

# Critical Literature Synthesis of Social and Environmental Performance and Disclosure Relationship: A Review of Empirical Studies

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## ABSTRACT

In this paper, we synthesize and critically assess empirical research on the relationship between social/environmental performance (SEP) and social/environmental disclosure (SED). We, therefore, use literature synthesis and critical assessment in conducting our review, focusing on theory selection and application, methods used and results reported by the empirical studies included in our sample of 77 studies. Empirical evidence documented to date in the area is still mixed ranging from positive, negative, nonlinear to neutral relationship. We found various reasons attributable to the persistent mixed-findings. These include issues on measurements of performance and disclosure variables; inconsistencies concerning the choice and application of econometric measures of association and the rather unsystematic way in which some researchers employ theories. We posit that mixed findings are here to stay because positive, negative or nonlinear relationship may appear consistent and appropriate depending on the research circumstance of a study, theory used and the kind of method employed. As a comprehensive literature review, this paper identifies some inconsistencies in the research area and proposes a road-map giving suggestions for future research focusing on purpose, location, nature of the study, methods and systematic choice of theory/theories.

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## 1. Introduction

Empirical research on the relationship between social and environmental performance (SEP) and social and environmental disclosure (SED) is conducted for various reasons. However, the main purpose of analyzing this relationship is to provide evident explanations for the differences in

managerial disclosure practices accounted for by changes in SEP (Patten, 2002; Cho et al., 2012a). Some studies investigate the relationship between the two variables to determine whether users of annual reports, especially investors, rely on social and environmental information for investment decisions (Ingram & Frazier, 1980; Rockness 1985; Li et al., 1997; de Villier and van Staden; 2011). Another objective of examining this relationship is to evaluate how socially and/or environmentally accountable and transparent corporations are to their stakeholders (Vurro and Perrini, 2011; Liao et al., 2015; Arena et al., 2015; Guenther et al., 2016). Others seek to analyse managerial disclosure practices in their attempts to strengthen strategic posture (Roberts, 1992; Dragomir, 2010; Reverte, 2009; Herbohn et al., 2014; Bouten et al., 2012). Yet, other studies investigate the relationship to evaluate managers' use of voluntary SEDs to explain poor SEP (Patten, 1992; Patten, 2002a; Cho et al., 2010; Braam et al., 2016) or announce their better SEP to differentiate their firms from poor performers (Clarkson et al. 2008; Dawkins and Fraas, 2011b; Clarkson et al. 2011; Deswanto and Siregar, 2018). These multiple sub-purposes driving empirical research on SEP-SED relationship are possibly contributing to the mixed and inconclusive findings in the area. We suspect that, at least in part, other theoretical and methodological issues also contribute to the mixed findings. Consequently, theory applications for which there are unclear guidance and methodological concerns motivate our review.

Legitimacy theory (LT), voluntary disclosure theory (VDT), stakeholder theory (SHT), impression management and agency theory are the theories mainly applied by researchers to underpin the relationship between SEP and SED. However, only a few studies applied impression management (see, Cho et al., 2010; Cho et al., 2012c, 2012d) and economic agency theory (see, Belkaoui and Karpik, 1989; Iatridis, 2013; Chaklader and Gulati, 2015). Although, very little attention has been given to the use of SHT, there is an interesting debate going on concerning the selection and application of LT and VDT. While some researchers consider LT and VDT competing (Clarkson et al. 2008; de Villier and van Staden, 2011; Cho et al., 2012a), others argue that they are complementary (Dawkins and Fraas, 2011a; Meng et al., 2014; Hummel and Schlick, 2016). This indicates that there is lack of clear and systematic direction on which theory to apply given a specific research circumstance and objective.

Methodological issues likely to create concern in this niche relate to measurements of SEP and SED, choice of control variables and application of econometric measures of association. Measurement of SEP has been particularly described as challenging (Ingram and Frazier, 1980; Brammer and Pavelin, 2006; Herbohn et al., 2014), problematic (Ilinitch et al. 1998)

and has been notably cited as one of the major reasons behind mixed results in the area (Patten, 2002; Dawkins and Fraas, 2011a). Obviously, measurement of SED is commonly implemented using content analysis. Various versions of this approach ranging from simple binary approach (Barth et al., 1997; Bae, 2014; Cho et al., 2012a), robust indexing procedures (Wiseman, 1982; Clarkson et al., 2008) to computer-assisted approaches (Cho et al., 2010; Arena et al., 2015) have been employed. It seems that cross-sectional regression has been the dominant econometric method used in estimating the relationship between SEP and SED. This is a possible sign that most researchers are reluctant to employ time-series and panel data methods. Despite the fact that cross-sectional regression may not be appropriate in each circumstance, the method requires certain assumptions to hold including normality, absence of multicollinearity, homoscedasticity and absence of too many outliers. In addition, to avoid misspecifying the regression model, all the relevant control variables that may interfere with the true relationship ought to be identified and included.

In view of the foregoing and the fact that no comprehensive literature review has been conducted in this specific research area, this paper synthesizes and critically assesses empirical studies on the relationship between SEP and SED. More specifically, our review focuses on theory selection and application, methods used and results reported by 77 empirical studies. The paper proceeds as follows. Section 2 describes the method used in conducting the review. Section 3 is devoted to the pieces of evidence in support of the theories used in the area. Next, we present section 4 focusing on variables measurements. Section 5 presents a critical assessment of measures of association employed. Section 6 discusses our findings and the study is concluded and future direction discussed in section 7.

## **2. Methodology**

Our approach followed three specific tasks namely, literature synthesis, critical assessment and suggestion of a roadmap for future research. Firstly, literature synthesis involves classifying and analysing studies based on certain elements that they have in common or differently leading to the derivation of new attributes or findings (Ridley, 2012; Berthelot et al., 2003). Consequently, we systematically categorized, blended and analysed studies in this niche based on, for example, theories adopted; nature of the relations established; type of content analysis employed; measurement strategy for SEP variable; statistical measures of association employed and choice of control variables. Secondly, critical assessment relates to identifying and discussing weaknesses of studies based on identified inconsistencies or irregularities relating to certain elements (Owen, 2008). In particular, we

discussed weaknesses of the studies in the niche relating to econometric measures of association, measurement of SEP and SED and choice of control variables. Thirdly, we suggested a roadmap to guide the conduct of future research.

