Is Readability of Textual Corporate Disclosures Measurable?

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Abstract: This paper reviews the accounting literature that studied readability of corporate narrative disclosures as a dependent variable being affected by firm performance, desire to highlight good news or hide bad news, risk exposures, among others, or as an independent variable affecting decision makers such as investors or analysts in their judgements. We limited the studies reviewed in this literature to those which quantitatively measured readability in terms of the Fog Index, Flesch Kincaid, Flesch Reading Ease, or even the file size as an overall measure of the level of readability of the textual disclosure. The purpose of the review is to document the increasing trend in the number of studies depending on these indices over the last two decades, and to show why, although these computational linguistic techniques might be appropriate for the purposes they were developed for, they might suffer several deficiencies when used in the financial disclosure field.

Keywords: Readability, Narrative Disclosures, Fog Index, Flesch Kincaid, Flesch Reading Ease.

1.0 INTRODUCTION

Accounting is an information system, and accountants are the producers of numerous amount of financial and nonfinancial information relating to various economic entities. The main challenging task for the accounting profession is to choose the most efficient and effective ways to aggregate, summarize and communicate this information to various decision makers. Over the last few decades, a huge accounting literature initiated by Ball and Brown (1968) has been conducted to examine the value relevance of various figures presented on the financial statements. More recently accounting literature has been interested in examining the value relevance of the information presented in the notes to these financial statements, and how can accountants improve the readability of the verbal section of the financial reports. The usefulness of the narrative disclosures presented in the annual report depends partly on the level of simplicity/complexity that is used in presenting the information, and partly on the capability of the users to articulate information presented in the verbal portion to the quantitative portion in the financial statements. As a result, an increasing interest has developed over the last few years in finding measures to examine the readability of these disclosures, and hopefully find ways to improve their understandability.

As part of its continuous efforts to improve the understandability of corporate disclosures, The Securities and Exchange Commission (SEC) has passed in 1998 The Plain English Rule (421(d)), which requires the issuers of financial reports to use more concrete language to make these disclosures clearer and more understandable to investors. The SEC published the Plan English Handbook as a guide for all financial reports preparers to adopt in all of their communications with investors. In response to the SEC's call for making investor communications more readable and understandable, accounting researchers used various methodologies to explore how do investors perceive the readability of various disclosures and how their understandability of these disclosures affect them in making various decisions. Large portion of this literature borrowed techniques from computational linguistics to measure readability such as the Fog, the Bog, and the SMOG indicators, among many others. Examples of studies using the Fog Index as a measure of readability include Li (2008); Biddle, Hilary, and Verdi (2009); Miller (2010); Lehavy, Li, and Merkley (2011); Twedt and Rees (2012); Lawrence (2013); Merkley (2014); De Franco, Hope, Vyas and Zhou (2015).

Accounting researchers have provided recently numerous examples of research studies documenting the negative influence of more difficult to read reports on investors/analysts reactions to the information provided in those reports. Examples of such archival studies include Li (2008); You and Zhang (2009); Lawrence (2013); and Loughran and McDonald (2014). On the other hand, Rennekamp (2012); Tan, Wang, and Zhou (2015); and Elliott, Rennekamp, and White (2015) represent examples of

experimental studies that argue that more readable disclosures enhance investors' ability and willingness to extract information when more simple and concrete language is used.

In his literature review, Li (2010) surveyed the existing research at the time, which focused on empirical evaluation of large sample textual disclosures. Specifically, he focused on research related to earnings quality, stock market efficiency, and corporate financial policies using the textual information in corporate disclosures. On the other hand Cole and Jones (2005) reviewed the literature concentrating on analyzing the value relevance of the information presented in the Management Discussion and Analysis. Our review is geared more towards the measures used in the accounting literature to measure readability of the textual corporate disclosures. In our review we survey both archival and experimental research examining the effect of more readable disclosures on various decision makers. We were motivated by the recent wide usage of some readability measures such as the Fog index, the SMOG index, the Flesch Reading Ease, the Flesch-Kincaid, and others in accounting context. Accounting research over the last two decades has significantly relied on these measures to quantify the readability of accounting textbooks in general [Flory, Phillips, and Tassin (1992), Chiang, Englebrecht, Phillips, and Wang (2008), and Pluncinski, Olasavsky, and Hall (2009), Plucinski and Seyedian, 2013], and accounting disclosures in particular (as mentioned before). We perceive huge benefits for depending on such readability measures for the purposes that they were designed for, but we share with others Loughran and McDonald (2014); Bonsall, Leone, Miller, and Rennekamp (2016) concerns about importing these measures to judge the readability of financial reporting disclosures because of the unique nature of these narrative disclosures and the special characteristics expected to be present in the readers for such disclosures.

The main focus of this literature review is to critically survey prior literature that tried to quantitatively measure the readability of financial reporting textual disclosures. In our survey we distinguish between those studies that examined the readability of the whole report versus those that focused on portions of the report. We also summarize the literature based on the readability index used in the analysis to test readability. The purpose of the review is to evaluate these measures and judge the appropriateness of using them in measuring the readability of narrative financial reporting.

The remainder of the paper proceeds as follows. In section two we discuss the literature which investigated the factors affecting firms' management choice between simple more readable textual disclosures versus complex less readable disclosures. In this section we focus on financial performance as the most widely used factor to explain readability. In section three we classify prior literature into two main categories based on the users of these disclosures i.e., investors versus analysts. In section four we summarize both literatures outlined in sections two and three in chronological order to highlight the increasing interest in searching for and using various quantitative measure

for readability. In section five we discuss limitations of using such readability indices in measuring textual corporate disclosures' readability. Finally, section six summarizes our discussion, provides suggestions for future research, and concludes the paper.

2.0 FACTORS AFFECTING THE READABILITY OF FIRMS' NARRATIVE DISCLOSURES

Information should be presented to its users in its simplest format possible to help them in decision making. Such information should have certain characteristics in order to fulfill its role[1]. According to the conceptual framework in financial reporting one of the most important characteristics is understandability of the information. We believe that for information to be effective, it should be of the suitable amount in order to avoid information overload; which can affect the individual investor negatively (Schroeder and Gibson, 1992). In addition, this information, whether presented in an annual report or a quarter one should be readable from its users' point of view.

Prior accounting literature was motivated to study the main factors affecting the readability of firm disclosures. The most widely investigated argument in this literature is that firms use more complex and less readable narratives to hide bad news. Thus the level of readability of the disclosures is function in the financial performance of the firm. This relation which is referred to in the literature as the Obfuscation Hypothesis has been intensively investigated in the literature. Examples of studies testing the obfuscation hypothesis include Courtis (1998); Clatworthy and Jones (2001); Sydserff and Weetman (2002); Rutherford (2003); Linsley and Lawrence (2007); Li (2008); Hrasky et al. (2009); Bayerlein and Davidson (2012); Dempsey, et al. (2012). Other factors affecting readability of the disclosures such as the trend in improved readability of the disclosures over time Courtis (1995), the language in which disclosures are provided Courtis and Hassan (2002), social capital Anand Jha (2013), and reduction in analysts coverage as a result of brokerage houses merger Irani and Oesch (2013), will also be reviewed in this section of our study.

