, & Gray, 1995; Pratten & Mashat, 2009), others have used number of sentences and number of words; see (Hackston & Milne, 1996) and (Zeghal & Ahmed, 1990). These measures which focus entirely on number of (pages, sentences, and words) had not reached the popularity of using disclosure index because of their limitations. First,(Al-Tuwaijri, Christensen, & Hughes, 2004) has concluded that the page may possibly include a picturethat does not have information which is related to the CSR activities (or to the specific disclosure category), on the other hand, sentences and words may possibly ignore a graph or necessary table. Secondly, it is hard to assume that either number of page, sentences and words as a proxy for quantity or quality disclosure. In other words, a person speaking for one hour does not mean giving more information than a person speaking for half an hour. Add to this, these methods can be subjective to font, line spacing and page size too.

Other studies used disclosure scoring measurement by forming disclosure indexes to assess the level of corporate disclosure. This method had been used quite extensively in the past by a number of studies including; (Botosan, 1997; Botosan & Plumlee, 2002; Esa & Mohd Ghazali, 2012; Hail, 2002) and many others. While some studies focused on the quantity of voluntary disclosure, others used compulsory and voluntary disclosure indexes focusing on the quality of compulsory disclosure (Espinosa & Trombetta, 2007). According to Leuz and Wysocki (2006) "The limitations of these types of measures are that the selection and coding of the relevant disclosures are subjective, that they generally capture the existence of particular disclosures rather than the quality of those disclosures". Khlifi & Bouri (2010) stated that the methodological approach in the research related to voluntary disclosure suffers from several limitations as suggested by (Chavent, Ding, Fu, Stolowy, & Wang, 2006). One of which is that, "the disclosure index is often determined by totaling several items. These items can be weighted or unweighted but there is no dominant practice".

This paper examines the validity of the use of disclosure indexes to quantify the level of corporate disclosure; i.e. 'Conventional Disclosure Score' (CDS) as a measure of corporate disclosure level and it introduces an alternative measure of disclosure level driven from mathematical probability allocation introduces by (Shannon, 1948)which is called Entropy. For simplicity, it is referred to as Entropy Disclosure Score (EDS).

While assessing disclosure level, several studies relied on totalling the number of items exists in the communication channel under analysis. However, this method may not be able to capture the fluctuation in items disclosed from one year to another due to replacement bias. This issue is will be discussed further by introducing the following illustrative example:

## IV. Illustrative Example for Replacement Bias

In this example, the attempt is made to measure disclosure level for a particular firm in three different years using a disclosure index consist of ten items as can be seen in table 1:

*Table 1 :* Disclosure fluctuation example

| | I_1 | I_2 | I_3 | I_4 | I_5 | I_6 | I_7 | I_8 | I_9 | I_10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| Year 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 5 |
| Year 3 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |

As can be seen from the example demonstrated in the above table that the five items disclosed in the first year are matching exactly the items disclosed in the third year. Hence, the total disclosure level was five points for both years. However, the items disclosed in the second year are unmatched with the five items disclosed in year one or three, yet the total disclosure level as measured by CDS, wish relies on totalling items, is showing no change in disclosure level. The argument here is that this is one of the limitations of using CDS as a disclosure measure where information disclosed may not be constant over time. Thus, relying on totalling items disclosed in an information channel alone may not offer a greater picture about the quality of disclosure.

## V. Methodology

*a) Disclosure measurement*

Conventional disclosure score (CDS) is based on constructing a score sheet measuring whether an item exists or not in a given source of information, (annual report) in this contest, can be expressed as follows:

$$DS = \begin{cases} 1 & if\ an\ item\ exists \\ 0 & otherwise \end{cases} \quad (1)$$

The sum of all points earned by a given firm represents the disclosure level of an entity, which can be expressed mathematically as:

$$CDS_j = \sum_{i=1}^{nj} di \quad (2)$$

Where:

$CDS_j$ is the disclosure score for company j.

$d_i$ is the information disclosed by company j.

$n_j$ is the maximum number of items expected to be disclosed by company j.

Entropy based disclosure score is derived from communication science where information can be modelled as a function of probability as introduced by (Shannon, 1948).Thus; the amount of information received from a given source can be expressed mathematically as:

$$\text{ES} = \text{H (X)} = p_i log_2 \left(\frac{1}{p_i}\right) + \ldots\ldots + p_m log_2 \left(\frac{1}{p_m}\right) \quad (3)$$

Where: ES is Entropy Score

H (X) is the Entropy

$M$ is the number of symbol that an information source contains

$p_i$ is the probability of a symbol to occur within a given source of information

The base of the logarithm is chosen to be two so the output can be expressed in bits.

Plot of the entropy function is shown in Figure 1. The diagram illustrates that the more the probabilities tend to move towards equality the higher the score of entropy would be, and vice versa. This means that information which is more likely to occur in annual reports yield more knowledge than information that is less likely to occur in the annual report. In accounting and finance terms, information can be more useful if they occur more frequently; i.e. if information appears more frequently they form a base of comparison and become more fruitful for decision making. This information which can be compared with ex-post information and/or across industry-wise are more useful than information with has no base for comparison.

