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Quality of Sustainability Disclosure, Signalling Theory, and Analyst Forecast

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Abstract- This paper examines the impact of the quality of sustainability disclosure (QSD) on the accuracy of analyst's earnings forecast. The study uses data from 1908 firm-year observations drawn from Egypt stock exchange covering 2009 to 2018. The results show evidence indicates that QSD mitigates information asymmetry by signalling QSD and improving the accuracy of analysts' forecast. In addition, this study distinguishes between the quantity and the quality of sustainability disclosure and examine their relationship with the accuracy of analyst forecast. The empirical results confirm that the QVD and its dimensions considered in the study framework give more realistic disclosure picture than quantity does. The results from the additional analysis also confirm the main result.

I. Introduction

Recently, the stakeholders' concern about sustainability disclosure (SD) has increased dramatically (e.g., Aribi and Gao, 2012; Diouf and Boiral, 2017; Friskeet al., 2022). Nevertheless, the research on the value relevance of SD to users in general and financial analysts in particular is scarce. This study examines the value relevant of SD to financial analysts when they estimate earnings for future periods using firm-level data from Egyptian listed companies. The current study argues that if quality and detailed SD would send a positive signal to stakeholder of strong sustainable performance (Dhaliwal et al., 2011; Rezaee and Tuo, 2019), then SD is expected to be more useful for analysts in assessing the firms' financial performance when the information disclosed is of high quality. Supporting this, Botosan (2004) argue that high quality disclosure is useful to the information's users in making financial decisions. High quality information also improves the ability of investors to evaluate future financial performance through considering better earnings forecasts (e.g. Dhaliwal et al., 2012; Becchetti et al., 2013; Bernardi and Stark, 2018). Recent empirical studies documented the relationship between the analysts' earnings forecasts and SD (Dhaliwal et al., 2012; Becchetti et al., 2013; Casey and Grenier, 2014; Ioannou and Serafeim, 2015; Garcia-Sanchez et al., 2019). This study is related but different from the work of prior studies in two aspects. First, Egypt has a different financial reporting environment in comparison with Western countries. Therefore, research findings for Western markets may not necessarily be applicable to the implementation of the Basic Standard in Egypt. Egyptian institutional laws, mechanism and governance are weak compared to Western countries (Reddy, 2016), it is also a fact that Egyptian listed companies have high presence of family and promoter groups ownership (Chauhan et al. 2016). Thus, research finding for Western countries may not be applicable for Egyptian context. Second, so far, prior studies employed two methods of measuring sustainability disclosure. The first method uses subjective sustainability rankings (e.g. Becchetti et al., 2013; Ioannou and Serafeim; 2015). Although of their popularity, sustainability ranking rarely evaluated and have been criticized for their own lack of transparency that helps stakeholder identify social responsible companies (Chatterji et al., 2009), in addition such ranking is not available in many countries and therefore cannot be applied widely. The second method evaluates sustainability reporting based on issuance of a stand-alone sustainability report without analysing the content of sustainability reports and evaluate the information provided to users. The issuance of standalone sustainability reports may be an attempt by management to convince powerful stakeholders that the firm is acting in the right way and socially and environmentally responsible, regardless of whether actual performance follows (Thorne et al., 2014). Unlike prior studies, this study offering new insights concerning the quality of sustainability disclosure (QSD) and its relationship with the accuracy of analyst forecast, and develops a multidimensional model to measure QSD. Second, Egypt has different financial reporting environment in comparison to Western Courtiers. This study finds evidence support the hypothesis, in fact, results of this study suggest that QSD mitigates information asymmetry by signalling QSD and improving the accuracy of analysts' forecast. The findings are also robust to the alternative measure of the attributes of analysts' earnings forecast and confirms the main results.