To conduct our review pursuant to the tasks outlined in the preceding paragraph, we first defined the niche relevant to our study. In this study, we define niche as a specific domain within a sub-area of a broader area of research. Therefore, SEP-SED-relationship research niche consists of empirical studies conducted on the relationship between SEP and SED, located within the broader social and environmental accounting (SEA) area. To compile studies for our review, we carried out both manual and electronic searches. First, we conducted electronic search of reputable publishers' websites, journal databases and general search engines. We particularly searched ScienceDirect, Emerald, Wiley, Springer link, Taylor and Francis, Sage, JSTOR, Inderscience, Business Source Premier and ProQuest. The following search words were used: 'environmental performance and environmental disclosure', 'social performance and social disclosure', 'CSR and CSR disclosure', 'sustainability performance and sustainability disclosure', 'determinants of social disclosure', 'determinants of environmental disclosure', 'determinants of sustainability disclosure' and determinants of CSR disclosure. Manual search at physical libraries were conducted to access very few older studies that we could not find on the internet. After searching all the relevant websites, 116 studies were compiled. However, a final sample consisting 77 studies emerged after applying the following inclusion criteria.

- (i) Articles must directly or indirectly examine the relationship between SEP and SED;
- (ii) must be empirical;
- (iii) must be published by a reputable publisher or journal and
- (iv) must be published between 1976 and 2019 (lower and upper boundaries inclusive).

**Table 1**  
**Sample: list of 77 articles reviewed**

<i>S/N</i>	<i>Study</i>	<i>Journal</i>
1	Abbot and Monsen (1979)	The Academy of Management Journal
2	Alberici and Querci (2015)	Corporate Social Responsibility and Environmental Management
3	Al-Tuwaijri, Christensen and Hughes II (2004)	Accounting, Organizations and Society

*contd. table 1*

<i>S/N</i>	<i>Study</i>	<i>Journal</i>
4	Arena, Bozzolan and Michelon (2015)	Corporate Social Responsibility and Environmental Management
5	Bae (2014)	American Review of Public Administration
6	Barth, McNichols and Wilson (1997)	Review of Accounting Studies
7	Belkaoui and Karpik (1989)	Accounting, Auditing and Accountability Journal
8	Bewley and Li (2000)	Advances in Environmental Accounting and Management
9	Bouten, Everaert, and Roberts (2012)	Journal of Business Finance & Accounting
10	Braam, Weerd, Hauck and Huijbregts (2016)	Journal of Cleaner Production
11	Brammer and Pavelin (2004)	Business Ethics: A European Review
12	Brammer and Pavelin (2006)	Journal of Business Finance & Accounting
13	Brammer and Pavelin (2008)	Business Strategy and the Environment
14	Chaklader and Gulati (2015)	Global Business Review
15	Chiu and Wang (2015)	Journal of Business Ethics
16	Cho and Patten (2007)	Accounting, Organizations and Society
17	Cho and Roberts (2010)	International Journal of Accounting Information Systems
18	Cho, Freedman and Patten (2012)	Accounting, Auditing and Accountability Journal
19	Cho, Guidry, Hageman and Patten (2012)	Accounting, Organizations and Society
20	Cho, Michelon and Patten (2012a)	Accounting and the Public Interest
21	Cho, Michelon and Patten (2012b)	Sustainability Accounting, Management and Policy Journal
22	Cho, Patten and Roberts (2006)	Journal of Business Ethics
23	Cho, Roberts and Patten (2010)	Accounting, Organizations and Society
24	Clarkson, Li, Richardson and Vasvari (2008)	Accounting, Organizations and Society
25	Clarkson, Overell and Chapple (2011)	ABACUS
26	Cong and Freedman (2011)	Advances in Accounting, incorporating Advances in International Accounting
27	Cong, Freedman and Park (2014)	Advances in Accounting, incorporating Advances in International Accounting
28	Cowen, Ferreri and Parker (1987)	Accounting, Organizations and Society
29	Darrell and Schwartz (1997)	Journal of Accounting and Public Policy
30	Dawkins and Fraas (2008)	Business and Society
31	Dawkins and Fraas (2011a)	Journal of Business Ethics
32	Dawkins and Fraas (2011b)	Journal of Business Ethics
33	de Villier and van Staden (2011)	Journal of Accounting and Public Policy

*contd. table 1*

<i>S/N</i>	<i>Study</i>	<i>Journal</i>
34	Deswanto and Siregar (2018)	Social Responsibility Journal
35	Dragomir (2010)	Journal of Accounting and Organizational Change
36	Elijido -Ten (2004)	Asian Pacific Interdisciplinary Research
37	Fekrat, Inclan and Petroni (1996)	The International Journal of Accounting
38	Freedman and Jaggi (1982)	Omega
39	Freedman and Wasley (1990)	Advances in Public Interest Accounting
40	Fry and Hock (1976)	Business and Society Review
41	García-Ayuso and Larrinaga (2003)	Spanish Journal of Finance and Accounting
42	Gelb and Strawser (2001)	Journal of Business Ethics
43	Guenther, Guenther, Schiemann and Weber (2016)	Business & Society
44	Hassan and Ibrahim (2012)	Corporate Social Responsibility and Environmental Management
45	Hassan and Kouhy (2013)	Accounting Forum
46	Hassan and Kouhy (2014)	International Journal of Accounting and Economics Studies
47	Hassan and Romilly (2018)	Business Strategy and the Environment
48	He and Loftus (2014)	Pacific Accounting Review
49	He, Tang and Wang (2013)	China Journal of Accounting Studies,
50	Herbohn, walker, and Loo (2014)	ABACUS
51	Hughes, Anderson and Golden (2001)	Journal of Accounting and Public Policy
52	Hummel and Schlick (2016)	Journal of Accounting and Public Policy
53	Iatridis (2013)	Emerging Markets Review
54	Ingram and Frazier (1980)	Journal of Accounting Research
55	Jaggi and Zhao (1996)	The International Journal of Accounting
56	Li, Richardson and Thontom. (1997)	Contemporary Accounting Research
57	Liao, Luo and Tang (2015)	The British Accounting Review
58	Lu and Taylor (2018)	Asian Review of Accounting
59	Luo (2017)	Accounting and Finance
60	Luo and Tang (2014)	Journal of Contemporary Accounting and Economics
61	Meng, Zeng, Shi Qi, and Zhang (2014)	Journal of Environmental Management
62	Michelon (2011)	Corporate Reputation Review
63	Monteiro and Aibar-Guzmán (2010)	Corporate Social Responsibility and Environmental Management
64	Oates and Moradi-Motlagh (2016)	Australasian Journal of Environmental Management
65	Patten (1991)	Journal of Accounting and Public Policy,
66	Patten (1992)	Accounting, Organizations and Society
67	Patten (2002a)	Accounting, Organizations and Society
68	Patten (2002b)	Accounting Forum