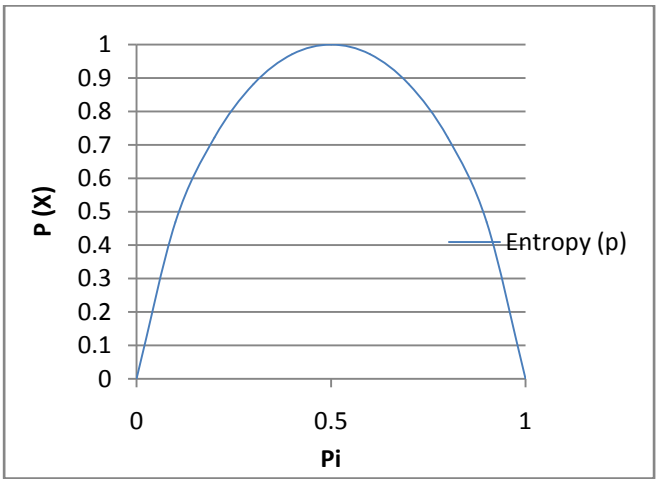


*Figure 1 :* Plot of the entropy function with exactly two possible outcomes Source: (Spiel, 2008)

In equation (3) probability is being dealt with instead of item appearance itself. Therefore, probability has to be defined. The chosen method for probability assignment is empirical probability. Empirical probability is defined as (x/T), where x is the number of ways in which an event occurs and T is total number of possible outcomes (Levine, Stephan, Krehbiel, & Berenson, 2011). In the case of our contest, this can be expressed mathematically as:

$$p_{ij} = \frac{\sum_{y1}^{yn} ij}{\sum_{y1}^{yn} i} \quad (4)$$

Where:

$p_{ij}$ is the probability of item ($j$)

$\sum_{y1}^{yn} ij$ is the total number of occurrence for item ($j$)

$\sum_{y1}^{yn} i$ is the sum of all items occurrence for a company

From a theoretical point of view, the following conclusion can be made. That, for any number of outcomes, a firm can get the highest entropy score as long as it is consistently reporting same items a year after another; this would give the information user more knowledge and a base of comparison. However, using probabilities on their own as in equation (3) to derive the level of disclosure level may not be practical. Thus, a modified entropy based score can be obtained by giving relevance to items existence as well as its probability. Hence, the level of disclosure as measured by the Modified Entropy Score (MES) can be expressed follows:

$$\boldsymbol{MES = p_i log_{max score}\left(\frac{(1*e_i)}{p_i}\right) + \ldots\ldots\ldots + p_m log_{max_{score}}\left(\frac{(1*e_m)}{p_m}\right)} \quad (5)$$

Where:

$e_i$ and $e_m$ are the values of item $i$&$m$ respectively (this takes the value of 1 or 0).

max score is the total number of score awarded for a given sampled firm.

Note: The base of the logarithm can be chosen to the maximum points awarded for any given firm from the sample; in this case, the MES can be measured on a scale from zero to one.

Going back to the example illustrated earlier, the following table shows a comparison between the two disclosure measures CDS and MES.

*Table 2 :* Comparison of disclosure scores between CDS and MES

| | I_1 | I_2 | I_3 | I_4 | I_5 | I_6 | I_7 | I_8 | I_9 | I_10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CDS Year 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| CDS Year 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 5 |
| CDS Year 3 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| Pi | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0 | 0 | 0 | 0 | 0 | 1 |
| Pi | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1 |
| Pi | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 1 |
| MES Year 1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0 | 0 | 0 | 0 | 0 | 1 |
| MES Year 2 | 0 | 0 | 0 | 0 | 0 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.72 |
| MES Year 3 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0 | 0 | 0 | 0 | 0 | 0.83 |

CDS is Conventional disclosure score; Pi is the empirical probability of items appearance; MES is Modified entropy score; 'I' denotes to item.

The table shows that CDS remains constant from year one to year three; five points in each year, the MES shows the fluctuations in the disclosure pattern from year one to year three. The MES level shows a decrease in value when items disclosed has no base of comparison with ex-post information, in the third year, however, the value has increased in value form the second year showing that the level of information increased as a result of the consistency in information disclosed in both years one and three. Laidroo (2009) stated that the less frequent information appears the more information they carry. Despite the suggestion of cognitive psychology theory, that people tend to put greater emphasis on, and pay more attention to rare events. In accounting and finance terms rare information may not be as useful as frequent information which can be compared with ex-post information and would be more powerful in decision making. The Accounting Standard Board (ASB) in a Statement of Principles

Issued in (1999) stated that the accounting information needs to be relevant, reliable, comparable, and understandable. Thus, when dealing with ex-post information, frequent information should carry more weight than rare information due to their comparability with other historical data which can help to understand the trends of movement.

## VI. Disclosure Index and Scores Allocation

The disclosure index which was used in this study consists of 109 items. These items are grouped under twelve categories. These categories are (i) Background information (ii) Five years summary of financial results (iii) Non-financial statistics (iv) Projected information (v) Management discussion and analysis (vi) Corporate social responsibility (vii) Environmental protection information (viii) Research and development policies(ix) Human resource information (x) Corporate governance information (xi) Ethical practice, and (xii) Additional information.

The score allocated for each item was derived from information available in annual reports. The disclosure index (checklist) was used to determine which items to be recorded, any item disclosed in the annual report was awarded one point if they matched the items on the disclosure index and zero otherwise.