On the other hand, huge accounting literature was motivated to investigate the impact of the readability of such disclosures on the investors' behavior such as Lee, (2010), Miller (2010), Lawrence (2013), and Kravet and Muslu (2013); and on analysts' judgements and forecasts such as Lehavy, et al. (2011). Also the role of readability in detecting the violation of Financial Corrupt Practices Act (FCPA), Lopatta et al. (2014), will be included in our review. These studies using the readability as an independent or a control variable will be discussed in the next section.

[1] Conceptual Framework for Financial Reporting: Chapter 3, Qualitative Characteristics of Useful Financial Information, statement of Financial Accounting Concepts No.8 (Norwalk, Conn.: FASB, 2010).

2.1 Financial performance as the main factor affecting readability of corporate disclosures

In this section we survey the studies that argued that the readability of corporate narrative disclosures is deliberately manipulated by poor performing firms' management to obscure the meaning of these disclosures. Although this argument formalized in the well-known hypothesis "Obfuscation Hypothesis" is very appealing, the evidence documented in prior literature that supports it is limited. More evidence was documented to dispute this hypothesis than to support it as we discuss in more details below.

Tying readability to firm performance, prior research analyzed narrative disclosures in various countries. In Canada, Courtis (1986) tried to investigate whether readability levels may be manipulated to hide higher levels of risk and lower profitability levels, but he found no evidence and pointed that lower readability is due to writing skills, traditions and corporate policy followed by the chairmen and chief accounting officers. In the same regard, Courtis (1998) examined the variability of readability formulas across the chairman's addresses sections in 120 annual reports of public companies in Hong Kong in 1994/1995 using an exploratory study. The author used the Flesch Reading Ease to measure the readability of the three paragraphs selected from each chairman's addresses (a paragraph from the first section, another from the second section and a third paragraph from the last section). The author relied on the mean of the three Flesch Reading scores and the standard deviation to measure the dispersion. The study found that there is variability across the chairman's addresses. In order to identify the reason behind this variability, the author used the obfuscation hypothesis, and hypothesized that companies with higher levels of profitability (lower levels of financial press coverage) will communicate more clearly than those with lower level of profitability (higher level of financial press coverage). The author focused on the highest and lowest 30 companies in terms of financial press coverage and the highest and lowest 30 companies in terms of the percentage change in profitability. The author found no evidence regarding the impact of profitability level on the readability variability. However he found that the companies that are subject to higher financial press communicate less clearly and have higher readability variability.

Carrying on the same line of thought to Europe and specifically In U.K., Clatworthy and Jones (2001) test for readability variability. The authors examined 60 U.K. chairman's statements (the 30 top and 30 bottom performing companies in the UK's FAME database). Using the Flesch Reading Ease as a readability measure, the authors found that the introduction of the chairman's statement is easier to read than the other parts of the statement but no evidence was detected regarding managers' use of readability variability to communicate good news or hide bad news.

Also in U.K. Sydserff and Weetman (2002) focused on the chairman's statement and manager's report of investment trust companies. The authors investigated whether there are differences between the Flesch Reading score of the chairman's statement and manager's report of the good performers and bad performers of 26 investment trusts in the U.K., but no evidence of significant differences was documented. In line with Sydserff and Weetman (2002), Rutherford (2003) examined whether readability style is associated with firm performance in the U.K. The author investigated whether managers of poor performing entities obfuscate their performance in their accounting narratives, specifically in the Operating and Financial Review (OFR). Using the Flesch Reading Ease to measure the textual complexity of the Operating and Financial Review of 654 companies from the Times UK 1000 in 1998, the author found no evidence that poor performing entities use textual complexity to hide their performance.

Bayerlein and Davidson (2012) examined the reading complexity and readability structure of chairman's addresses in Australian firms. The authors hypothesized that positive (negative) information is associated with lower (higher) level of readability difficulty. The authors used a sample of 87 chairman addresses in the 2009 annual reports of firms drawn from the Australian Standard & Poor's ASX200 index portfolio and used the Flesch Reading Ease as a readability measure. They found no evidence that lengthy and complex sentences were used to hide negative information or that simple and easy to understand language is used to highlight positive information. Using the same sample and the same readability measures, Bayerlein and Davidson (2015) investigated whether the preparers of the chairman's addresses use two methodologies (syntactical complexity and/or rationalization) to manage users' perceptions. The authors meant with the syntactical complexity the writing style and the wording while they meant with the rationalization the amount of information to communicate news. The authors found no evidence on managers' change of syntactical complexity to highlight or to hide certain information. However, they found that negative chairman's addresses contain larger amount of negative sentences, but no evidence was found that the same chairman's addresses contain more neutral sentences in comparison with the positive chairman's addresses.

Despite this evidence documented by prior researchers that does not support the obfuscation hypothesis in various countries, some evidence that supports this hypothesis was documented using U.S firms' narrative disclosures. For example, Li (2008) found that firms use complex language in their annual reports in order to present less persistent good news but he didn't find significant evidence that firms issue difficult to read annual reports in order to hide more persistent bad news. Dempsey, et al. (2012) focused on a specific industry and examined the impact of annual report opacity of the Real Estate Investment Trusts (REIT) on the relationship between profitability and financial disclosure. Using Flesch Kincaid Grade level to measure the readability of annual reports,

the authors found that firms with poor performance (measured by ROA) have more incentive to publish less transparent financial reports.

In addition to this Hrasky et al. (2009) assessed the differences in the textual complexity of the chairperson's annual report letter in a sample of poor performance and high performance Australian companies. Using the Flesch Reading Ease to measure the readability of the chairperson's letter, the authors found evidence that the readability of the chairpersons' letters of the poor performers are significantly lower than that of high performers.

Due to the importance of risk disclosures in the context of decision making, some researchers have argued that readability level might differ depending on the risk factors facing the firm. Linsley and Lawrence (2007) examined the risk disclosures by UK companies in their annual reports and used the Flesch Reading Ease formula in order to measure the readability level of these disclosures. The authors based their results on the Flesch Reading Ease formula and concluded that the readability level of the risk disclosures is difficult or very difficult but find no evidence regarding the directors' incentives to hide bad risk news using their writing style.

With the same focus on risk disclosures but on U.S firms, Campbell, et al. (2014) investigated the information content of the "Risk Factor" section in the 10-K annual reports. The authors used the Fog Index to control for the readability of the risk factor section and the MD&A section and the 10-K filing. They concluded that firms facing higher risk disclose more risk factors and the type of risk the firm faces determines whether it dedicates a greater portion of its disclosures towards describing this risk. In addition they concluded that the information conveyed through the risk factor section and its disclosures is reflected in systematic risk, idiosyncratic risk, information asymmetry, and firm value.

2.2 Other factors affecting the readability of corporate disclosures

In this section we focus our attention on those studies examining other factors that can affect the readability of textual disclosures issued by firms' management. Prior research argued that readability of the disclosures could differ as a result of the firm's location, i.e. readability differs across countries. Others argue that readability might differ just because of the language used in presenting the information. Also previous researchers have examined the change in readability of the disclosures, over time, across portions of the annual report, or even across portions of the same report. We review all these factors in this section plus other major factors that will play a role in the readability of the narrative disclosure a firm issue.