This study contributes to the literature in several ways. First, it extends the analyst forecast literature and the sustainability reporting literature. Prior studies show that SD is related to analyst forecast accuracy (Dhaliwal et al., 2012; Becchetti et al., 2013; Casey and Grenier, 2014; Ioannou and Serafeim, 2015). However, it is not clear whether the existence of sustainability information or the quality of sustainability information is relevant to

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analyst forecast accuracy. To the best of my knowledge, this is the first study examines whether the quality of sustainability information, as represented by the three dimensional framework, is related to analyst forecast accuracy. Second, sustainability reporting has been criticised for its lack of relevance and credibility (Husillos et al., 2011), this study seeks to contribute to this debate by developing new model to measure QSD that considers the quantity of information disclosed, the spread of SD, and usefulness of SD for users. Third, this study expands our understanding on the quantity vs quality of sustainability reporting. Study' findings suggest that it is quality of SD rather than quantity which enhance analyst forecast accuracy. Fourth, this study enrich analyst forecast literature and the sustainability reporting literature by examining their relationship in emerging economy context like Egypt.

This study proceeds as follows. The following section presents literature review and empirical studies. The description of the research method used in the paper was presented in the next section. After that, the findings sections outlines the main results and the final sections present the main discussion and implications.

II. Literature Review

Recently, internal managerial practice has been changed due to increased concern about firms' sustainability practices (Ioannou and Serafeim, 2010). Managerial disclosures about sustainability, which are quantifiable, specific, comparable, relevant and represent sustainability activities faithfully, is more likely to reflect the company's social and environmental behaviour with different stakeholders (Beattie et al., 2004). The QSD is related to disclosures that reflect companies' real commitment to sustainability strategies and thus mitigate asymmetric information (Dhaliwal et al., 2012). It has been argued that SD reduces asymmetric information, which may also mitigate the uncertainty risk, improve the financial decisions in the capital markets and enhances financial analysts' decisions (Sun et al., 2010). Wang and Tuttle (2014) indicated that financial analysts employ social and environmental disclosure to form a general impression about managers' credibility, which is related positively with the share price. However, low QSD may have negative impact on users' interest in sustainability activities (Botosan et al., 2004). If low quality information is reported by the manager, it will not enhance the judgments of analysts and other stakeholders (Dhaliwal et al., 2012). Transparency need to be increased by managers, and rhetoric statements about sustainability activities also should be improved through higher quality of sustainability disclosures (Delmas and Burbano, 2011).

Limited studies have investigated whether financial analysts use sustainability reporting to make their decisions and most of these studies are conducted using data from developed countries. For instance, Dhaliwal et al. (2012) examine the association between the analysts forecast accuracy and the stand-alone CSR disclosure by using data from 31 countries. They indicate that the stand-alone sustainability disclosure is negatively related to analyst forecast error. Becchetti et al. (2013), investigate the impact of the sustainability reporting on earnings forecast, using a sample of US companies from 1992 to 2012, they found that KLD CSR scores is positively related to the accuracy of earnings forecasts, particularly among the top CSR companies. Similarly, Casey and Grenier (2014) also provide evidence that the existence of sustainability reporting is negatively related to analyst forecast errors and dispersion. Ioannou and Serafeim (2015) also investigate the relationship between sell-side analysts' forecast and KLD CSR ratings. They used a sample of US companies over 15 years. They suggest that when analysts perceive CSR as an agency cost, due to the prevalence of an agency logic, they produce pessimistic recommendations for firms with high CSR ratings. Garrido et al., (2016) examine whether the issuance of a sustainability stand-alone report impact errors of analysts' earnings forecast in Spain. They provide evidence that the publication of sustainability reports negatively affect the error of earnings forecast. Garcia-Sanchez et al., (2019) examine whether this innovative practice provides a better reflection of a firm's social and environmental dimensions and therefore improves the forecasts made by financial analysts, who are significant stakeholders in this respect. Their analysis of an unbalanced sample of 750 international companies, located in 19 countries and operating in 22 business sectors during the years 2011–2016, in which a logistic regression is applied to the panel data, reveals the existence of a two-way relationship between the adoption of the GRI-IFC disclosure strategy and the level of analyst coverage. Moreover, the use of this strategy, and the resulting increase in coverage, has a positive impact on the accuracy of analysts' forecasts. Friske et al., (2022) examine the relationship between sustainability disclosure and firm value, as measured by Tobin's q. The results suggest that, sustainability reporting is negatively related to Tobin's q. In an analysis of sustainability reporting organizations, they find that external assurance is positively associated with Tobin's q. External audits appear to increase the credibility of reports.