*contd. table 1*

<i>S/N</i>	<i>Study</i>	<i>Journal</i>
69	Qian and Schaltegger (2017)	The British Accounting Review
70	Reverte (2009)	Journal of Business Ethics
71	Roberts (1992)	Accounting, Organizations and Society
72	Rockness (1985)	Journal of Business Finance and Accounting
73	Rover, Murcia and Murcia (2015)	Environmental Quality Management
74	Stantoputra, Lindarf and Johnson (2012)	Australasian Journal of Environmental Management
75	Tadros and Magnan (2019)	Sustainability Accounting, Management and Policy Journal
76	Vurro and Perrini (2011)	Corporate Governance: The International Journal of Business in Society
77	Wiseman (1982)	Accounting, Organisation and Society

### 3. Theoretical underpinnings of the relationship between SEP and SED

#### 3.1. Dominance of insignificant relationship in early research

Except for Fry and Hock (1976), Abott and Monsen (1979) and Cowen et al. (1987), early empirical studies published in the 80's and 90's such as Ingram and Frazier (1980), Freedman and Jaggi (1982), Wiseman (1982), Rockness (1985), Freedman and Wasley (1990), Jaggi and Zhao (1996) and Fekrat et al. (1996) documented no-association between SEP and SED. A consistent feature of these studies is their exclusion of social aspect from the performance and disclosure variables. Obviously, this shows possible attempts by these studies to avoid difficulties in measuring social performance (Dawkins and Fraas, 2011b). Another consistent feature of these studies is their focus on the investment decision implications of SEDs. For instance, some studies investigated the reasons behind report users' reluctance to rely on environmental disclosures for investment decisions (Ingram and Frazier, 1980; Freedman and Jaggi, 1982). Others attempted to investigate whether environmental information was relevant for managerial decisions (Jaggi and Zhao, 1996), investment and other financial decisions (Wiseman, 1982; Rockness, 1985; Freedman and Wasley, 1990; Fekrat et al., 1996). However, the study by Fekrat et al. (1996) is different from the rest of the studies that found no association between performance and disclosure, for the authors applied a theory to underpin the relation. The study found no-association between environmental performance and disclosure implying absence of empirical support for VDT. In a slightly different context, results reported by Cowen et al. (1987) showed that when total CSR disclosure was disaggregated into its specific components, CSR committee appeared significantly positively associated with human

resource disclosure; otherwise the authors concluded that there was no association between the two variables.

Although, in the main, earlier studies reviewed in the preceding paragraph consistently documented absence of statistically significant association, they ought to be praised for two important contributions to the development of empirical research in the area. Firstly, it has to be admitted that these studies laid the foundation supporting the conduct of recent studies. Secondly, these studies must be commended for their efforts in developing various content analysis methods (see, for example, Ingram and Frazier, 1980; Wiseman, 1982) mainly adopted and sometimes improved upon by subsequent researchers.

Despite the merits identified with the early studies, they have been heavily criticised in many ways. For instance, these studies have been accused of not employing large samples and failure to control for size and industry type (Patten, 2002). In addition, they have been criticised for using environmental performance measurement strategy based on Council on Economic Priority (CEP) rating which has been described as faulty (Dawkins and Fraas, 2011a; Cong and Freedman, 2011). Furthermore, apart from Fekrat et al. (1996) all the early studies conducted in the period (1976-1995), are lacking in terms of engagement with theory.

### *3.2. Voluntary disclosure theory (VDT) evidence*

VDT originates from managers' tendencies to use the release of voluntary nonproprietary information over which they have control to enhance organisational economic benefits (Dye, 1986; Li et al., 1997; Hummel and Schlick, 2016; Deswanto and Siregar, 2018). Dye (1986) describes nonproprietary information as private and verifiable information whose disclosure increases the present value of future cash flows. Since companies disclose most social and environmental information voluntarily such information could be described as nonproprietary. Consequently, VDT may underpin disclosures of social and environmental information by corporations. Consistent with this theory, it is argued that to derive economic benefits, corporations tend to increase disclosures of social and environmental information if they record good SEP that cannot be copied by poor performers (Clarkson et al., 2008; Dawkins and Fraas, 2011a). Conversely, poor performers tend to decrease voluntary disclosure of this information to avoid or reduce proprietary costs (Dye, 1985) and being seen in bad light (Clarkson et al., 2008).

Li et al. (1997), Barth et al. (1997), Bewley and Li (2000) used VDT to explain the positive association between environmental performance and



disclosure in context of financial reporting. Their basic premise is that firms report environmental information in annual reports alongside the usual financial information. They also share the implicit belief that disclosure of environmental information is mainly driven by economic benefits. Furthermore, they consistently contend that uninformed stakeholders will form their opinion about firms' environmental impacts using all available sources including external sources (Barth et al., 1997; Bewley and Li, 2000). Consequently, firms will release environmental information that reflects external evaluations of their environmental performance such that verifications by uninformed stakeholders will not reveal significant differences. It is indeed evident that the three studies share the implicit assumption that higher pollution propensity reflects better environmental performance which drives more extensive environmental disclosures.