Courtis (1986), Courtis (1995), and Courtis and Hassan (2002) are three studies that concentrated on the variability level of narrative disclosures readability over time, across countries, across languages, and across sections of the issued report. Courtis

(1986) examined the readability levels of the chairman's addresses and footnotes to the financial statements by selecting 100-word prose passages from 46 different Canadian annual reports for 1982 and from 96 different annual reports for 1983. The author chose the chairman's addresses because it was shown from prior studies that it is the most read section by private shareholders, and chose the footnotes because it contains technical terms and assumed to be complex and difficult to read by the majority of readers. In contrast with expectation, the author found that both the chairman's addresses and footnotes are difficult to read. The author justified this result that those who could read these passages should be at least a university undergraduate, however only 43.9% of Canadian shareholders have obtained a level of university education.

Focusing on analyzing the readability of textual disclosures in Hong Kong, Courtis (1995) concentrated on the trend of annual report readability over the period 1986 to 1991. The author assumed that such reports are to be prepared with special care to be more readable because they are prepared in English for readers which this language is a second one. Using Flesch, Fog and Lix indices to measure the readability of 32 chairmen's addresses and footnotes to the accounts section, the author found that the selected passages in the Hong Kong reports are classified as very difficult to read. When comparing the readability of the Hong Kong reports with that in the Western countries, the author found that based on Flesch evidence, Hong Kong evidence is of similar degree of difficulty with western evidence for both the chairman's addresses and the footnotes. However, Fog and Lix evidence is as yet too scattered to undertake meaningful cross-country comparisons.

Through a comparative study, between Hong Kong and Malaysia, Courtis and Hassan (2002), examined the reading ease of the English and Chinese versions of 65 corporate annual reports in Hong Kong and the English and Malay versions of 53 annual reports in Malaysia. The authors focused on the impact of bilingual versions of chairman's addresses on the reading behavior as reflected by slower reading, skipped passages and small interpretational differences. They compared the chairman's addresses presented in two languages (English and Chinese for the Chinese addresses and English and Malay for the Malaysian addresses). Using the Flesch Reading Ease to measure the readability of the English versions, Yang formula for the Chinese version, and the Yunus formula for the Malaysian version, the authors found evidence that the English chairman's addresses in the Malaysian annual reports are easier to read than the English ones in Hong Kong annual reports and the indigenous versions are easier to read than the English ones.

With the same focus of comparing readability of disclosures across countries, but through a comparative study on U.K and U.S firms' disclosures, Schroeder and Gibson (1994) examined the MD&A of a sample of 25 U.S firms and a matched sample of 25 U.K firms listed on NYSE. The authors used the Flesch Kincaid level as a readability

measure and focused on three aspects of readability; passive voice, sentence length and word length. In comparison with the MD&A of U.S firms, the authors found that the MD&A of U.K firms had significantly shorter average word length, greater average sentence length and contained greater use of passive voice. Overall, there were no significant differences between both narratives in the readability estimates because the effect of longer sentences is offset by the shorter average word length in the U.K disclosures.

Consistent with this line of thought that readability level differs across location Lundholm, et al. (2014) examined the readability of text and the use of numbers in the Management Discussion and Analysis and earnings press releases of foreign firm listed on U.S. stock exchanges. The authors focused on three alternative notions of distance: linguistic distance (whether the foreign firm is from an English speaking country); accounting distance (whether there is similarity between the accounting rules of the foreign country and the U.S.); and investor protection distance (whether there is similarity in the legal system of the foreign country and that of the U.S.). the authors hypothesized that the readability of text and the use of numbers in foreign firms' MD&A and earnings press releases will be greater for foreign firms listed in the U.S. than for similar U.S. firms and with the geographic, accounting and investor protection distances from the U.S., and for firms from non-English speaking countries than for firms from English speaking countries. The authors used the Fog index and the number of numbers on a sample of MD&A disclosures and earnings press releases of foreign firms and another of U.S. firms. The authors found evidence that the readability of foreign firms' MD&A disclosures and their earnings press releases increase with their geographic, accounting, and investor protection distances from the U.S. and when the foreign firm is from a non-English speaking country.

Aside from the differences in readability of the disclosures caused by the diversity resulting from the location and/or language, prior research argued that readability level differences can be caused as a result of the nature of the section of the report being analyzed. For example, Schroeder and Gibson (1990) focused on the MD&A section versus the footnotes of the annual reports and relied on three aspects of readability: use of passive voice, sentence length and word length. Using a sample of 40 firms in different industries in the U.S and the Flesch Kincaid level as a readability measure, the authors compared the readability level of MD&A with that of the footnotes and the president's letter. The authors found that although the MD&A and the president's letter allow for great flexibility in style and presentation and the footnotes are considered to be difficult to read, it was found that the understandability of the MD&A is close to that of the footnotes than of that of the president's letter.

Similarly, Li (2008) investigated the diversity of readability levels across various sections of the annual report, by focusing on the MD&A section and the notes of the

financial statements, in addition to the annual report as a whole. The author measured readability using the Fog index and the length of the report. Depending on archival data and using a multivariate regression analysis, he found that the annual reports of public companies are very difficult to read and the MD&A section and the notes are easier to read than the document as a whole and that firms with high earnings issue more readable annual reports. In line with Li (2008), but focusing on retirement decisions and using different readability measures, Czyzewski and Wilkinson (2014) examined the readability of MD&A section in a sample of 100 U.S firms in nine industries. The authors hypothesized that the readability of MD&A is significantly different with headers and tables than without them and that the level of readability is higher than the average level of the U.S population. Using the Flesch Reading Ease and the Flesch Kincaid Level as two readability formula, the authors found that the MD&A sections are difficult to read and a large percentage of the U.S population is unable to understand it.

Focusing on the type of reports but in a different country (Australia), Hrasky and Smith (2008) compared the characteristics of the chairperson's annual report letter and graphical representations in annual reports containing a concise financial report and those in traditional full reports of listed Australian companies. Using the Flesch Reading Ease to measure the textual complexity of the chairperson's report letter, the authors didn't find any differences in the letters' complexity or in graph use across the two report types and this was due to the symbolic use of the report and not the instrumental one.

Also in Australia, Bayerlein and Davidson (2012) examined the reading complexity and readability structure of chairman's addresses. The authors hypothesized – consistent with Clatworthy and Jones (2001) - that the first part of the chairman's address is easier to read than the second and third part and that the positive and negative information leads to readability differences between sections; positive (negative) information is associated with lower (higher) level of readability difficulty. The authors used a sample of 87 chairman addresses in the 2009 annual reports of firms drawn from the Australian Standard & Poor's ASX200 index portfolio and used the Flesch Reading Ease as a readability measure. They found that the second section of the chairman's address is more difficult to read than the first and last sections.

Regarding the impact of social capital on readability level, Anand Jha (2013) highlighted the impact of social capital environment (where individuals have a higher degree of altruism, community-centric attitudes, propensities to respect obligations, and with mutual trust) on the level of readability. The author used the fog index and the number of words to measure the readability of the financial annual reports and found a negative relationship between social capital and the indices used to measure the readability of annual reports. Firms headquartered in social capital counties have lower accrual management, real earnings management and produce more readable and high quality financial reports.