One important gap in previous studies is related to the methods used to evaluate sustainability reporting which are the issuance of stand-alone report and CSR ranking. Both methods do not consider other important dimensions that distinguish the information provided to users. It is not possible to conclude the possible effects of sustainability reporting on analysts forecast accuracy

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without knowing whether sustainability disclosure conveys a quality information or not. Since singling theory suggest that the QSD could be used to mitigate information asymmetries (Watts and Zimmerman 1990; Miller 2002), it can be expected that the QSD is useful for various stakeholders and stock markets (Garrido et al., 2014). Thus, the current study argues that higher QSD will increase the accuracy of analysts' forecast. Therefore, the current study makes the main proposition as followings:

H1: QSD is positively associated with the accuracy of analyst earnings forecasts.

III. Research Method

a) Sample of the Study

The initial sample for the study is the companies in Egyptian Stock Exchange during the period from 2009 to 2018. Following prior studies (e.g., Arun et al. 2015; DeFond & Jiambalvo, 1994; Klein, 2002), financial, utilities and regulated companies are excluded because of the unique characteristics of their financial statements. Further to this, foreign cross-listed firms are excluded since they are influenced by different regulations. Firms with missing data were also excluded from the sample. The final sample consists of 1900 firm-year observations during the study period.

b) Measurement of QSD

The current study adapts the framework proposed by Beattie et al. (2004) for voluntary disclosure to measure sustainability disclosure. Their framework, consist of two dimensions: (i) the quantity of voluntary disclosure (ii) the spread of voluntary disclosure. In line with their work, this study develops a framework to captures three dimensions: (i) the quantity of sustainability disclosure (what and how much is disclosed) (ii) the spread of sustainability disclosure (coverage and concentration of sustainability disclosure) and (iii) the usefulness of sustainability disclosure (the qualitative characteristics of accounting information). This framework provides evidence on the nature of a company's sustainability disclosures based on three-dimensions, which allows to capture the quantitative and qualitative features concerning a specific kind of sustainability information.

i. *The quantity dimension*

The first dimension of QSD is the actual amount of disclosure, relative to the amount adjusted by two factors, size and complexity, prior studies shows these two variables to have a strong impact on disclosure (e.g. Beattie et al., 2004; Beretta and Bozzolan, 2008). This is more likely to help for evaluating sustainability disclosure taking into account the differences in the companies' size and industry.

To measure the quantity of sustainability disclosure in annual reports, a checklist containing 25 items was constructed (see Appendix 1). The current study follow previous studies to construct this checklist. In particular, this study follow Haniffa and Cooke (2002, 2005); Ghazali (2007); Khan et al. (2013); Kansal et al. (2014); Oikonomou et al. (2015) and develop a modified checklist including the items relevant to Egyptian companies. The coding unite used in previous studies, in content analysis units of disclosure, are words, text, sentences and paragraphs of sustainability disclosure. Each technique has its own advantages and drawbacks (Campbell, 2004). Coding by sentences, paragraphs and words has been criticised on the basis that different information may be included in the same paragraphs or sentences related to the sustainability disclosure. Also, individual words are meaningless. As a result, a text unit was employed to measure sustainability disclosure in this study, which was identified by Beattie and Thomson (2007) as "part of sentence captures a piece of information''.

Following Beattie et al. (2004) the dimension of disclosure quantity is measured by using the relative number of text units, which is adjusted by two external factors, size and industry type, that have been persistently found to influence the level of disclosure. The standardised residuals from an Ordinary Least Squares (OLS) regression of the number of text units on industry and size are used as proxy of the quantity dimension.

ii. *The spread dimension*

The second dimension measures the spread of sustainability information. Using spread dimension in this framework helps to evaluate whether the sustainability information disclosed meets the need of different stakeholders or focus on specific groups.