However, other researchers who tested VDT through the positive relationship between SEP and SED have done so in context of nonfinancial reporting. In doing so, they relied on stand-alone sustainability reports (Clarkson et al., 2008; Clarkson et al., 2011), web-based environmental reports (Sutantoputra et al., 2012), participation in a nonfinancial disclosure program (Bae, 2014; Luo and Tang, 2014) or social and environmental disclosures made in annual reports (Al-Tuwaijri et al., 2004) as the main sources of information used to measure the disclosure variable. A consistent goal of these studies relates to the application of VDT to determine whether disclosure of verifiable information that cannot be copied by poor performers is explained by better environmental performance. Although, Al-Tuwaijri et al. (2004) and Luo and Tang (2014) did not emphasize on the specificity of environmental information, Clarkson et al. (2008), Clarkson et al. (2011) and Dawkins and Fraas (2011b) argued that consistent with VDT specific environmental information is positively determined by environmental performance.

While these studies seem to have economic benefits that managers seek to derive in releasing environmental information based on environmental performance as common implication, they also tend to have other inconsistent implications. For instance, describing the implication of their findings in light of Ullmann (1985) strategic posture, Al-Tuwaijri et al. (2004) claim that their finding provides further insight into our comprehension of the interplay between environmental commitments, management disclosure strategy and profitability. However, Clarkson et al. (2011) explicate that their results raise persistent concern regarding the reliability of voluntary environmental disclosures, and therefore they call for increased regulations of the disclosure of this kind of information. In a slightly different context,

Dwakins and Frass (2011b) recognise the influence of media visibility in amplifying the effect of environmental commitments on management strategy concerning the amount and nature of environmental information managers are prepared to release. This enhances our understanding of the role that visibility plays in explaining the reporting practices of managers. However, the positive association reported by Deswanto and Siregar (2018) between the lagged values of environmental performance and current values of disclosure implies that it takes at least one year for the signal of good environmental performance to be recognized by the market or the information users.

### *3.3. Evidence of stakeholder theory*

SHT has been widely applied to explain managerial disclosure practices relating to SEDs as strategic tools (Ullmann, 1985; Roberts, 1992). In this light, it is argued that social and environmental information is provided to manage stakeholders' conflicting information needs (Cooper and Owen, 2007; Vurro and Perrini, 2011). Secondly, others contend that the information is reported to serve as a dialoging tool between the reporting entity and various stakeholders in the society (Cooper and Owen, 2007; Muller and Kolk, 2009). Thirdly, and more recently, it has been suggested that social and environmental information is conveyed to various users to facilitate the inclusion of various groups in the reporting process (Cooper and Owen, 2007; Global Reporting Initiative, 2014).

Studies that have relied on SHT to explain the positive association between SEP and disclosure could be split into two categories. The first category is composed of studies that have tested SHT based on Ullmann's (1985) strategic posture framework (Roberts 1992; Reverte, 2009; Herbohn et al., 2014; Bouten et al., 2012). In testing SHT via this framework, SEP variables are mainly defined as strategic posture variables that are driving changes in SEDs (Lu and Taylor, 2018). Public affairs and philanthropic committee (Roberts, 1992), press releases (Herbohn et al., 2014), ethics committee and stakeholder engagement (Michelon, 2011), donations to Tsunami funds (Bouten et al., 2012), Truecost environmental impact score (Lu and Taylor, 2018) were used to represent strategic posture. Consistent with SHT, these studies mostly established significant positive relationships between these strategic-posture-based variables and measures of SED.

The second category consists of studies that test the theory to gain insights into how managers use SEDs to manage various stakeholders (Brammer and Pavelin, 2004; Vurro and Perrini, 2011; Liao et al., 2015; Arena et al., 2015; Guenther et al., 2016). Studies in this category have, at least,

one of the following three possible implications: (i) managing stakeholder conflicting information needs (Vurro and Perrini, 2011; Chiu and Wang, 2015); (ii) gaining trust/confidence of stakeholders through transparency (Arena et al., 2015) and (iii) enhancing stakeholder engagement (Liu and Anbumozhi, 2009; Dragomir, 2010; Liao et al., 2015). For example, consistent with the first implication, Vurro and Perrini (2011) find that companies with better social performance provide more extensive SEDs designed and structured to facilitate effective management of all-encompassing stakeholders. This implies that better performers tend to structure and provide CSR information for all stakeholder groups in a balanced way. Based on the second implication, Arena et al., (2015) conclude that increased environmental disclosure transparency is used as a strategic tool to communicate superior environmental performance to stakeholders. In light of the third implication and to establish whether the environment is a stakeholder, Dragomir (2010) analysed the relationship among environmental performance, environmental disclosure and economic performance and reported a significant positive association between environmental performance and disclosure.

#### *3.4. Legitimacy theory (LT) evidence*

LT proposes that an organisation enjoys supports from the society if its system value matches that of the society (Patten, 1991, 1992). Thus, the theory advocates that for an organisation to operate successfully in a society, it must conduct its affairs in accordance with what the society has recognised as generally acceptable social behaviours (O'Donovan, 2002). When the social acceptability of an organisation is threatened its management attempts to manage such threat by changing the perception of the legitimacy-conferring public. In an attempt to give a clearer picture of this theory, O'Donovan (2002) notes that LT attempts to explain the fact that the greater the magnitude of negative perception by the society, the more effort will be made by the management to change such adverse perception through increased disclosures. This, therefore, implies a negative relationship between SEP and SED.

Numerous studies have tested LT using different approaches in their attempts to explain what motivates corporations to provide more or less SEDs. Firstly, studies have tested LT by carrying out single-variable time-series analysis for a single case (Hogner, 1982; Tilling and Tilt, 2010). Secondly, others have employed an approach involving the conduct of time-series analysis of SED as a single variable for several companies to test the theory (Guthrie and Parker, 1990; Campbell, 2004). A third approach

involves testing LT when there is social/environmental crisis (Patten, 1992; Darrell and Schwartz, 1997; Arora and Lodia, 2017). A fourth category is comprised of studies that test the theory by comparing poor performing group with better performing companies (Hughes et al., 2001; Cho and Patten, 2006; Cho and Robberts, 2010). A fifth approach involves an analysis of the relationship between SEP and SED, and this kind of investigation mainly focuses directly on the two variables (Patten, 2002; Cho et al., 2010; Devilier and van Staden, 2011; Bae, 2014; Braam et al., 2016; Luo, 2017) with other variables serving as control or mediator variables. Out of the five approaches outlined in this paragraph, only the studies that used the last three approaches are relevant to our review.