Finally, Irani and Oesch (2013) focused on the impact of the reductions in coverage resulting from brokerage house mergers on the financial reporting quality. Using the Fog index as a measure for financial reporting quality, the authors found that the reduction in coverage is associated with a decline in the financial reporting quality as in this case the annual reports require readers to be older to understand it.

It is clear from the discussion above that there is considerable literature that investigated the readability of corporate disclosures. Part of the research focused on the factors that lie behind the readability levels of corporate disclosure such as the corporate performance, and social capital among others. Other research examined the different readability levels across time, countries, different sections of the same reports and even across the different formats and contents of the corporate disclosure.

3.0 THE READABILITY OF NARRATIVE DISCLOSURES AFFECTING VARIOUS DECISION MAKERS

In this section we show how a more recent trend has developed among accounting researchers to study the effect of understandability of narrative disclosures on capital markets in general, and on investors and analysts specifically. In addition, we will survey in this section the studies that examined the readability of some auditors' special reports [Liu and Rowe (2013), and Boritz, et al. (2014)], analysts' reports [Twedt and Rees (2012), and De Franco, et al. (2015)], and Compensation Discussion and Analysis [Laksmana et al. (2012)], as they have a considerable impact on decision makers in general and investors in particular.

3.1 Readability of corporate disclosures affecting investors

Consistent with the huge prior accounting literature examining the effect of financial information, the effect of various levels of readability of narrative disclosure on investors was the subject of considerable investigation. Focusing on investors' investment strategies, Biddle, et al. (2009) investigated the relationship between financial reporting quality and investment efficiency. They assumed that financial reporting quality increase investment efficiency by reducing information asymmetries. The authors hypothesized that higher quality financial reporting is associated (negatively related) with either over investment, under investment, or both. To measure the financial reporting quality, the authors formed a summary statistic by normalizing three proxies; accrual quality, modification of the accrual quality and the fog index, and take the average of these three measures. Based on a sample of 34791 firm-year observations from 1993 to 2005 in the U.S., the authors found that higher reporting quality is associated negatively with investment among firms shown to be more likely to over-invest and positively with investment among firms shown to be more likely to under invest.

With a focus on quarterly reports, Lee (2010) examined the impact of the readability of quarterly reports (10-Q) on the information efficiency of stock prices. Using 55,660 10-Q reports filed with the SEC in the period from 2001 to 2007, and using the Fog index as a readability measure, the author found that longer and more textual difficult quarterly reports have a negative impact on the market's ability to process earnings-related information in a timely manner. This negative impact is more pronounced for firms with lower analyst following and smaller institutional ownership.

Miller (2010) examined the effects of financial reporting complexity (length and readability) on small and large investors' trading behavior (volume and consensus) around 10-K filings. He hypothesized that some investors in general and small ones in particular will choose not to process the complex reports because doing so is too costly and in turn this will have a negative impact on volume trading. In case of trading, complex reports will lead to more disagreement (dispersion in the inferences drawn) within an investor class. Miller (2010) depends on two aspects of the annual report; report length and report readability. He measured report length with words or words + tables and followed Li (2008) and defined Words as the logarithm of the number of words in the entire document, but this measure fails to incorporate data included in tables, so the author examined Words + Tables which is defined as the natural log of the total words plus table cells contained in the document. He measured report readability using the Fog index, but because it was not developed to specifically measure the attributes of financial reporting complexity, the author used also a proprietary computational software program, *StyleWriter-Plain English Editor*, to develop a multidimensional measure of financial readability. The author found evidence that complex reports lead to a decrease in total trading activity and more disagreement among small investors who choose to trade. Small investors are more affected by less readable reports than large investors due to the increase in processing costs.

In line with Miller (2010), Lawrence (2013) investigated the impact of clear and concise financial disclosures on investors' shareholdings but paid special attention to different types of investors. The author hypothesized that clearer and concise reports will increase investors' investments, however, this positive relation is less pronounced for high frequency traders (because such traders tend to trade more based on technical analysis of stock-market data rather than on fundamental analysis of financial statement data) and financially-literate individuals and speculative individuals who will gravitate to more opaque environment and so be less partial to clearer and more concise disclosures. Using Fog index and the length of annual report as two measures of financial disclosure quality, the author found that investors prefer to invest more in firms with more readable and concise financial disclosures; however, high frequency traders, financially literate individuals and speculative investors do not display a preference for clearer and more concise disclosures.

Again, from the investors' point of view, Callen et al. (2011) examined the impact of accounting quality on stock price delay and future stock returns. Using Fog index to measure the readability of annual reports as a proxy for accounting quality, the authors found that difficult to read annual reports are associated with significantly higher price delay and higher future stock returns. To extend the analysis beyond the investors and to incorporate other stakeholders and regulators, Lopatta, et al. (2014) examined the role of language; tone and readability in detecting the violation of the FCPA. Using the Fog index to measure the readability of 10-K annual reports and by comparing FCPA violators and FCPA non-violators, the authors found that the management of FCPA violators uses more negative, uncertain, litigious and complex language in their 10-K filings. However, after the FCPA prosecution and in spite of their exposure to more litigation risk, managers tend to lower their negative, uncertain, and complex tone in their 10-K filings.

From another perspective regarding the use of Fog index, Kravet and Muslu (2013) investigated the relationship between textual risk disclosures (number of risk sentences in the annual 10-K filings) and investors' behavior as measured by stock return volatility, trading volume, and analysts' forecast revisions around the filing dates and used the Fog index to control for the readability of the annual reports. The authors concluded that the annual increase in the number of risk sentences in a company's 10-K filing is accompanied with higher volatility of negative returns and higher trading volume during the 60 trading-day period after the filing relative to the 60 trading day period before the filing, and more volatile analyst forecast revisions surrounding the filing.

3.2 Readability of corporate disclosures affecting analysts

Financial analysts are very important users of financial statements that's why prior research focused on the impact of corporate disclosures' readability on their behavior. Being interested in Investor's and analysts' behavior, Kravet and Muslu (2013) was a recent study that investigated the volatility of stock returns, the variability in trading volumes, and the revision in analysts forecast around filing dates.

Focusing on analysts' judgements and decision making, Lehavy, et al. (2011) focused on the effect that the readability of firms' written communication has on the behavior of financial analysts. The authors focused on several measures of analyst behavior; including analyst following, analyst forecast revision response time, the information content of analysts' reports, and the properties of analyst earnings forecasts (accuracy, dispersion and uncertainty). Using Fog index to measure disclosure readability, the authors found evidence that firms issuing complex reports will increase analyst following because of the increase in investors' demand on the analysts' services and will require analysts to exert greater efforts to follow them and this will be reflected positively on their response time. Additionally, the authors found that analyst reports of firms with less readable 10-K reports are more informative from the investors' point of

view, but that the earnings forecasts of such firms have greater analyst dispersion, are less accurate, and are associated with greater levels of uncertainty.

Because R&D investments are a major source for firm growth and value, Merkley (2014) focused on the impact of earnings performance on these disclosures and whether management use such disclosure to provide relevant information or opportunistically to hide poor performance. Using the Fog index to measure the readability of R&D disclosures and earnings disclosures, the author found evidence that the quantity of narrative R&D disclosure is positively related to analyst following and analyst forecast accuracy and negatively related to analyst forecast dispersion. In addition, the author found that higher R&D disclosure is associated with greater disclosure information content and lower information asymmetry around the 10-K filing event window.