Following Beattie et al. (2004), the current study determines the spread as a function of the sustainability disclosure coverage (COV), and sustainability disclosure dispersion (DIS). The coverage is measured by the percentage of items (sub items) filled in by at least one piece of information out of the total number of items (sub items) in the checklist. The coverage ranges from 0 (non-disclosed) to 1 and assumes its maximum value when a company makes disclosure over each of the topics (subtopics) in the checklist. COV is measured as per the following equation:

$$\text{COV} = \frac{1}{\text{st}} \sum_{j=1}^{s} \text{INF}$$

Where, INF = 1 if company i discloses information about the item j in the annual report, otherwise = 0, and s = number of subcategory. Disclosure dispersion (DIS) indicates to how concentrated disclosed items are among checklist items. DIS is defined as follows:

$$\text{DIS} = 1 - \sum_{j=1}^{n} \quad \text{Pj2}$$

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Where, Pi = proportion of disclosure of item i measured by the frequency of item disclosed in category j. The minimum value of DIS is 0 when all sustainability disclosure text units fall in one category and the value is larger when sustainability disclosure text units are spread between categories. The higher value of DIS index is the higher quality of disclosure.

COV and DIS indexes help in estimating how dispersed information and how wide is. Larger DIS and COV indexes reveal the higher spread of information (SPR). Thus, this study calculates the spread as the average of COV and DIS as follows:

$$SPR = \frac{1}{2}(DIS + COV)$$

iii. *The usefulness dimension*

The usefulness dimension helps information users to evaluate QSD by capturing the four type characteristics: the relevance, faithful representation, understandability and comparability (based upon the qualitative characteristics of information suggested in the conceptual frameworks of IFRS (2010A). To measure the usefulness of sustainability disclosure, the study develops a disclosure index based on the qualitative characteristics of accounting information suggested in the conceptual frameworks of the International Financial Reporting Standards (IFRS) (2010A)"relevance" "faithful representation," "understandability" and "comparability". This allows for measuring the QSD by the weighted method as provided in earlier studies (Alotaibi and Hussainey, 2016; Braam and van Beest, 2013)(see Appendix 2). Thus, the current study defines the Usefulness as:

$$USEF = \frac{1}{4}(Relevance + Faithfulness + Understandability + Comparability)$$

Finally, the overall index of quality is the average of USEF, SPR and STRQ as follows:

$$\text{The Quality Index of disclosure (QSD)} = \frac{1}{3}(USEF + SPR + STRQ)$$

iv. *Checking Validity and Reliability*

Special considerations were given to reliability and validity of the measurements. To enhance validity, our themes and sub-themes were carefully developed from prior studies. In addition, the items validity of the initial index were reviewed independently by three expert scholars who discussed the ambiguities raised in the review. One way of improving reliability is to use multiple coders (Holsti, 1969; Aribi and Gao 2011) and, in this study, two other coders scored the research instrument. Any problems and discrepancies that arose were discussed and resolved accordingly via a set of basic coding rules. In addition, the disclosure coding scores were checked by comparing between the scores produced by the first author with those produced by the other two coders for a sample of annual reports.

c) Measuring the accuracy of analysts' earnings forecasts

Following Lang and Lundholm (1996) and Beretta and Bozzolan (2008) this study measure the accuracy (ACCU) as follows:

$$ACCU = -(EPSt - MFt,i)/Pt,i)$$

Where,
EPS = actual earnings per share in period t,
MF = the median analysts' forecast of earnings per share in period t,
P = share price in period t

To investigate the link between ACCU and QSD, this study following Beretta and Bozzolan (2008), controlled for factors such as industry type, leverage, profitability, size, and variation in accounting earnings., the following regression models are used.

$$ACCUit = \beta0 + \beta1\ \text{Disclosure proxy} + \beta2\ SIZE + \beta3\ LEV + \beta4\ ROA + \beta5\ ChROA + eit$$

Where,
Disclosure proxies = QSD, STRQ, SPR and USFUL
QSD = the quality of sustainability disclosure score measured through employing multidimensional proxy index.
STRQ = the standardised residuals from an Ordinary Least Squares (OLS) regression of the number of text units on industry and size (based on the checklist for each company and every year).
SPR = the spread is a function of the sustainability disclosure coverage, and sustainability disclosure dispersion.
USFUL = disclosure index developed based on the qualitative characteristics of accounting information suggested in the conceptual frameworks of the International Financial Reporting Standards (IFRS) (2010A).
ROA= profitability, measured through net income from operations divided by total assets.
SIZE= company size measured through the natural log of company's total assets.
LEV= leverage ratio measured through long-term debt scaled by total assets.
Ch-ROA = the variation in accounting earnings.
ACCU = accuracy of analysts' earnings forecasts