## VII. Hypotheses Development

Since the study is focusing entirely on the use of entropy based measure to quantify DL in annual reports, the study will use two measures namely CDS and MES to assess the superiority of MES. Therefore, the focus will be on the relationship between DL and several firms' fundamental variables which are discussed below.

## VIII. Size

The majority of previous studies had confirmed that size is a major determinant of DL (Botosan, 1997; Cooke, 1991). According to Firth (1984)firms which are more visible in the public eyes are more likely to voluntarily disclose information to enhance their corporate image. Fixed disclosure costs induce economics of scale and can make certain disclosures less desirable for smaller firms; moreover, small firms may not have the necessary resources for collecting and presenting an extensive range of information in their annual reports (Buzby, 1995). Based on that, it is proposed that there is a positive relationship between size and disclosure level.

H1. There is a positive relationship between firms' size and DL.

## IX. Longevity

Large firms face higher demand for information from public that causes an increased pressure to enhance information quality (Alsaeed, 2005). According to Camfferman and Cooke (2002) that the rational for identifying firm age as a variable lies in the possibility that older firms might have improved their financial reporting practices over time. The second hypothesis is as follows:

H2. There is a positive relationship between longevity and DL.

## X. Ownership Dispersion

In constant with the agency cost theory, the conflict of interest between shareholders and mangers increases as the number of shareholders increase, therefore, to reduce this conflict companies have to provide more information to the owners.Previous studies showed mixed results on the relationship between ownership dispersion (OD) and DL; whileGelb (2000); McKinnon and Dalimunthe (1993)stated that OD has a positive effect over the DL. On the other hand, Alsaeed (2005);Naser, Al-Khatib, and Karbhari (2002);Wallace, Naser, and Mora (1994) found no support for such an association between OD and DL in their studies on Saudi, Jordanian and Spanish listed firms respectively. Despite these findings that, firms with large proportion of shares owned by the Saudi Government intend to disclose more information. Alsaeed claimed that the high level disclosure among those companies is associated with the size of firms rather than ownership structure. However, Smith, Adhikari, and Tondkar (2005) pointed out that, because of the broader mandate of governments, state-controlled firms have more pressure to perform and report on social responsibility activities that benefit the community and society at large. Based on these arguments, the proposed hypothesis is as follows:

H3. There is a positive relationship between ownership dispersion and DL.

## XI. Profitability

Singhvi & Desai (1971)stated that higher profitability might encourage managers to provide more information to illustrate their ability to maximize shareholders' wealth and elevate their performance compensation. On the same level managers of a profitable organization may feel proud of their achievement and wish to disclose more information to promote positive impression of their performance. On the other hand, managers of less profitable firms may provide less information to secure their threatened positions (Alsaeed, 2005). However, mixed results are

given by empirical evidence on the association between profitability and disclosure. Lang and Lundholm (1993) stated that disclosure is influenced by company's relative performance; while Camfferman and Cooke (2002) found significantly negative relationship between the British firms' profit margin and the level of disclosure, and no significant relationship between return on equity and disclosure level was found. From this discussion the following two hypotheses were formulated:

H4. There is a positive relationship between profit margin and DL.

H5.There is a positive relationship between return on equity and DL.

## XII. Debt Level

According to Myers (1977) the long-term creditors require adequate and timely information to reduce their suspicion that shareholders and management are more likely to encroach on the claims that accrue to them through bond covenants.In explaining the agency theory, Jensen and Meckling (1976) argued that, firms with high level of debt in their capital structure are exposed to a higher agency cost or higher monitoring cost. Higher agency cost result in an increase in information disclosure as managers tend to provide more information via various means to reduce these monitoring cost. As a result, it should be acceptable to suggest a positive relationship between debt level and corporate disclosure. Thus, the following hypothesis is stated:

H6. There is a positive relationship between debt level and disclosure level.

## XIII. Liquidity

Liquidity is defined as the ability for a firm to fulfil its short-term liabilities and is perceived by investors as a financial strength measure, higher liquidity ratio is viewed as a financially strong firm. Cooke (1989b), reveals that firms with higher liquidity are more expected to disclose more information than those suffering low liquidity. On the other hand, Wallace et al. (1994) stated that, if liquidity is perceived in the market as a measure of performance, a firm with low liquidity ratio may need to give more details to explain its weak performance than a firm with a high liquidity ratio. From this the following hypothesis is formulated:

H7. There is a positive relationship between liquidity level and disclosure level.

To determine factors influencing disclosure level a multiple regression model consisting of five variables was conducted. The regression models for the two disclosure level CDS and MES are as follows:

$$CDS_L = \beta_0 + \beta_1 S + \beta_2 LON + \beta_3 OD + \beta_4 PF + \beta_5 LIQ + \varepsilon_i \quad (6)$$

$$MES_L = \beta_0 + \beta_1 S + \beta_2 LON + \beta_3 OD + \beta_4 PF + \beta_5 LIQ + \varepsilon_i \quad (7)$$

Table 3 shows the dependent and independent variables included in the statistical tests. Both variables Profit margin and Return on equity were combined in a single factor component using factor analysis to obtain a single factor that could be used as an indicator for profitability.