3.3 Readability of non-corporate disclosures and other reports affecting investors

From the investors' point of view, analysts' and auditors' reports are of great significance and play a major role in the decision making process. Prior research focused on the readability of the preferability letters [Liu and Rowe (2013)] and SOX 404 reports [Boritz, et al. (2014)]. How analysts' reports affect investors behavior and the markets in general was examined by Twedt and Rees (2012), while how these reports can influence trading volume was tested by De Franco, et al. (2015). Finally, because of the importance of proxy statements to investors to acquire necessary information about top executive compensation, Laksmana et al. (2012) examined the readability of Compensation Discussion and Analysis in proxy statement.

3.3.1 Auditors' special reports

Liu and Rowe (2013) focused on the effect of audit quality on the readability of auditor preferability letter which is issued by the auditor in case the registrant in the SEC makes a voluntary accounting change with material effects. The authors examined the readability of 420 preferability letters enclosed in the 10-K filings across small, medium, and large size audit firms during the period 1994-2008. Using the Fog index as a readability measure, the authors found that the perferability letters issued by medium size audit firms are the easier to read, which means that such firms are doing a better job to make these letters more readable and provide more understandable information to decision makers outside the firm. On the other side, the authors found that the letters issued by large audit firms are the hardest to read, in comparison with the medium and small firms.

Applying on another auditor special report, Boritz, et al. (2014) investigated the informativeness of the SOX 404 (internal control) reports issued in the period 2004 to 2009. They used the Fog index to measure the readability of the SOX 404 reports and

found that the informativeness of longer reports has decreased over time and that shorter reports are more informative.

3.3.2 Analysts' reports

Twedt and Rees (2012) Investigated whether the detail and tone of the analysts' reports are significant in explaining the market's response to these reports. To assess the detail of the reports, the authors used three aspects; complexity, length and visual aids. Fog index was used to measure the report complexity. Using 2057 analysts reports, the authors concluded that the tone of financial analyst reports contain significant financial information content in addition to the earnings forecasts and recommendation and the report complexity helps in explaining cross-sectional variation in the market's response to the recommendations included in the reports.

On a specific basis, De Franco, et al. (2015) investigated the relationship between readability and "high-ability" analysts and whether more readable analysts' reports will have a positive impact on volume of trading. They focused on two aspects of readability, which are straightforward language; that was measured using the aggregation of the Fog, Flesch, and Flesch-Kincaid indices, and concise reports; that was measured using the aggregation of the number of words and the number of characters in the report (in line with Li (2008). The authors found evidence which support their hypotheses that high-ability analysts issue reports that are more readable, which in turn have a favorable impact on trading volume.

3.3.3 Compensation Discussion and Analysis (CD&A)

Management's compensation is an important issue and the information of such should be readable from the financial statements users' point of view, that's why Laksmana et al. (2012) examined the relationship between the readability of the CD&A section in proxy statements and management motives to hide executive compensation disclosures. It uses Flesch Reading Ease, Flesch Grade Level, Fog, and Smog to measure the readability of the CD&A section and Using the CD&As in the 2007 and 2008 proxy statements, the authors concluded that the average CD&A is difficult to read. In addition, the authors found that CD&A in the 2007 proxy season are difficult to read for firms that have CEO pay exceeding the benchmark pay, but this level of readability has improved in the 2008 proxy season as a result of regulatory oversight and public pressure.

Accordingly, it is obvious from the previous discussion that prior literature examined the impact of the readability level of corporate disclosures on its users in general and on investors' and financial analysts' behavior and decisions in particular. Part of the research examined the effect of the readability level on the investors' trading and investments and another part focused on the impact of textual complexity on the analysts' behavior, accuracy and information content of their reports. Finally, previous

research investigated the readability of non-corporate disclosures, such as special auditors' reports, analysts' reports, and disclosures related to executive compensation.

4.0 READABILITY MEASURES APPLIED IN LITERATURE REVIEW

Prior literature used the different readability indices, such as the Fog index [Li (2008), Miller (2010), Lehavy, et al. (2011), Anand Jha (2013), Liu and Rowe (2013), Lundholm, et al. (2014), and Campbell, et al. (2014)], Flesch Reading Ease [Clatworthy and Jones, (2001), Sydserff and Weetman (2002), Rutherford (2003), and Hrasky and Smith, (2008)], and Flesch Kincaid Level [Schroeder and Gibson (1990), and Schroeder and Gibson, (1994)] to measure the readability of accounting narratives. We decided in this section of the paper to review the literature in a chronological order to highlight the recent increasing trend in accounting research for depending on the Fog index, the Flesch Reading Ease measure, and the Flesch-Kincaid Grade Level indicator. This increasing trend is clearly revealed in the following SEC Chairman Christopher Cox, speech at USC Marshall School of Business, March 23, 2007: "Just as the Black-Scholes model is a commonplace when it comes to compliance with the stock option compensation rules, we may soon be looking to the Gunning-Fog and Flesch-Kincaid models to judge the level of compliance with the Plain English rules".

The following table summarizes each of the papers in terms of the measure/s used to indicate the level of readability, the narrative section that was subject to examination, and finally the results of each study.

Summary of prior literature on readability

Study	Readability Index	Measure Indicator	Accounting Narrative subject to examination	Results
Courtis (1986)	Fog and Flesch	Readability	Chairman's addresses and footnotes	Based on a sample of Canadian annual reports in 1982 (46 reports) and 1983 (96 reports), both Fog and Flesch indicated that chairman's addresses (which were expected to be most read and in turn should be easier) and footnotes (which are expected to be least read and more difficult) are both difficult to read in both years contrary to what the author originally hypothesized.
Schroeder and Gibson (1990)	Flesch Kincaid Level	Readability	MD&A	Based on a sample of 40 U.S. firms in 1986, the Flesch Kincaid Level showed that the understandability of the MD&A is close to that of the footnotes (more difficult to understand) than that of the president's letter.
Schroeder and Gibson (1994)	Flesch Kincaid Level	Readability	MD&A	Based on a sample of 25 U.S firms and a matched sample of 25 U.K. firms for which the fiscal year ended at any point within July 1989 and June 1990, the authors concluded that the U.K firms on the NYSE issued MD&A