IV. Descriptive Statistics

Table 1describes the total observations, mean, standard deviation, minimum and maximum values and median for all variables used in this study. Table 1 shows the QSD has an average of 0.533, which is consistent with previous results reported by Martinez et al. (2015). For the dependent variable, the mean value of accuracy of analysts' earnings forecast is -0.016, which is in line with the findings reported by Bernardi, et al. (2015) in the South African who found that the mean

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value of accuracy of analysts' earnings forecast is -0.0102.Table 3 also reports descriptive statistics for various firm-specific variables and shows that the mean value of company size, which is measured by log total assets, is 7.48. The mean value of the return on total assets, as measure of the profitability is around 0.011, and the mean value of financial leverage is 0.64.

Table 2 shows that the highest correlation (0.276) as between accuracy of analysts' earnings forecast and DISE. The correlation coefficients of other variables used in the current study are below the thresholds showing that there is no multi-collinearity problem between the study independent variables (Grewal et al., 2004)[1].

Table 1: Descriptive statistics

Variable	Mean	Sd	p25	p50	p75
QSD	.533	.104	.359	.508	.62
SPR	.58	.10	.19	.58	.83
STRQ	.51	.21	.10	.52	.98
USFUL	40	.16	0	.33	.91
Accuracy	-.016	.220	-.074	-.023	-.0021
ROA	.112	.124	.041	.090	.15
SIZE	7.48	.663	7.00	7.39	7.8
LEV	.546	.224	.392	.583	.71
Ch-ROA	.0086	.329	-.031	-.002	.026

Table 2 presents descriptive statistics for all variables used in this study. QSD= Corporate social responsibility disclosure score measured through employing multidimensional proxy index. STRQ = the quantity dimension of QSD. SPR = the width dimension of QSD. USFUL = the usefulness dimension of QSD. Accuracy=accuracy of analysts' earnings forecast. ROA= profitability, measured through net income from operations divided by total assets. SIZE= company size measured through the natural log of company's total assets. LEV= leverage ratio measured through long-term debt scaled by total assets. Ch-ROA = the variation in accounting earnings[1].

[1] Grewal et al. (2004) argue that a multicollinearity problem above 80% might harm the findings of the regression analysis.

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Table 2: Correlations metrics

Panel A								
	QSD	ROA	Size	Type	Lev	Ch-ROA	DISE	ACCU
QSD	1.000							
ROA	0.018	1.000						
Size	0.101***	-0.113***	1.000					
Type	0.081***	0.041*	-0.074***	1.000				
Lev	0.005	0.071***	0.059***	0.006	1.000			
ChROA	-0.003	-0.049**	0.037	-0.003	-0.022	1.000		
DISE	-0.176***	0.029*	-0.107***	-0.0473**	0.024	-0.001	1.000	
Accuracy	0120***	-0.002	0.007	0.075***	0.088***	-0.11***	.279***	1.000
Panel B								
	STRQ	ROA	Size	Type	Lev	Ch-ROA	DISE	ACCU
STRQ	1.000							
ROA	0.0239	1.000						
Size	0.0531**	-0.113***	1.000					
Type	0.038*	0.041*	-0.074***	1.000				
Lev	0.0104*	0.071***	0.059***	0.006	1.000			
ChROA	-0.042*	-0.049**	0.037	-0.003	-0.022	1.000		
Accuracy	0.0967***	-0.002	0.007	0.075***	0.088***	-0.11***	.279***	1.000
Panel C								
	USFUL	ROA	Size	Type	Lev	Ch-ROA	DISE	ACCU
USFUL	1.000							
ROA	0.031	1.000						
Size	0.079***	-0.113***	1.000					
Type	0.052**	0.041*	-0.074***	1.000				
Lev	0.008	0.071***	0.059***	0.006	1.000			
ChROA	-0.039*	-0.049**	0.037	-0.003	-0.022	1.000		
Accuracy	0117***	-0.002	0.007	0.075***	0.088***	-0.11***	.279***	1.000
Panel D								
	SPR	ROA	Size	Type	Lev	Ch-ROA	DISE	ACCU
SPR	1.000							
ROA	0.049*	1.000						
Size	0.181***	-0.113***	1.000					
Type	0.177***	0.041*	-0.074***	1.000				
Lev	0.022	0.071***	0.059***	0.006	1.000			
ChROA	-0.038*	-0.049**	0.037	-0.003	-0.022	1.000		
Accuracy	0.028	-0.002	0.007	0.075***	0.088***	-0.11***	.279***	1.000