*Table 3 :* Operational definitions of variables

| Variable | Operational Definition |
|---|---|
| Dependent Variables | |
| $CDS_L$ | Total items disclosed in annual reports |
| $MES_L$ | Items disclosed converted to modified entropy score using equation (5) |
| Independent Variables | |
| Firm Size (S) | The natural logarithm of total assets |
| Longevity (LON) | Number of years since incorporation |
| Ownership dispersion (OD) | Number of shareholders to the number of share issued |
| Profit margin (PM) | Operating profit to net sales |
| Return on equity (ROE) | Net income to the last year book value of equity |
| Liquidity (LIQ) | Current assets to current liabilities |
| Debt level (DEL) | Total debt to total assets |

## XIV. Data Collections and Analysis

Disclosure level was assessed through annual reports of a 101 firms listed on Bursa Malaysia (BM). Five years annual reports covering a period of five years from 2005 to 2009 were downloaded from BM website. The annual reports were checked for the existence of several items included in the disclosure index. The companies included in the sample were chosen from five industries: Industrial products (30), Trading & Service (31), Properties and hotels (15), Consumer products (20), and Construction sector (5). Data of all dependent variables were obtained through companies' annual reports.

## XV. Descriptive Statistics

*Table 4 :* Categorical disclosure means for the five years period

| Categories | Years<br>Disclosure Categories | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|
| C1 | Background Information (BI) | 7.21 | 7.53 | 7.6 | 7.58 | 7.43 |
| C2 | Three to five years Financial Summary (FS) | 2.72 | 2.82 | 2.83 | 2.96 | 2.94 |
| C3 | Key Non-financial statistics (NFS) | 2.72 | 2.29 | 1.96 | 1.91 | 1.97 |
| C4 | Projected Information (PI) | 0.06 | 0.07 | 0.06 | 0.09 | 0.02 |
| C5 | Management Discussion & Analysis (MD&A) | 3.3 | 3.29 | 2.92 | 3.25 | 3.19 |
| C6 | Corporate Social Responsibility (CSR) | 0.58 | 0.98 | 2.17 | 2.81 | 2.98 |
| C7 | Environmental Protection Information (EPI) | 0.26 | 0.47 | 1.11 | 1.61 | 1.67 |
| C8 | Research & Development Policies (R&DP) | 0.15 | 0.16 | 0.17 | 0.19 | 0.19 |
| C9 | Human Resource Information (HRI) | 1.3 | 1.23 | 1.06 | 0.93 | 0.81 |
| C10 | Corporate Governance Information (CGI) | 5.93 | 6.12 | 6.28 | 6.45 | 6.5 |
| C11 | Ethical Practices (EP) | 0.31 | 0.39 | 0.45 | 0.41 | 0.41 |
| C12 | Additional Disclosure (AD) | 3.96 | 4.14 | 4.5 | 4.45 | 4.45 |

The table above shows that disclosure level across the five year period is not constant. DL has increased slightly on some categories such as (BI, FS, R&DP, CGI, EP, and AD); moreover, DL has increased significantly from year 2005 to year 2009 on two categories (CSR, and EPI). On the other hand, information related to (NFS, PI, MD&A, and HRI) has decreased from year 2005 to year 2009. The following table shows the yearly change in DL.

*Table 5 :* Change in categorical disclosure level

| Disclosure Categories | 2005-2006 (%) | 2006-2007 (%) | 2007-2008 (%) | 2008-2009 (%) | 2005-2009 (%) |
|---|---|---|---|---|---|
| Background Information | 4.64 | 1.04 | -0.26 | -2.07 | 3.27 |
| Three to five years Financial Summary | 3.64 | 0.35 | 4.55 | -0.67 | 8.00 |
| Key Non-financial statistics | -16.30 | -14.29 | -2.53 | 3.11 | -27.90 |
| Projected Information | 16.67 | -14.29 | 50.00 | -77.78 | -66.67 |
| Management Discussion & Analysis | -0.59 | -11.04 | 11.41 | -2.11 | -3.56 |
| Corporate Social Responsibility | 67.80 | 125.25 | 30.04 | 6.21 | 422.03 |
| Environmental Protection Information | 77.78 | 135.42 | 44.25 | 3.68 | 525.93 |
| Research & Development Policies | 6.67 | 6.25 | 11.76 | 0.00 | 26.67 |
| Human Resource Information | -6.77 | -13.71 | -12.15 | -12.77 | -38.35 |
| Corporate Governance Information | 3.31 | 2.56 | 2.50 | 1.07 | 9.75 |
| Ethical Practices | 29.03 | 15.00 | -8.70 | 0.00 | 35.48 |
| Additional Disclosure | 4.73 | 8.55 | -1.09 | -0.22 | 12.19 |
| Average | 15.88 | 20.09 | 10.82 | -6.80 | 75.57 |

The above table shows that DL on two categories CSR, and EPI has increased very sharply from 2006 to 2007 by about 125 and 135 percent respectively. A paired sample t-test was conducted to see the differences in the mean scores of disclosure in 2006 and 2007. The results showed an increase in CSR and EPI was statistically significant at $p<0.01$. The mean differences were -1.188, and -0.644; std. deviation (SD) at2.618, and 2.221 and significant level of 0.000, and 0.004 for the two disclosure categories respectively. The total mean deference of the two categories combined is (-1.832). However, a paired sample t-test was performed to assess the difference in total disclosure mean of (CDS) for the same period showed that the mean difference is (-1.634); SD 3.812; and significant at $p=.000$. This shows exactly that while disclosure level has increased on two categories (CSR and EPI) disclosure on other categories decreased offsetting the mean difference to a lower level at (-1.634).