				and MLS of comparable readability to the U.S based firms because the effect of longer sentences of U.K firms is offset by the shorter average word length in the U.K disclosures.
Courtis (1995)	Flesch, Fog and Lix	Readability	Chairmen's addresses and footnotes	Based on a sample of 32 Hong Kong firms in the years ending between 1986 and 1991, contrary to the Fog and Lix indicators, the Flesch indicator showed that the chairman's addresses and the footnotes in the Hong Kong firms are of similar degree of difficulty compared with the western firms.
Courtis (1998)	Flesch Reading Ease	Readability	Chairmen's addresses	Based on a sample of 120 public firms listed in Hong Kong in 1994/1995, the author found no evidence regarding the impact of profitability level on the readability variability across the chairmen's addresses. However, the author found that higher financial coverage press leads to higher readability variability and lower readability levels of chairmen's addresses.
Clatworthy and Jones (2001)	Flesch Reading Ease	Readability	Chairman's statements	Based on a sample of 60 U.K chairman's addresses selected at the end of June 1997 and includes 1995 and 1996 fiscal year ends, the Flesch Reading indicator showed that the introduction of the chairman's statement is easier to read than the other parts of the statement. However, no evidence was detected to indicate managers' used of different readability levels to communicate good news or hide bad news.
Sydserff and Weetman (2002)	Flesch Reading Ease	Readability	Chairman's statement and manager's report	Based on a sample of 26 U.K investment funds, the Flesch Reading score indicated no difference between the chairman's statement and manager's report across the good performers and bad performers.
Rutherford (2003)	Flesch Reading Ease	Readability	Operating and Financial Review (OFR)	Based on a sample of 419 Operating and Financial Reviews, the Flesch Reading Ease didn't show evidence regarding poor performing entities' use of textual complexity to hide their performance. On the other hand, the differences in lengths were as a result of the activity levels.
Courtis and Hassan (2007)	Flesch Reading Ease, Yang and Yunus formulas	Readability	Chairman's addresses	Based on a sample of 65 Chinese annual reports and 53 Malay annual reports, the readability indices provided evidence that the English chairman's addresses in the Malaysian annual reports are easier to read than the English ones in the Hong Kong annual reports and the native language versions are easier to read than the English ones.
Linsley and Lawrence (2007)	Flesch Reading Ease	Readability	Risk disclosures in annual reports	After examining the risk disclosures of the 25 largest non-financial U.K companies listed in the FT-SE100 in January 2001, the Flesch Reading Ease showed that it is difficult or very difficult to read the risk disclosures. However, no evidence was shown to indicate that managers make intentional use of textual complexity to hide less favorable risk news.
Hrasky and	Flesch Reading	Readability	Chairperson's annual report	Based on a sample of 168 firms listed on the Australian Stock Exchange in 2001, the Flesch Reading Ease didn't

Smith (2008)	Ease		letter	show differences in the complexity of the chairperson's letters across the concise and traditional full reports. In addition no significant relationship was shown between the number of graphs and the type of the report and this was due to the symbolic use of the concise report and not the instrumental one.
Li (2008)	Fog	Readability	MD&A	Based on a sample of 55719 firm years covering the fiscal years 1993-2003, the Fog index provided evidence that annual reports of public companies are very difficult to read and the MD&A section and the notes are easier to read than the document as a whole. In addition, the author found a relation between annual report readability and earnings persistence; such that firms with high earnings issue more readable annual reports and firms use complex language in their annual reports in order to present less persistent good news
Biddle, et al. (2009)	Fog	Financial reporting quality	Financial statements	Based on a sample of 34791 firm year observations during the period 1993-2005, the authors used the Fog index as a measure of financial reporting quality and found evidence that higher reporting quality is associated negatively with investment among firms shown to be more likely to over-invest and positively with investment among firms shown to be more likely to under invest.
Hrasky et al. (2009)	Flesch Reading Ease	Readability	Chairperson's annual report letter	After Ranking the top 500 companies listed on the Australian Stock Exchange in 2004 according to their percentage change in their return on equity in the period 2003-2004, the authors chose the top 40 (high performers) and bottom 40 (poor performers) firms. Using the Flesch Reading Ease, the authors found that the readability of the chairpersons' letters of the poor performers is significantly lower than that of the high performers.
Miller (2010)	Fog	Readability	Annual Report	Based on a sample of 12771 firm year observations, the Fog index showed that complex reports lead to a decrease in total trading activity and more disagreement among small investors who choose to trade. Small investors are more affected by less readable reports than large investors due to the increase in processing costs.
Callen et al. (2011)	Fog	Accounting Quality	Annual Report	Based on a sample of 29345 firm years in the period from 1981 to 2006, the Fog index, as a measure of accounting quality, indicated that difficult to read annual reports are associated with significantly higher price delay and higher future stock returns.
Lehavy, et, al. (2011)	Fog	Readability	Annual Report	Based on a sample of 57642 firm years, the Fog index provided evidence that complex reports will lead to several consequences: 1- Greater analyst following (because of higher investors' demand on analysts' services) 2- Analysts will exert more efforts and in turn will take longer time to issue their reports 3- Analyst reports will be more informative 4- Analysts' forecasts will be associated with greater dispersion, higher uncertainty, and lower accuracy
Bayerlein and	Flesch	Readability	Chairman's	Based on a sample of 87 chairman reports of firms listed

Davidson (2012)	Reading Ease		addresses	in the Standard & Poor's ASX200 index, the Flesch Reading Ease provided evidence that the second section of the chairman's address is more difficult to read than the first and last sections, however, the authors found no evidence that lengthy and complex sentences were used to hide negative information or that simple and easy to understand language is used to highlight positive information.
Dempsey, et al. (2012)	Flesch Kincaid Grade level	Readability	Annual Report	Based on a sample of 1273 firm year observations of 183 REITs over the period from 1994 to 2007, using the Flesch Kincaid Grade level as a readability measure, the authors showed a relationship between financial performance and financial opacity and that firms with poor performance (measured by ROA) have more incentive to publish less transparent financial reports.
Laksmana et al. (2012)	Flesch Reading Ease, Flesch Grade Level, Fog, and Smog	Readability	CD&A	Based on a sample of 329 and 310 firms for 2007 and 2008 proxy years respectively, the authors concluded that the average CD&A is difficult to read. In addition, the authors found that CD&A in the 2007 proxy season are difficult to read for firms that have CEO pay exceeding the benchmark pay (when their practices are not linked to economic determinants to pay), but this level of readability has improved in the 2008 proxy season as a result of regulatory oversight and public pressure.
Twedt and Rees (2012)	Fog	Report complexity	Analysts' reports	Based on a sample of 2057 analyst reports published in 2006, the authors found that the tone of financial analyst reports contain significant financial information content in addition to the earnings forecasts and recommendation provided by the analysts. In addition, the reports details provide indication of the analysts' efforts and its level of complexity helps in explaining cross-sectional variation in the market's response to the recommendations included in the reports.
Anand Jha (2013)	Fog	Readability	Annual Report	Based on a sample of 29660 firm years in the period from 1994 to 2009, the authors found a negative relationship between social capital and the indices used to measure the readability of annual reports. Firms headquartered in social capital regions have lower accrual management and real earnings management and produce more readable and high quality financial reports.
Irani and Oesch (2013)	Fog	Financial reporting quality	Annual report	Using a quasi-experimental design, the authors investigated the impact of the merger of 13 brokerage houses over the period from 1994 to 2005 on the financial reporting quality. The authors found that the reduction in coverage as a result of brokerage houses mergers results in more use of discretionary accruals and reduction in financial reporting quality, but this is not applicable in the case of well governed firms.
Kravet and Muslu (2013)	Fog	Readability	Annual Report	Based on a sample of 28,110 firm year observations from 4,315 firms filing their 10-ks on the SEC Edgar universe during the period from 1994 to 2007, the authors concluded that the annual increase in the number of risk sentences in a company's 10-K filing is accompanied with