Patten (1992), Darrell and Schwartz (1997) and Arora and Lodhia (2017) tested LT in times of environmental disaster. Combining the third and fifth approaches, Patten (1992) found involvement in Alyeska, as an indicator of poor environmental performance, significantly positively associated with changes in the volume of environmental disclosures from 1988 to 1989. Extending Patten (1992), Darrell and Schwartz (1997) investigated changes in the extensiveness of CSR disclosure after the Exxon Valdez oil spill disaster. Consistent with Patten (1992), Darrell and Schwartz (1997) reported significant increases in CSR disclosures in 1988, 1989 and 1990. More recently, Arora and Lodhia (2017) used a qualitative thematic analysis to investigate how British Petroleum had used increased environmental disclosures to manage reputation during the Gulf of Mexico oil spill disaster. Unlike Patten (1992), Darrell and Schwartz (1997) did not use any measure of association to test the direct statistical relationship between environmental performance and disclosure variables. However, the study by Arora and Lodhia (2017) is different from both Patten (1992) and Darrell and Schwartz (1997) as none of the two variables has been quantitatively measured in the study.

Consistent with LT, the study by Hughes et al. (2001) established that poor environmental performers provided more extensive environmental disclosures than good performers. Similarly, Cho and Patten (2007) used two-sample t-test for mean difference to report that environmental performance and disclosure were negatively related. Using two-sample comparative analysis, Cho and Roberts (2010) also applied the lens of Goffman's self-presentation theory in context of LT to investigate the association between web-based environmental disclosure and environmental performance. The three studies reviewed in this paragraph were conducted using groups comparison of firms' disclosures based on the fourth approach. Note that these studies invariably grouped companies in their samples based on environmental performance.

Majority of researchers who tested LT did so by examining the relationship between SEP and SED. Thus, based on the fifth approach, studies such as Patten (1991), García-Ayuso and Larrinaga (2003), Reverte (2009), Cho et al. (2012b), He et al. (2013), Cong et al. (2014), Bae (2014), Braam et al. (2016) and Luo (2017) reported evidence in support of LT by examining the empirical relation between SEP and SED. They invariably reported a significant negative relationship between the two variables. However, Patten (2002), Cho and Roberts (2010), de Villier and van Staden (2011), Cho et al. (2012c) established a significant negative association between SEP and SED, by combining the fourth and the fifth approaches. This means that they compared the SEDs of groups with good environmental performance to the disclosures of groups with poor performance and investigated the relationship between the two variables. However, a more recent study by Qian and Schaltegger (2017) use lag-lead panel data model in the first difference and established a significant positive association between the lagged values of carbon disclosure and the current values of carbon performance to provide evidence in support of LT. This result highlights a management disclosure practice that involves the use of prior period's environmental disclosures to anticipate and fill legitimacy gaps in the current or other subsequent periods. In sum, it should be noted that the ultimate implication of studies that have established evidence for LT is that what derives SED is neither economic benefit nor a demonstration of transparency and accountability to stakeholders but mainly securing societal acceptability and approval.

### *3.5. Evidence of mixed theories*

Documentation of both positive and negative associations between SEP and SED is evident in the literature and is possible in any of the following situations. Firstly, documentation of duo associations is possible where one measure of disclosure is regressed on two measures of performance (Dawkins and Fraas, 2008, 2011a; Meng et al., 2014; Hassan and Romilly, 2018; Tadros and Magnan, 2019). For instance, Dawkins and Fraas (2008) attributed the positive relation they established between social disclosure and social performance strength for low-performing companies to legitimizing efforts aimed at repairing reputations. On the other hand, the significant positive relation between social performance weaknesses and social disclosure for high-performing group was attributed to maintaining stakeholder trust and confidence. Similarly, Tadros and Magnan (2019) report that there is negative relationship between the environmental performance and disclosure for low-performing firms, whereas such relationship between the environmental performance and disclosure for

better performing firms is positive. However, Hassan and Romilly (2018) document evidence of LT (negative association) and VDT (positive association) in the context of developed and developing countries respectively. Thus, the authors found strong evidence of association and causation between environmental performance and disclosure for companies in developed and developing countries with causation flowing from environmental performance to environmental disclosure in both cases. Note that both Dwakins and Fraas (2011a) and Meng et al. (2014) documented similar results.

Secondly, positive and negative relations could be established when two measures of disclosure are regressed on one measure of performance (Cho et al., 2010; He et al., 2013; Hassan and Kouhy, 2014; Hummel and Schlick, 2016). For example, Hummel and Schlick (2016) presented an empirical evidence consistent with both VDT and LT to support the view that the theories are two sides of the same coin. The authors regressed high-quality and low-quality measures of sustainability disclosure on sustainability performance and established that while high-quality disclosure was positively associated with sustainability performance, low-quality disclosure was negatively associated with the performance. However, Cho et al. (2010) used impression management and LT as complementary theories to explain the positive and negative relationship they documented. The authors documented a significant positive relation between environmental performance and certainty measure of environmental disclosure and relied on literature from impression management to underpin the result. Consistent with LT they also reported a significant negative relationship between optimism disclosures and environmental performance. However, Hassan and Kouhy (2014) used the lenses LT and VDT as two competing theories to underpin the positive and negative relation they documented between volume and substance measures of gas-flaring-related environmental disclosure on the one hand, and carbon emission performance on the other hand.

Thirdly, regressing two measures of disclosure on two measures of performance may also lead to the documentation of positive and negative relations in the same study. In this regard, He et al. (2013) used LT and VDT as complementary theories. Consistent with LT, they established a significant negative relation between carbon performance and disclosure. However, consistent with VDT the authors attributed the significant positive relation they documented between cost of capital and environmental disclosure to the wealth-maximizing tendencies of managers via cost minimization.

However, Dawkins and Fraas (2011a) and Meng et al. (2014) established a nonlinear relationship between environmental performance and disclosure. However, while the former regressed one measure of environmental disclosure on two measures of environmental performance, the latter regressed two measures of environmental disclosure on one measure of environmental performance. In particular, Dawkins and Fraas (2011a) established a U-shaped relationship between environmental performance and disclosure providing empirical evidence for both negative and positive relationships in a complementary fashion. Similarly, Meng et al. (2014) documented a curvilinear association between environmental performance and disclosure, thereby confirming the earlier evidence reported by Dawkins and Fraas (2011a). Thus, the argument behind this kind of relation between environmental performance and disclosure denotes that VDT and LT are not competing but are rather complementary theories in the long-run.