*Table 6 :* Descriptive statistics of yearly disclosure scores

| Year | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CDS | MES | CDS | MES | CDS | MES | CDS | MES | CDS | MES |
| Mean | 28.50 | 0.831 | 29.48 | 0.857 | 31.11 | 0.879 | 32.63 | 0.89 | 32.55 | 0.90 |
| Std. Deviation | 7.55 | 0.06 | 8.31 | 0.06 | 8.38 | 0.06 | 8.16 | 0.06 | 8.08 | 0.06 |
| Cv | 0.26 | 0.08 | 0.28 | 0.07 | 0.27 | 0.07 | 0.25 | 0.07 | 0.25 | 0.07 |
| Skewness | 0.72 | 0.15 | 0.89 | 0.18 | 0.43 | -0.05 | 0.38 | -0.31 | 0.60 | -0.34 |
| Kurtosis | 0.27 | -0.63 | 0.43 | -0.41 | -0.22 | -0.33 | -0.52 | 0.08 | -0.06 | 0.18 |
| Minimum | 17 | 0.71 | 15 | 0.72 | 16 | 0.73 | 16 | 0.72 | 18 | 0.74 |
| Maximum | 52 | 0.99 | 54 | 1.01 | 53 | 1.01 | 54 | 1.02 | 54 | 1.03 |

The result shows that CDS has a higher coefficient of variance ranging between 0.25 in year 2008 and 2009 to a 0.28 in 2006. The result of CDS also shows an increase in disclosure mean from 2005 up to 2008. Similarly, the means of MES has increased from 0.83 in 2005 to 0.90 in year 2009. The skewness and kurtosis levels are within acceptable level.

*Table 7 :* Descriptive statistics of overall disclosure level

| Disclosure Measure | Mean | SD | $C_v$ | Skewness | Kurtosis | Min | Max |
|---|---|---|---|---|---|---|---|
| Total disclosure level (CDS) | 30.788 | 8.226 | 0.267 | 0.588 | -0.136 | 15 | 54 |
| Total disclosure level (MES) | 0.872 | 0.068 | 0.078 | -0.140 | -0.470 | 0.710 | 1.028 |

The above table shows descriptive statistics of the two disclosure measures for the five years period combined. It shows that CDS having higher SD of 8.23, while MES has a lower SD of 0.07. The coefficients of variance show that CDS has the higher coefficient of 0.27, while MES have a low variance coefficient of less than 0.1.

The skewness level for the two measures is less than absolute 1 which implies that there is no skewness issue with the data distribution. The data also reveals that, non-entropy based measure; i.e. CDS shows a positive skewness level. While entropy based measure shows a slightly negative skewness.

*Table 9 :* Descriptive statistics of independent variables

| | Mean | SD | Cv | Skewness | Kurtosis | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| LN Size | 5.516 | .520 | .094 | .499 | -.038 | 4.36 | 7.10 |
| Longevity | 26.780 | 16.629 | .621 | 1.121 | 1.388 | 5 | 86 |
| Ownership dispersion | -3.679 | .743 | -.202 | -.235 | -.325 | -5.830 | -1.643 |
| Profit margin | .077 | .131 | 1.701 | -.388 | .958 | -.234 | .409 |
| Return on equity | .077 | .160 | 2.078 | .067 | .622 | -.299 | .450 |
| Debt level | .434 | .179 | .412 | .198 | -.537 | .023 | .967 |
| Liquidity | .379 | .149 | .393 | .586 | .597 | .020 | .882 |

The independent variables were computed from secondary data; thus, to mitigate the influence of extreme values data were transformed using natural logarithm for S and OD. PM and ROE were winsorised at the top and bottom levels using Hoaglin and Iglewicz (1987) outliers labeling rule. Finally, liquidity values were transformed using inverse method. The statistics show that firms' average age was about 27 years with a high SD of about 17. Profitability variables PM and ROE have the highest variance coefficients.

## XVI. Analysis of Disclosure Determinates

Since different methods are used to measure disclosure level, it is vital to assess the validity of MES against the CDS which is widely used in previous studies. The following table shows the correlation between (CDS and MES) and among other independent variables.

*Table 10 :* Correlation among dependent and independent variables

| | CDS | MES | S | LON | OD | PM | ROE | DEL | LIQ |
|---|---|---|---|---|---|---|---|---|---|
| CDS | 1 | | | | | | | | |
| MES | .895*** | 1 | | | | | | | |
| S | .680*** | .618*** | 1 | | | | | | |
| LON | .412*** | .375*** | .407*** | 1 | | | | | |
| OD | -.168*** | -.157*** | -.310*** | 0.085* | 1 | | | | |
| PM | .270*** | .269*** | .285*** | 0.064 | -.120*** | 1 | | | |
| ROE | .259*** | .245*** | .297*** | 0.023 | -.217*** | .643*** | 1 | | |
| DEL | -0.056 | -0.065 | .120*** | -.108** | 0.076* | -.212*** | -.107** | 1 | |
| LIQ | -.157*** | -.153*** | 0.005 | -.159*** | .122*** | -.211*** | -.203*** | .729*** | 1 |

Note: Liquidity data were transformed using inverse method; therefore, the figures should be regarded in the opposite signs.