				higher volatility of negative returns and higher trading volume during the 60 trading-day period after the filing in comparison with the 60 trading day period before the filing, and more volatile analyst forecast revisions surrounding the filing.
Lawrence (2013)	Fog	Financial disclosure quality	Annual Report	Based on a sample of 91,228 account-firm-year observations during the three calendar years 1994-1996, the author found that investors prefer to invest more in firms with more readable and concise financial disclosures. In addition, the author concluded that high frequency traders, financially literate individuals and speculative investors don't display a preference for clearer and more concise disclosures.
Liu and Rowe (2013)	Fog	Readability	Auditor preferability letter	After examining 420 preferability letters enclosed in 10-K filings during the period from 1994-2008, the authors concluded that the perferability letters issued by medium size audit firms are the easiest to read, however, the letters issued by large audit firms are the hardest to read, in comparison with the medium and small audit firms.
Boritz, et al. (2014)	Fog	Readability	SOX 404 Reports	After experimentally examining a sample of 50 SOX 404 reports issued during the period 2004-2009, the authors found evidence that there is a positive relationship between audit experience and the level of understandability of the reports and that shorter reports are more informative and readable over time.
Campbell, et al. (2014)	Fog	Readability	Risk disclosures in "Risk Factor" section, MD&A, and the 10-K filing	Based on a sample of 9,076 firm-year observations, the authors found that firms facing higher risk disclose more risk factors and the type of risk the firm faces determines whether it dedicates a greater portion of its disclosures towards describing this risk. In addition, they concluded that the information conveyed through the risk factor section and its disclosures is reflected in systematic risk, idiosyncratic risk, information asymmetry, and firm value.
Czyzewski and Wilkinson (2014)	Flesch Reading Ease, Flesch Grade Level	Readability	MD&A	After selecting a random sample of 100 firms from the Edgar database, and concentrating on the MD&A sections, the authors concluded that the MD&A sections are difficult to read and a large percentage of the U.S population is unable to understand it and that the readability of the MD&A sections with headers is greater than without headers.
Lopatta, et al. (2014)	Fog	Readability	Annual Report	After examining 86 violating firms and matching them with non-violators, the authors found that management of FCPA violators uses more negative, uncertain, litigious and complex language in their 10-K filings. However, after the FCPA prosecution and in spite of their exposure to more litigation risk, managers tend to lower their negative, uncertain, and complex tone in their 10-K filings.
Lundholm, et al. (2014)	Fog	Readability	MD&A and earnings press releases	For the MD&A (earnings press releases) analysis, the authors selected a sample of 3,499 foreign firm years (1,582 foreign firm earnings press releases) and a sample of 37,344 U.S. firm years (21,976 U.S. firm earnings press

				releases). The authors concluded that readability of foreign firms' MD&A disclosures and their earnings press releases increase with their geographic, accounting, and investor protection distances from the U.S. and when the foreign firm is from a non-English speaking country
Merkley (2014)	Fog	Readability	R&D disclosures	Based on a sample of 22,482 firm-year observations, the authors found that the quantity of narrative R&D disclosure is positively related to analyst following and analyst forecast accuracy and negatively related to analyst forecast dispersion. In addition, Higher R&D disclosure is associated with greater disclosure information content and lower information asymmetry around the 10-K filing event window.
Bayerlein and Davidson (2015)	Flesch Reading Ease	Readability	Chairman's addresses	Based on a sample of 87 chairman reports of firms listed in the Standard & Poor's ASX200 index, the authors, using Flesch Reading Ease didn't find evidence that managers use syntactical complexity methodology to highlight or hide certain type of information. The authors found that the number of negative sentences was greater in the negative chairman's addresses than that in the positive ones. However, they didn't find the same evidence regarding the neutral sentences.
De Franco, et al., 2015	Fog, Flesch, and Flesch-Kincaid indices	Readability	Analysts reports	Based on a sample of 4,014 firms and 2,334 analysts, the authors found evidence that high-ability analysts issue more timely forecasts, revise forecasts more frequently and are more likely to issue consistent forecast and recommendation revisions. In addition, high ability analysts issue reports that are more readable, which in turn have a favorable impact on trading volume.

5.0 LIMITATIONS OF READABILITY INDICES DISCUSSED IN PRIOR LITERATURE

Prior literature discussed some limitations related to the use of the readability indices in the accounting research (citations). In this section we will focus on the limitations related to using the Fog index, Flesch Readability index, and the Flesch Kincaid grade level as readability measures. In addition, we will shed some light on prior literature's usage of these measures as indicators of readability versus understandability. To us these two conceptions reflect different things as readability is text centered while understandability is reader centered, which is contingent on the reader's background, prior knowledge, and interest.

5.1 Readability indicators not captured by readability indices

In general readability indices such as the Fog, the Flesch Ease, and the Flesch Kincaid provide an overall estimate of the level of difficulty to read certain text by focusing mainly on word length and the sentence length. This focus excludes other

important factors that affect the readability level such as format, graphical representations, lack of punctuations, length of paragraphs, and so on. In this section we will summarize some of the arguments made by prior literature, which questions the validity of using these indices as measures of readability in the context of financial disclosures.

Dreyer (1984) argues that "A book is readable only if it is readable for the intended reader, regardless of its formula score" thus depending on just the word length and the sentence length excludes other important factors that affect the readability level, such as the number of dependent clauses and the factors that are related to the sentence complexity and its components. In addition, readability indices don't measure textual factors that may affect the level of readability such as the level of abstraction, word frequency, the appropriate organization and the logical presentation of information. The author also points that factors such as those related to the format or geographic design, lack of punctuation, long paragraphs, illustration and color, and hyphenated words are not considered in these readability indices which might play a significant role in making certain text more readable than the other. Accordingly, readability formulas can give a general level of estimate of difficulty, however, they are used inappropriately when considered as writing tools. Dreyer (1984) also brings to attention the consistency that these indices might provide as in some cases different indices provide different (contradicting) readability scores when used on the same text.

Courtis (1986) argues that "the success of a formula in providing meaningful predictive information depends on its ability to measure elements in the writing that are related to reader comprehension. These elements could come from content, style, format and organization". Referring to the limitations mentioned by Irwin and Davis (1980) and McConnell (1982), Courtis (1986) noted that readability indices don't consider the match between the conceptual background of the reader and the conceptual load in the text. Accordingly, the readability formula won't show the inability of a poorly educated accountant to understand accounting terminology. Also, they don't consider the way new concepts are introduced, nor do they consider how motivational the materials are. Consistent with this argument, Bogert (1985) indicates that these indices can estimate the difficulty of style, but cannot rate the content, format, organization or qualities of the readers. He added that the Fog Index is considered to be a limited tool and not a formula of writing. It focuses on sentences only but doesn't consider other factors such as paragraph length, the use of headings, the quality and size of print and so on.

5.2 Readability indices being misused not misstated

The majority of the readability indices were originally developed by educationalists to test the readability of non-technical children's material, thus the focus was mainly on word complexity and sentences length. In standard novel, measuring sentence length is relatively accurate, where the text format of traditional prose and its

presentation structure are essentially one-dimensional, but in the case of financial disclosures, they are full of itemized lists, abbreviations, headings, nonstandard methods for structuring the document, thus the process of identifying sentences and complex words in the financial disclosure setting is considered to be more challenging. The problem is not in the readability indices themselves as they were designed to provide a general estimate of difficulty and not to be considered a writing tool. Readability indices are not suitable for the financial reports, as they focus on textual aspects only; which are the sentence length and the number of syllables in the word.