#### **4. Variables measurements**

##### ***4.1. Measurement of social and environmental disclosure (SED)***

Content analysis remains the dominant method employed to measure the SED variable mainly included in a regression model as the response variable. Beck et al. (2010) broadly classify approaches to content analysis employed by accounting researchers into mechanistic and interpretive. They describe mechanistic approach as form oriented assumed to imply disclosure significance to users mainly focusing on disclosure amounts, frequency or simple disclosure/nondisclosure binary options. However, interpretive approach involves the analysis of what the disclosures mean "... by disaggregating narrative into its constituent parts and then describing the contents of each disaggregated component." (Beck et al., 2010, p. 208).

Researchers in the niche have employed different variations of the two approaches identified by Beck et al. (2010). For example, Barth et al. (1997), Li et al. (1997), Bae (2014), Cho et al. (2012a), used disclosed/not-disclosed binary approach. This represents the lowest form of measurement which merely sorts companies into disclosing and non-disclosing categories. Different variations of volume-oriented content analysis under the mechanistic classification such as line count (Wiseman, 1982; García-Ayuso and Larrinaga, 2003; Patten, 2002); word count (Hassan and Kouhy, 2013, 2014); sentence count (Darrell and Schwartz, 1997; Michelon, 2011; de Villier and van Staden, 2011; Eljido-Ten, 2004) and proportion of pages (Patten, 1991, 1992) were employed. This type of mechanistic approach does not go beyond the levels of SEDs.

Furthermore, researchers in the niche employed different kinds of interpretive content analysis to operationalize SED. Some used items checklist designed to describe disclosure contents and/or themes (Ingram and Frazier, 1980; Wiseman, 1982; Patten, 2002a; Cho and Roberts, 2010; Rover et al., 2015). Others developed objective-based specificity disclosure indexes (Al-Tuwaijri et al., 2004; Hassan and Kouhy, 2014; Meng et al., 2014). However, studies such as Reverte (2009), Oates and Moradi-Motlagh (2016), He et al. (2013) and Bouten et al. (2012) developed their SED variables based on reporting guidelines. Measures of disclosure extensiveness reflecting the breadth and depth of SEDs were employed by Cho and Patten (2007), Cong and Freedman (2011) and Vurro and Perrini (2011). But, to measure rhetoric in social and environmental reports, researchers use tone-oriented content analysis (Cho et al. 2010; Arena et al. 2015; Cong et al. 2014). However, Darrell and Schwartz (1997), Cho and Patten (2007), Iatridis (2013), Chiu and Wang (2015) and Albeirici and Querci (2015) claimed to have derived measures of disclosure quality from content analyses of social and environmental information.

Under the interpretive category, Clarkson et al. (2008) developed a comprehensive disclosure index incorporating volume, items checklist, specificity and compliance to GRI guidelines. Due to the robustness of this indexing procedure, several subsequent studies adopted the method (Sutantoputra et al., 2012; Iatridis, 2013; He and Loftus, 2014; Braam et al., 2016). Some argue that this content analysis method depicts quality (Iatridis 2013), and therefore, generating the disclosure variable using this approach is tantamount to measuring quality. Wiseman (1982) disclosure rating is another content analysis method commonly used by researchers in the area to quantify the SED variable. Freedman and Wasley (1990), Fekrat et al. (1996), Bewley and Li (2000) and Cho et al. (2006) employed Wiseman disclosure index. Other studies that employed previously developed disclosure indexes such as Earnst and Earnst disclosure index (Abbot and Monsen, 1979; Cowen et al., 1987; Belkaoui and Karpik, 1989); Standard and Poor's Transparency and Disclosure Rating (Dawkins and Fraas, 2008), Sustainability Reporting Scorecard developed by Deloitte and Touche (Herbohn et al., 2014).

Milne and Adler (1999) raised lack of reliability as a major concern associated with content analysis in SEA research. In this light, they suggested involving multiple independent coders or subjecting the principal coder to effective training to increase reliability. A complementary suggestion they also provided relates to ensuring reliability of the coding instrument across coders or datasets. However, only a few studies seem to heed this suggestion as out of the 77 studies reviewed only 11 conducted



and reported reliability test and 2 studies, Cho et al. (2010) and Arena et al. (2015), used computer-assisted content analysis assumed to exhibit high level of objectivity. For example, consistent with Mine and Adler's recommendation, Clarkson et al. (2011) and He and Loftus (2014) conducted reliability tests across raters and overtime while Ingram and Frazier (1980), Wiseman (1982), Fekrat et al. (1996), Darrell and Schwartz (1997), Bouten et al. (2012) and Chiu and Wang (2015) reported the conducts of reliability tests across coders. However, whereas only Guenther et al. (2016) attempted to justify the reliability of Carbon Disclosure Project, no other study out of the remaining 59 mentioned or attempted to discuss the reliability or validity of SED measurement.

Diversity of content analysis methodologies is another concern discernible from the studies in the niche. It is clear that more than 15 different approaches have been employed by the 77 studies over the 4 decades covered by our review. This issue coupled with reliability and validity concerns might be contributing to the mixed findings still evident in the area.

#### *4.2. Measurement of social and environmental performance (SEP)*

Broadly, SEP measurement strategies employed by researchers in this niche can be categorised into three. The first category relates to a specific measurement of the variable involving the adoption of sample companies from a particular rating agency's database. This facilitates the use of the rating agency's indexes developed for companies included in their database. Several studies used this kind of approach to quantify the variable. For example, most early studies used the CEP environmental rating (Ingram and Frazier, 1980; Wiseman, 1982; Rockness, 1985; Freedman and Wasley, 1990; Fekrat et al., 1996; Hughes et al., 2001). Recently however, many studies in the area adopted KLD rating to measure the variable (Arena et al., 2015; Bouten et al., 2012; Cho and Patten, 2007; Cho et al., 2010; Dawkins and Fraas, 2011b). One of the major concerns identified in relation to this kind of measurement strategy is diversity of methodologies and outcomes of the ratings (Ilinitich et al., 1998; Orlitzky et al., 2003). Two other problems raised are human subjectivity (Hassan and Kouhy, 2014) and measurement error (Orlitzky et al., 2003).