Table 3 reports the correlation coefficients between the dependent and independent variables. * Significance at the 0.10 level, ** Significance at the 0.05 level, *** Significance at the 0.01 level.

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V. Multivariate Analysis

In this section the current study examines whether QSD helps analysts in achieving higher accuracy in their earnings forcast. QSD and its three dimenstions are used as independent variables whereas the dependent variable used in the study model is the accuracy of analysts' earnings forecast. Table 3 shows that the QSD is statistically significant and positively related to the accuracy of analysts' earnings forecast at 0.01 level (Model1). This result is consistent with findings reported by prior studies (e.g. Beretta and Bozzolan 2008; Dhaliwal et al., 2012; Becchetti et al., 2013; Casey and Grenier, 2014), indicating that accuracy of analyst earnings forecasts is more likely to be higher when companies publish a higher QSD. Table 3also indicates that SPR and USEF as dimensions of QSD (Model 3 and Model 4) are statistically significant and positively related to the accuracy of analysts' earnings forecast (coef = 3.50, $p < 0.01$; coef = -1.54, $p < 0.05$, respectively). These findings suggest that USFUL dimension and SPR dimension are likely to increase the accuracy of financial analysis for earnings forecasts. Although STRQ dimension is insignificantly related to the accuracy of analysts' earnings forecast (Model 2), the relationship between them is still positive (coef = 0.334, $p < 0.282$). In general, the findings suggest that the identified framework in this study is more likely to help information users to evaluate the QSD for making their decisions and, therefore, comprises a positive phenomenon for stock markets.In respect control variables, table 3 also found evidence that SIZE (Model 2) is significantly and positively related to the accuracy of analysts' earnings forecast (coef = .317, $p < 0.05$), suggesting that the accuracy of earnings forecast can be predicted in large companies more than small companies. Finally, it is interesting to note that ROA (column 1 and column 3) is statistically significant and negatively associated with the accuracy of analysts' earnings forecast (coef = -.524, $p < 0.01$; coef = -.457, $p < 0.01$), suggesting that financial analysts are more likely to achieve less accuracy forecasts for companies with higher ROA.

Table 3: Regression panel analysis: Accuracy and QSD and its dimensions

	Accuracy Model 1		Accuracy Model 2		Accuracy Model 3		Accuracy Model 4	
	Coef	T	Coef	T	Coef	t	Coef	t
QSD	1.68***	3.72						
STRQ			.334	1.08				
USFUL					3.50***	5.42		
SPR							1.54**	2.25
ROA	.036	0.08	.142	0.29	.012	0.03	.065	0.13
SIZE	.091	0.82	.317**	2.04	.037	.22	.176	1.04
Type	1.052*	1.66	.001	-0.01	-011	-0.04	-012	-0.04
Lev	-.330	-1.31	.006	0.02	.039	0.14	.016	0.06
ChROA	-.524***	-3.84	-.455	-3.26	-.457***	-3.30	-.450	-3.23

Table 4 reports the relationship between accuracy of earnings analysts' forecast and the three dimensions of QSD. * Signfican ce at the 0.10 level, ** Significance at the 0.05 level, *** Significance at the 0.01 level.