Thirty years ago, Bogert (1985) noted that the difficulties with the readability indexes arise from the misuse of them not from the failings in the formulas themselves. They can estimate the difficulty of style, but cannot rate the content, format, organization or qualities of the readers. He added that the Fog Index is considered to be a limited tool and not a formula of writing. It focuses on sentences only but doesn't consider other factors such as paragraph length, the use of headings, the quality and size of print and so on. Jones and Shoemaker, 1994, noted that the tests of reading difficulty were designed by educationalists to judge the appropriateness of non-technical children's material for each grade level. These tests are dubious instruments for adequately assessing the readability of accounting narratives which are adult oriented and specialist in nature"

According to Loughran and McDonald (2014), the Fog Index is not an appropriate measure of readability in financial documents as the first component of the Fog Index "average words per sentence"; which measures sentence length in the context of financial disclosures is substantially less precise than measuring sentence length in traditional pose. Additionally, the second component in the Fog Index "complex words" is a poorly specified measure in business documents, as business text contains multisyllable words like corporation, operations, company often used in 10-K's, and yet are presumably easy to comprehend for investors. The authors provided evidence that syllable counts are a poor measure of readability in the context of firms' business disclosures. Consistently, the authors found that the Fog Index has insignificant predictive power in explaining both unexpected earnings and analyst dispersion.

Similarly, several authors [Klare (1974), Klare (1975), Davison and Kantor (1982), and Smith and Taffler (1992)] have argued that reducing sentence length will not necessarily improve readability, as sometimes the addition of subordinate clauses helps better in communicating some issues.

5.3 Readability versus Understandability

We believe that readability is considered one of several factors that affect the level of understandability. Contrary to our view, Jones (1988), Courtis (1995), and Liu and Rowe (2013) view readability as a proxy for understandability. On the other hand, and consistent with our view, Smith and Taffler (1992) distinguished between readability

and understandability. They noted that the usefulness of the accounting narratives depends on both their readability and their understandability. To distinguish between readability and understandability, an experiment was conducted on a sample of chairman's narratives of failed (33) and non-failed (33) companies. The authors used LIX and Flesch to measure the readability of chairman's addresses and administered the CLOZE procedure of an undergraduate audience in order to compare between readability and understandability. The authors found that the narratives are difficult or very difficult to read and the correlation between LIX and Flesch is higher, however the correlation between them and the CLOZE measure is low, indicating that the two concepts are different. Then the experiment was administered on a group of sophisticated audience (practitioner accountants from the London Office of a big 8 company). The authors found that for the sophisticated group, the accounting narratives were also difficult to comprehend (44% of cases in comparison with 16% of cases in the unsophisticated group), and the correlation between the readability indices (especially Flesch) and the understandability index (CLOZE) was high, indicating that these measures are close to each other as measures of textual complexity. The authors concluded that measuring understandability depends on the sophistication of the audience group and the complexity of the text.

6.0 CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

In this literature review we surveyed accounting and finance literature examining the readability of narrative corporate disclosures measured quantitatively mainly over the last two decades. The purpose of the review is to document the increased interest over this period to attach a numerical measure to readability. We believe that the current approaches for borrowing computational linguistic techniques to measure readability of narrative corporate disclosures are not appropriate because of the unique nature of these disclosures and the specific knowledge assumed to be available in their readers. The review is structured mainly in two sections the first where readability level is investigated as an outcome of various factors such as financial performance, risk exposure, and firm's geographic location, among others. The second section concentrated on the studies that treated the readability level of these disclosures as an independent variable affecting decision makers.

Whether readability level was included in these studies as a dependent or an independent variable, the main common factor in all the studies surveyed in this review is attaching a numerical value to the level of readability, which we, with others, find to be problematic. We argue that the current indices used in prior literature fail to include very important readability indicators that are very important in the context of corporate financial disclosures such as the use of graphs, tables, and other forms of presentation

that would be necessary to summarize complex financial information. We argue that these indices are miss-used when they are imported as is in the financial reporting setting. However, several challenges exist for researchers wants to proceed with this line of literature. First, it is very important to distinguish between readability, understandability, and the overall quality of financial disclosures. If readability is text centered and understandability is reader centered, which is contingent on the reader's background, prior knowledge, and interest, then financial disclosure quality is compressively reflected by studying the quantitative and the qualitative disclosures in corporate disclosures, and how do both tie together to reflect the financial situation of the firm.

Second, the readability level of the narrative disclosures will be better documented in a multi-period setting where investors, analysts, and decision makers compare and contrast firm disclosures to the style which they are already accustomed to from the firm's management. This can be examined in an experimental economics setting where subjects are exposed to various types of disclosure. In such setting the researcher will be able to document the impact of various forms of disclosures can affect decision makers.

Third, we encourage future research to extend this study and re-evaluate the effectiveness of using such readability formulas to measure the textual complexity of other narratives, such as the corporate mission statements, charters and bylaws, and interim reports in addition to the governmental reports such as the mutual fund prospectuses. Also, Fog and Flesch reading ease were being used to measure the readability of different accounting textbooks, so future research is recommended to investigate their suitability in their context. Additionally, a future comparative study is demanded to focus on the differences between the results obtained using the fog and flesch reading formulas on one side and the use of the plain English guidelines on the other side. A future experimental research is needed to investigate the appropriateness of such readability formulas to measure the textual complexity of different accounting narratives.

Finally, with the increasing recent trend in relying on online disclosures, firms are opening new avenues and capabilities for various decision makers to read, interact, and display the information, which definitely affect their level of understandability of the information. How do these new advances in presenting the disclosures affect the traditional disclosure techniques would be an interesting research topic that worth exploring in the future.

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Appendix (1)

Jones, 1994 discussed three readability formulas:

1- DALE-CHALL INDEX

“It uses a combination of unfamiliar words and sentence length to predict vocabulary difficulty”.

US Grade = (0.1579 x % UFMWDS)

+ (0.0496 x WDS/SEN)

+ 3.6365

where

% UFMWDS = percentage of unfamiliar words

WDS/SEN = average number of words per sentence

The index suffers from its relative complexity compared to the Flesch index and Fog index.

2- FLESCH TEST

“The Flesch test is the most popular of the readability formulas. The Flesch test uses sentence length and a syllable count as determinants of passage difficulty. It is expressed as:

206.835 - [(L x 1.015) + (S x 0.846)]

where

L = sentence length

S = mean syllables per 100 words

The lower the score the more difficult the passage. Flesch produced a table which he believed gave the level of difficulty of a passage.”

3- THE FOG INDEX

The Fog index and the Flesch index are very similar. Both use average words per sentence. However, the Fog index uses percentage of polysyllabic words as its measure of word difficulty, rather than number of syllables. A polysyllabic word is treated as one with three or more syllables. Again, five years must be added to arrive at the equivalent English age. The formula is:

US Grade = 0.4 x OWDS/SEN + % PSW)

where

WDS/SEN = average number of words per sentence

% PSW = percentage of polysyllable words”

The author advised extreme caution when interpreting the results. The readability formulas suffer from many methodological problems which undermine their validity. They do appear to measure textual difficulty, but further research is needed to assess the exact relationship of this to “readability” and to “understandability””