Surprisingly, nominal rating of the variable, essentially indicating 1 for good performance and 0 for lack thereof, has been employed by several studies (Patten, 1992; Li et al., 1997; Bewley and Li, 2000; Chaklader and Gulati, 2015; He and Loftus, 2014; García-Ayuso and Larrinaga, 2003; Iatridis, 2013; Liao et al., 2015; Meng et al., 2014; Rover et al., 2015). This

constitutes an evidence showing that recent studies are still facing problems with measurement of SEP. Statistically speaking, nominal measurement of SEP may represent an inaccurate reflection of firms' response to social and environmental impacts since the strategy merely sorts units in a sample into performing and nonperforming companies.

Developing SEP variables by researchers themselves is another common approach used in the area (see, Patten, 2002a; Al-Tuwaijri et al., 2004; Bae, 2014; Clarkson et al., 2008; Cong and Freedman, 2011). Färe et al. (1996, 167) criticised this approach to measuring the variable as follows: "(i) The index is not underpinned by a theory; (ii) it relies on arbitrary *a priori* weighing to aggregate environmental (and social) impacts" and "(iii) absence of any global reference to best practice".

#### 4.3. Control variables

Firm size, financial performance and industry type are the three main variables mostly included as control variables in estimating the relationship between SEP and SED. These variables are included in a regression model to control for their effect on the SED variables. Previous studies have controlled for different combinations of these variables. For instance, studies that documented evidence of the negative relationship in support of LT mainly controlled for size and industry classification (Patten 2002a; Cho et al. 2006; Cho et al. 2012a). However, most studies controlling for size and financial performance reported a positive association in support of either VDT (Al-tuwaijri et al. 2004; Bewley and Li, 2000; Clarkson et al., 2008; Sutantoputra et al., 2012; He and Loftus, 2014) or SHT (Michelon, 2011; Arena et al., 2015; Liao et al., 2015). This indicates that the proponents of legitimation, as a socio-political theory, tend to avoid controlling for financial performance variables (Guidry and Patten, 2012). This might be traced to the inherent notion of the theory that economic motive does not play a key role in influencing managers' decision to disclose social and environmental information (Gray et al., 1995; Guidry and Patten, 2012).

Interestingly however, studies controlling for the combined effects of size, financial performance and industry type reported mixed results. For instance, consistent with SHT Brammer and Pavelin (2008), Bouten et al. (2012), Vurro and Perrini (2011), Chiu and Wang (2015) documented positive associations while controlling for the three variables. However, Dawkins and Fraas (2011b) controlled for the three variables and established a positive association based on VDT; but providing evidence for LT, de Villier and van Staden (2011) and Braam et al. (2016) controlled for the three variables and reported a negative association.

In another context, Dawkins and Fraas (2008, 2011a), Cho et al. (2010) and Hummel and Schlick (2016) controlled for the three variables and documented both positive and negative associations. Apparently, these studies applied different combinations of theories to explain the negative and positive relations reported. For example, while the study by Cho et al. (2010) applied LT and literature from impression management, both Dawkins and Fraas (2011a) and Hummel and Schlick (2016) used the lenses of LT and VDT. Dawkins and Fraas (2008), however, used the lenses of LT and SHT to explain the positive and negative associations they established.

Other control variables which we believe are no less important than the three commonly included are media exposure, leverage, financial risk and ownership (see, Table 2 for details on studies that controlled for these variables).

## 5. Econometric measures of association

Studies in our sample have employed various statistical measures of association to analyse the relationship between the two variables. Most early studies used simplistic methods which are mainly bivariate. Using these measures of association subjects studies to two statistical risks. One risk is associated with inability of bivariate measures of association to allow controlling for certain variables that may interfere with or facilitate the relationship. Moreover, bivariate measures of association encourage the use of small samples as they supposedly work well regardless of the sample size (Healey, 2015).

A couple of studies used statistical methods of comparative analysis such as two-sample t-test, analysis of variance and Wilcoxon rank-sum test to indirectly deduce the nature of the relationship between the two variables. One major weakness for using t-test is that it is a single-variable tool for statistical analysis. Consequently, it does not allow for a convenient control of several variables that may affect the relation between SEP and SED. Furthermore, it may only allow for the control of one variable at a time as in Cho and Patten (2007).

Out of the 77 studies reviewed, 66 used one type of regression analysis or the other. The dominant regression analysis used by researchers is cross-sectional regression through the method of ordinary least squares (OLS). Obviously, cross-sectional regression dominates the estimation methods used by researchers in the field despite its limitations. As noted by Gujarati (2004), one of the basic limitations of cross-sectional dataset is heterogeneity explicitly described by Bowen and Wiersema (1999) as variability of model parameters across firms or time. In this context, it has been noted that cross-

sectional regression models based on one-sample period omit trend effects (Bowen and Wiersema, 1999); are susceptible to high risk of failure to establish the true nature of the relationship being investigated (Rumelt, 1991) and constrain the detection of long-run relationships. In addition, Bowen and Wiersema (1999) note that even when the true nature of the relationship is somehow established, the efficiency of the model parameters might be impaired.

Although, cross-sectional regression appears to be the dominant method used to estimate the relationship between SEP and SED, researchers have employed other methods. For example, Hassan and Kouhy (2013) employed time-series regression in the first difference incorporating a number of oil-industry-specific control variables. Other researchers used pooled OLS (Chaklader and Gulati, 2015; Hassan and Kouhy, 2014; Herbohn et al., 2014) which is essentially a cross-sectional regression model estimated by fixing the time effect. A few other studies have employed traditional (static) panel data models (Bae, 2014; Guenther et al., 2016; Rover et al., 2015; Qian and Schaltegger, 2017; Tadros and Magnan, 2019). However, as at the time of writing this paper, only one study employs structural equation modelling (Deswanto and Siregar, 2018). Hassan and Romilly (2018) employ robust panel data approach which culminates at using generalized method of moments and three stage least squares (3SLS). It is clear from the dominant methods that have been employed that the literature has been shying away from dynamic time-series and dynamic panel data analysis and long panels which can permit the estimation of robust long-run relationship between the two variables.