*** Correlation is significant at the 0.01 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The above table shows that CDS and MES are significantly and highly correlated at $p < .01$ and a coefficient of about 0.90. This gives some evidence about the validity of MES, as this will be discussed later on. The table also shows that there are positive relationships between both DL CDS and MES and a number of variables including S, LON, PM, ROE, and LIQ. On the other hand there is a negative relationship between DL and OD.

The table also shows a high correlation between PM and ROE at a coefficient of .64; this might cause some concerns in the regression analysis. Thus, a single component factor of both variables was generated through SPSS software to eliminate the issue of multicollinearity in the regression analysis. The generated variable (PF) was significantly and highly correlated with (PM, and ROE) at a coefficient of 0.91.

Size seems to be the highest determinate of DL since it is coefficients with CDS and MES are quite high at 0.68 and 0.62 respectively. On the other hand, the statistics reveals that there is no relationship between debt level and DL. The results of determinates of DL is summarized in Table 9.

*Table 11 :* Influence of independent variables on disclosure level

| | $CDS_L$ | | | | $MES_L$ | | | |
|---|---|---|---|---|---|---|---|---|
| Variables | B | Beta | t | Sig | B | Beta | t | Sig |
| (Constant) | -20.609 | | -6.708 | .000 | .498 | | 18.402 | .000 |
| LN Size | 9.793 | .618 | 15.586 | .000*** | .071 | .553 | 12.890 | .000*** |
| Longevity | .066 | .134 | 3.648 | .000*** | .0005 | .124 | 3.127 | .002*** |
| Ownership dispersion | .441 | .040 | 1.149 | .251 | .003 | .033 | .893 | .372 |
| Liquidity | -7.113 | -.128 | -3.829 | .000*** | -.055 | -.122 | -3.361 | .001*** |
| Profitability Factor | .538 | .065 | 1.890 | .059* | .005 | .078 | 2.090 | .037** |
| $R^2$ | .508 | | | | .424 | | | |
| Adj. $R^2$ | .503 | | | | .418 | | | |
| F-statistic | 102.990 | | | | 73.334 | | | |
| Significant | .000 | | | | .000 | | | |

* Significant at $p<0.1$; ** significant at $p<0.05$; *** significant at $p<.01$.

Table 9 shows that the result of both models reveal consistent results in terms of significant determinates of DL. Size, longevity, and liquidity are found to be significant determinates of DL at $p < 0.01$. Profitability factor is also significant determinate of DL as measured by CDS and MES. However, the statistics shows that profitability factor significant at $p<0.05$ when disclosure measured using MES, than using CDS which shows the significant result at $p<0.1$.

On the other hand, the first model explains almost 51% of the variations in CDS, compared with 42% of the variations in MES are explained by the second model. In addition, both models are well as the F values are significant.

## XVII. Assessment of Validity of MES

The issue of validity within this regard refers to whether the index scores do capture what the researcher is intended to measure or does the index has any meaning in relation to disclosure of information. Previous researches in this field have adopted different kinds of disclosure indexes, and no single index has gained favour with researchers. Instead, researchers developed their own index to suit their research objectives, goals, and the environment. Therefore, there is no universal index that could be used by all researchers in measuring disclosure level. However, If the disclosure index is properly designed to meet a particular purpose and the unit of analyses (items or companies) is properly managed in terms of size and coverage, and further complemented with qualitative analyses, many of the issues discussed above will not arise(Abdurrahman, 1998). Patton (2002) has details three sub-categories of measurement validity. (i) content validity, (ii) criterion validity, and (iii) construct validity. Criterion validity is demonstrated by comparing the selected measure with another valid measure. Criterion validity can be grouped under either (i) Predictive validity: that predicts a recognized association between the identified construct and something else. Typically, one measure occurs at an earlier time and is used to predict a later measure; and (ii) Concurrent validity: which exists when the identified measure positively correlates with a measure that has been previously found to be valid. The two measures could be for the same or different constructs that are related.

From that angle; we examine the validity of MES through its association with CDS. The result of analysis shows a highly positive correlation between the two measures at a coefficient of 0.895. The MES was regressed against CDS which shows that 80% of the variations in MES which can be due to the variations in CDS. The predictive model was as follows:

$$MES = 0.647 + 0.007*CDS + 0.030$$

The F-statistic was very high at 2028.83 and significant at $p<0.01$. The t-statistic was also high at 45.04, which is significant at 1% level.

Another way of looking at the validity of MES is by assessing its relationship with other predictive variables in comparison with the CDS. The result shows that all significant variables which determined CDS (size, longevity, liquidity, and profitability factors) are also significant determinates of MES. In addition, insignificant determinates of CDS which is OD was also insignificant determinates of MES.