VI. Quality vs Quantity of Sustainability Disclosure

The current study further compares the quantity measurement of sustainability disclosure with the quality measurement of sustainability disclosure in order to test whether the accuracy of analysts forecast is improved by using QSD framework, or not. This study argues that although quantity and quality are inseparable, however, mere quantity information related to sustainability activities may not improve the market decisions. Thus, the main analysis that reported in table 3 were repeated using content analysis to capture the quantity of sustainability disclosure (SD), through the number of text unit (e.g. Haniffa and Cooke, 2005; Belgacem and Omri, 2015). The test' findings is reported in table 4. The results indicate that SD (Model 5) is insignificantly associated with the accuracy of analysts' forecast (coef = 0.003, $p < 0.154$), while QSD(model 6)has a significant and positive correlation with the accuracy of analysts' forecast at 0.01 level. Furthermore, when the QSD and SD are employed as predictors in the same model (model 7), the findings reveal that QSD is statistically significant and positively related to the accuracy of analysts' forecast (coef = 1.68, $p < 0.01$) while SD did not show significant association (coef = -0.001, $p < 0.261$). These results support the main hypothesis of this studyand provide evidence that high quality information of disclosure are more likely to help financial analysts than just quantity information to predict earnings in the subsequent year.

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Table 4: Regression panel analysis 1: Accuracy and both QSD and DF

	Accuracy Model 5		Accuracy Model 6		Accuracy Model 7	
	Coef	T	Coef	t	Coef	T
QSD			1.68***	3.72	1.68***	3.73
DF	.003	1.42			.002	1.46
ROA	.199	0.40	-.036	-0.08	-.016	-0.04
SIZE	.422**	2.55	.091	0.82	.133	1.16
Type	.006	-0.02	.047*	1.66	.048*	1.67
Lev	.005	0.02	-.330	-1.31	-.329	-1.30
ChROA	-.457***	-3.27	-.524***	-3.84	-.522***	-3.83

Table 5 reports the relationship between accuracy of earnings analysts' forecast and both quantity and quality of sustainability disclosure. * Significance at the 0.10 level, ** Significance at the 0.05 level, *** Significance at the 0.01 level.

VII. Robustness Check

The current study conducts a robustness test to check for robustness of its results. An alternative measurement of the dependent variable the accuracy of analyst's earnings forecastis used to test whether the primary findings are robust to various measures or not. The main empirical analyses were repeated by using dispersion of analysts' earnings forecast (DISE) as alternative measure for the accuracy of analyst's earnings forecast. Following prior studies (e.g. Harjoto, et al., 2015; Garrido et al., 2016), this study uses standard deviation of analysts' earnings forecast as proxy of analyst's dispersion of earnings forecast. The measure for dispersion of analysts' earnings forecast was collected from Bloomberg database.

Table 5 provides evidence that QSD is negatively related to DISE at 0.01 level (Model 8). These results are consistent with the main finding in table 4 suggesting that when manager report higher quality of disclosure, they are more likely to help financial analysts in reducing their error of earnings forecast at the subsequent year. Table 5 also provides results for the relationship between DISE and QSD dimensions. The three dimensions of QSD (in Model 9, Model 10 and Model 11) are statistically significant and negatively related to DISE (coef = -.588, $p < 0.01$; coef = -1.35, $p < 0.01$; coef = -.798, $p < 0.01$ respectively). These results provide other evidence that the main results are robust unchanged with alternative measures.

Table 5: Regression panel analysis: dispersion and QSD

	DISE Model 8		DISE Model 9		DISE Model 10		DISE Model 11	
	Coef	t	Coef	t	Coef	T	Coef	T
QSD	-1.32***	-6.05						
STRQ			-.588***	-3.80				
USFUL					-1.35***	-4.84		
SPR							-.798***	-3.83
ROA	-.427**	-1.97	-.619**	-2.48	-.42*	-1.92	-.485**	-2.22
SIZE	-.225***	-4.29	-.431***	-5.53	-.20***	-3.79	-.243***	-4.58
Type	1.013	-1.06	-.007	-0.05	-.009	-0.74	-.016	-1.25
Lev	.109	0.89	.065	0.46	.096	0.78	.111	0.90
ChROA	.061*	1.34	.097	0.55	.101	0.57	.086	0.48

Table 6 reports the relationship between dispersion of earnings analysts' forecast and quality of sustainability disclosure. * Significance at the 0.10 level, ** Significance at the 0.05 level, *** Significance at the 0.01 level.