## XVIII. Conclusion

This paper applies CDS and MES to quantify corporate disclosure. Normally financial performance will dominate the disclosure. The MES is superior in quantifying the disclosure as it converts the items into a probabilistic measure which will capture the quality of the data while CDS will quantify the data ignoring quality of disclosures.The disclosure when ranked in the order of mean; the background information, corporate governance information, financial information and management proposals and projects dominate. When changes in disclosure are considered environmental protection and corporate social responsibility are inconsistent more volatile information among the information disclosed. It seems there is no regularity in giving information when it is suitable for the firms they disclose, moreover, the level of disclosure on CSR has increased significantly in 2006 following the introduction of the silver book in September 2006 which promotes firms to engage in more social activities (Esa & Mohd Ghazali, 2012). When the trend of disclosures is considered the mean score is always increasing which gives an indication that Malaysian firms disclose more and more information over the years.

To prove the hypothesis formed a multiple linear regression was run with the CDS and MES as dependent variables and other six independent variables. The models are fitting well. The models give the same results except a few percentage drop in R2in the case of MES. Size, age and liquidity of the firm are significant which indicates that large firms and old firms disclose more information about their business in annual reports and so does firms with higher liquidity. It is natural, as they have more information and resources to do so. Interestingly, the profitability factor comes far behind in disclosure. This may be due to the quality information released to the market because this study only considers annual reports. Ownership dispersion is insignificant which indicates that this variable does not influence the firms in disclosing information. The CDS and MES both quantify the disclosed information alike and there is no much variation.

## References Références Referencias

1. Abdul Rahman, A. B. (1998). Disclosure of corporate financial information in Malaysia. (PhD), University of Newcastle upon Tyne, Newcastle upon Tyne.
2. Al-Tuwaijri, S., Christensen, T. E., & Hughes, K. E. I. (2004). The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach. Accounting, Organizations and Society, 29, 447-471.
3. Alsaeed, K. (2005). The association between firm-specific characteristics and disclosure: The case of Saudi Arabia. The journal of American Academy of business, 7(1), 310-321.

4. Amran, A., & Devi, S. S. (2007). Corporate social reporting in Malaysia: A political theory perspective. Malaysian Accounting Review, 6(1), 19-44.
5. Beattie, V., McInnes, B., & Fearnely, S. (2004). A methodology for analysing and evaluating narratives in annual reports: a comprehensive descriptive profile and metrics for disclosure quality attributes. Accounting Forum, 28(3), 205-206.
6. Botosan, C. A. (1997). Disclosure level and the cost of equity capital. The Accounting Review, 72(3), 323-349.
7. Botosan, C. A., & Plumlee, M. A. (2002). A re-examination of disclosure level and the expexted cost of equity capital. Journal of Accounting Research, 40(1), 795-841.
8. Buzby, S. (1995). Company size, listed versus unlisted stocks, and the extent of financial disclosure Journal of Accounting Research, 13, 16-37.
9. Camffermsan, K., & Cooke, T. (2002). An analysis of disclosure in the annual reports of U.K. and Dutch companies. Journal of International Accounting, 1(28).
10. Chavent, M., Ding, Y., Fu, L., Stolowy, H., & Wang, H. (2006). Disclosure and determinants studies: An extension using the divisive clustering method (DIV). European Accounting Review, 15(2), 181-218.
11. Cooke, T. E. (1989b). Voluntary corporate disclosure by Swedish companies. Journal of International Financial Management and accounting, 1(2), 113-137.
12. Cooke, T. E. (1991). An assessment of voluntary disclosure in the annual reports of Japanese corporations. International Journal of Accounting, 26(1), 16.
13. Diamond, D., & Varrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. Journal of Finance, 46(4), 1325-1359.
14. Embong, Z., Mohd-Saleh, N., & Hassan, M. S. (2012). Firm size, disclosure and cost of equity apital. Asian Review of Accounting, 20(2), 119-139.
15. Esa, E., & Mohd Ghazali, N. A. (2012). Corporate social responsibility and corporate governance in Malaysian government-linked companies. CORPORATE GOVERNANCE, 12(3), 292-305.
16. Espinosa, M., & Trombetta, M. (2007). Disclosure interactions and the cost of equity capital: Evidence from the Spanish continuous market. Journal of Business Finance & Accounting, 34(9-10), 1371-1392.
17. Firth, M. (1984). The Impact of Size, Stock Market Listing, and Auditors on Voluntary Disclosure in Corporate Annual Reports. Applied Economics, 16(2), 269-278.
18. Gelb, D. S. (2000). Managerial ownership and accounting disclosures: An empirical study. Review of Quantitative Finance and Accounting, 15(2), 169-185.
19. Grüning, M. (2010). Artificial intelligence measurement of disclosure (AIMD). Forthcoming in European Accounting Review.
20. Guthrie, J., & Parker, L. (1990). Corporate disclosure practice: A comparative international analysis. Advances in Public Interest Accounting, 3, 159-176.
21. Hackston, D., & Milne, M. J. (1996). Some determinant of social and environmental disclosures in the New Zealand companies. Accounting, Auditing & Accountability Journal, 9(1), 77-108.
22. Hail, L. (2002). The impact of voluntary corporate disclosures on the ex-ante cost of capital for Swiss firms. The European Accounting Review, 11(4), 741-773.
23. Haniffa, R. M., & Cooke, T. (2002). Culture, corporate governance and disclosure in Malaysian corporations. ABACUS, 38(3), 317-349.
24. Hoaglin, D., & Iglewicz, B. (1987). Fine tuning some resistant rules for outliers labeling. Journal of American Statistical Association, 82, 1147-1149.
25. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305-360.
26. Khlifi, F., & Bouri, A. (2010). Corporate disclosure and firm characteristics: A puzzling relationship. Journal of Accounting - Business & Management, 17(1), 62-89.
27. Kristandl, G., & Bontis, N. (2007). The impact of voluntary disclosure on cost of equity capital estimates in a temporal setting. Journal of Intellectual Capital, 8(4), 577-594.
28. LaCross, C. C., & Bernardi, R. A. (2006). Disclosures of Codes of Ethics on Corporate Websites: A Pre- and Post-Sarbanes-Oxley Longitudinal Study. Advances in International Accounting, 19(0), 91-114.
29. Laidroo, L. (2009). Association between ownership structure and public announcements' disclosures. Corporate Governance: An International Review, 17(1), 13-34.
30. Lang, M., & Lundholm, R. (1993). Cross-sectional determinants of analyst ratings of corporate disclosures. Journal of Accounting Research, 31(2), 246-271.
31. Leuz, C., & Wysocki, P. (2006). Capital-market effects of corporate disclosures and disclosure regulation. In C. S. Up (Ed.), Evolving Investor Protection.
32. Lev, B. (1992). Information disclosure strategy. California Management Review, 34, 9-32.
33. Levine, D. M., Stephan, D. F., Krehbiel, T. C., & Berenson, M. L. (2011). Statistics for managers, using microsoft excel. New Jersey: Prentice Hall.

34. Lopes, A. B., & de Alencar, R. C. (2010). Disclosure and cost of equity capital in emerging markets: The Brazilian case. The International Journal of Accounting, 45(4), 443-464.
35. McKinnon, J. L., & Dalimunthe, L. (1993). Voluntary disclosure of segment information by Australian diversified companies. Accounting and Finance, 33(1), 33-50.
36. Meek, G. K., Roberts, C. B., & Gray, S. J. (1995). Factors influencing voluntary annual report disclosure by U.S., U.K. and continental European multinational corporations. Journal of International Business Studies, 26(3), 555-572.
37. Mitchell, W. (1999). Voluntary environmental and social accounting disclosure practices in the Asia-Pacific region: An international test of political ecconomy theory International Journal of Accounting, 34(2), 209-238.
38. Myers, S. C. (1977). Determinants of corporate borrowing. Journal of Financial Economics, 5(2), 147-175.
39. Naser, K., Al-Khatib, K., & Karbhari, Y. (2002). Empirical evidence on the depth of corporate information disclosure in developing countries: The case of Jordan. International Journal of Commerce and Management, 12(3/4), 122-155.
40. Patton, M. Q. (2002). Qualitative research and evaluation methods (3rd ed.). Thousand Oaks, California: Sage Publications, Inc.
41. Pratten, J. D., & Mashat, A. A. (2009). Corporate social disclosure in Libya. SOCIAL RESPONSIBILITY JOURNAL, 5(3), 311-327.
42. Said, R., Zainuddin, Y., & Haron, H. (2009). The relationship between corporate social responsibility disclosure and corporate governance characteristics in Malaysian public listed companies. SOCIAL RESPONSIBILITY JOURNAL, 5(2), 212-226.
43. Shannon, C. E. (1948). A mathematical theory of communication. Mobile Computing and Communications Review, 5(1).
44. Singhvi, S., & Desai, H. B. (1971). An empirical analysis of the quality of corporate financial disclosure. Accounting Review, 46, 621-653.
45. Smith, J. v. d. L., Adhikari, A., & Tondkar, R. H. (2005). Exploring differences in social disclosures internationally: A stakeholder perspective. Journal of Accounting and Public Policy, 24, 123-151.
46. Spiel, C. (2008). Enfuse reference manual. Retrieved 10/June/2012, from http://hugin.sourceforge.net/docs/manual/Enfuse_reference_manual.html
47. Suttipun, M., & Stanton, P. (2012). A study of Environmental Disclosures by Thai listed Companies on Websites. Procedia Economics and Finance, 2(0), 9-15.
48. Trabelsi, S., Labelle, R., & Dumontier, P. (2008). Incremental Voluntary Disclosure on Corporate Websites, Determinants and Consequences. Journal of Contemporary Accounting & Economics, 4(2), 120-155.
49. Verrecchia, R. E. (1983). Discretionary Disclosure. Journal of Accounting and Economics, 5(3), 179-194.
50. Wallace, R. S. O., Naser, K., & Mora, A. (1994). The relationship between the comprehensiveness of corporate annual reports and firm characteristics in Spain. Accounting and Business Research, 25(97), 41-53.
51. Welker, M. (1995). Disclosure policy, information asymmetry and liquidity in equity markets. Contemporary Accounting Research, 11(2), 801-827.
52. Yip, E., Chris, V. S., & Cahan, S. (2011). Corporate social responsibility reporting and earnings management: The role of politcal costs. Australian Accounting Business & Finance Journal, 5 (3), 17-33.
53. Zeghal, D., & Ahmed, S. A. (1990). Comparison of social responsibility information disclosure media used by Canadian firms. Accounting, Auditing & Accountability Journal, 3(1), 38-53.