VIII. Concluding Remarks

This study examines the relationship between the QSD and the accuracy of analyst forecast using a sample of the Egyptian listed companies. The paper argues that the accuracy of analyst earnings forecast is more likely to be increased when companies do report higher QSD. This study combines different dimensions to measure the QSD: the quantity of the information disclosed (how much is disclosed), the spread of the information disclosed (coverage and dispersion), and the usefulness of the information disclosed (characteristics of accounting information). The current study performs OLS regression and find that QSD practices are associated with analyst forecast accuracy. The empirical results also confirm that the dimensions considered in the study framework give more realistic disclosure picture than quantity does. In the additional

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analysis, the study distinguishes between the quantity and the quality of sustainability disclosure and examine their relationship with the accuracy of analyst forecast. The results from this additional analysis confirm the main result. In line with signalling theory, the findings suggest that QSD could be used to mitigate information asymmetries and increase accuracy of analyst forecast.

These results are important for standard setters and regulators because they assess the possible effectiveness of sustainability disclosures. The results also advance the understanding of the role played by QSD in the stock valuation process and provide guidance to investors on how to utilise the sustainability disclosure that companies provide.

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Appendix 1

Sustainability disclosure checklist items

1- **Community development**
   1- Education,
   2- Contribution to national economy
   3- Charity and donation,
   4- Social activities support
   5- Other Community investment

2- **Human resources**
   1- Safety and health,
   2- Employee equal opportunities
   3- Employee training and development
   4- Retirement benefits.
   5- Other employee Data

3- **Products and services**
   1- Products/ Services quality
   2- Products safety.
   3- Product or service development,
   4- ISO or other awards received by company.
   5 - Other products data

4- **Customer**
   1- Customer service information.
   2- customer feedback
   3- Others customer data

5- **Environment**
   1- Pollution
   2- Recycling
   3- Waste management
   4- Water usage
   5- Emission of carbon and harmful gases
   6- Energy policy statement
   7- ISO or other awards received by company
   8- Other environmental policy statement

6- **Others sustainability Information**
   1- General sustainability Information

Appendix 2

Weighted Method for Usefulness Dimension

	Question	Likert's	Literature
Relevance	Sustainability disclosure is estimated to be relevant if it has an influence on the users' decisions (IASB, 2010, p. 17). IFRS suggests that financial information impacts the decision-making by users to make it different.	0 = nosustainability disclosure 1= disclose descriptive information on sustainability is disclosed, 2 = descriptive and financial information of sustainability disclosure is included, 3 = descriptive disclosure including financial and forward-looking information is reported.	e.g. Jonas and Blanchet, 2000; McDaniel et al., 2002; Chakroun et al. 2013, Hussainey, K., & Alotaibi, K., 2016.
Faithful representation	Sustainabilitydisclosure to be faithfully representative, it should be natural, complete and free of the bias (IASB, 2010).	0 = no negative and positive sustainability activities are disclosed. 1 = few positive events are disclosed (one paragraph). 2 = more positive events are disclosed (more than one paragraph). 3 = more positive events with negative events are disclosed.	e.g. Razaee, 2003; Cohen et al., 2004; Chakroun et al. 2013, Hussainey, K., & Alotaibi, K., 2016.

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Understandability	Understandability is defined as understanding of disclosure regarding the information quality which help users to understand the disclosure meaning. (IASB, 2010), when information is classified concisely and presented clearly, understandability will be enhanced.	0 = no disclosure on sustainability. 1 = poor presentation (nonfinancial information only, without any table, pictures or graphs). 2 = financial and nonfinancial information without any table, pictures or graphs are provided. 3 = a good presentation (text, financial information plus graphs, tables or pictures)	e.g. Jonas and Blanchet, 2000; Chakroun et al. 2013, Hussainey, K., & Alotaibi, K., 2016.
Comparability	The Comparability is defined as the quality of disclosure that enables users for identifying the performance trends of the company over time and help users to compare between two sets of economic activities (IASB, 2010).	0 = no ratios is found in annual report. 1 = few ratios are found (less than 5). 2 = some ratios are found (from 5 to 10). 3 = enough ratios are found (more than 10).	e.g. Cleary, 1999; Hussainey, K., & Alotaibi, K., 2016.

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