One of the fundamental assumptions of OLS is constant variance across units and time (Gujarati, 2004), commonly known as homoscedasticity. When variance is not constant, this becomes a problem widely referred to as heteroscedasticity. For this reason, Bowen and Wiersema (1999) express concern over the results reported by cross-sectional studies that have neither tested nor attempted to correct for heteroscedasticity. Out of the 59 studies that used regression analysis, only 13 either acknowledged tested and/or corrected for heteroscedasticity while 46 studies ignored it all together. In particular, Meng et al. (2014), Hummel and Schlick (2016), Cho et al. (2012a), Dragomir (2010) either made mention of it, acknowledged it was a problem or claimed to have accounted for it but did not implement any formal test or correction. For instance, Dragomir (2010, p.385) admitted that "sample heterogeneity may be regarded as a major flaw of the final output." However, Hummel and Schlick (2016) only mentioned White's paper in their end-of-paper list of references. But, Cho et al. (2012a) mentioned that they took the log of size to reduce potential concerns for heteroscedasticity.

**Table 2**  
**Attributes of Studies in the Sample**

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
1	Abbot and Monsen (1979)	500	Third party rating of CSR items disclosed.	Earnst and Earnst disclosure index.	No	Pearson's correlation	NA	No	Positive	No theory	International
2	Alberici and Querci (2015)	109	National EPI	GRI disclosure level.	No	K-means cluster analysis	Size, FP and GDP	Yes	Positive	No theory	International
3	Al-Tuwaijri et al. (2004)	198	Ratio of toxic waste recycled to total toxic waste	Specificity-oriented content analysis	No	Simultaneous equations	Size, FP, unexpected earnings, growth opportunities and, public visibility	Yes	Positive	VDT	USA
4	Arena et al. (2015)	n=96; y=3	KLD Environmental Concern scores and KLD-based binary variable.	Content analysis: Tone-oriented in 10-K reports.	Computer assisted – reliable.	Pooled probit regression	Size, FP, discretionary accruals, tangibility, market-to-book ratio and debt issue.	Yes	Negative	SHT	International
5	Bae (2014)	n=713; y=11	CO2 emission level.	Content analysis: Binary (presence/absence)	No	Panel data regression	Size, consumer interaction	No	Positive	VDT	USA
6	Barth et al. (1997)	257	Log of number of superfund sites on which a firm is named.	Content analysis: Binary (presence/absence) for 13 dummy variables	No	Pooled OLS	Size	No	Positive	VDT	USA
7	Belkaoui and Karpik (1989)	23	Business & Society Review reputational Index	Content analysis: Earnst and Earnst disclosure index.	No	OLS regression (cross-sectional)	Size, leverage; capital intensity ratio, and systematic risk.	No	Positive	Agency theory	USA
8	Bewley and Li (2000)	188	Two binary measures of pollution propensity.	Content analysis: Wiseman total disclosure index.	No	OLS regression (cross-sectional)	Size, FP and media exposure	No	Positive	VDT	Canada
9	Bouten et al. (2012)	588	KLD Environmental Concern scores	volume + specificity/ + GRI-compliance content analyses.	Yes, involved three independent coders	OLS; Tobit; Probit and Log-normal (cross-sectional)	Size, FP, industry type, leverage, systematic risk (beta) and media exposure	Yes	Positive	SHT	Belgium and USA

*contd. table 2*

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
10	Braam et al. (2016)	n=100; y=3	ratios of GHG emissions, waste production, and water consumption to total revenue	Clackson' et al. (2008) disclosure index	No	OLS regression (cross-sectional)	Size, FP, industry type; market listing, board composition, leverage and media coverage	Yes	Negative	LT	Netherlands
11	Brammer and Pavelin (2004)	134	Modified Ethical Investment Research Service (EIRIS) social performance score.	Content analysis Binary (presence/absence)	No	Spearman's rank correlation	None	NR	Positive	SHT	United Kingdom
12	Brammer and Pavelin (2006)	447	Inverse ratio of aggregate amount of environmental fines to total assets.	(1) Binary (participation) in PIRC Environmental Reporting 2000' survey. (2) quality disclosure index based on aspects identified by PIRC Environmental Reporting 2000' survey.	No	Probit (cross-sectional)	Size, FP, ownership, leverage and media exposure	No	Negative (implied)	LT	United Kingdom
13	Brammer and Pavelin (2008)	450	Inverse of aggregate level of environmental fines incurred over the period 1999-2002..	5 binary (presence/absence) based on the aspects in PIRC Environmental Reporting 2000 survey.	No	Logit regression (cross-sectional)	Size, FP, industry type, media exposure, ownership.	No	Negative (implied)	SHT	United Kingdom
14	Chaklader and Gulati (2015)	n=50, y=4	Binary: certification/non-certification	Unweighted environmental disclosure index.	No	Pooled OLS	Size, FP industry type and leverage.	No	Positive	LT & Agency theory	India
15	Chiu and Wang (2015)	246	Binary: Existence of an independent CSR department or a special-purpose committee	Quality disclosure index. Covering volume + type + compliance.	Yes, trained and involved 2 independent coders	OLS regression (cross-sectional)	Size, FP, industry type, media exposure, leverage.	No	Positive	SHT	Taiwan
16	Cho and Patten (2007)	100	KLD environmental concern scores	Content analysis: Quality disclosure index (breadth and depth).	No	Paired two samples t-test	None	NR	Negative	LT	USA
17	Cho and Roberts (2010)	76	Political Economy Research Institute (PERI)'s ranking	Content and presentation of corporate website environmental disclosure.	No	Analysis of variance and t-test	Size	No	Negative	LT	USA

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
18	Cho et al. (2012a)	119	Size-adjusted toxic releases	Binary content analysis: disclosure of environmental capital expenditures).	NO	Logit regression (cross-sectional)	Size, and Industry type	No	Negative	LT	USA
19	Cho et al. (2012b)	92	Truecost Newsweek "Environmental Impact Score"	Clarkson et al. (2008) GRI disclosure index.	No	Path analysis (cross-sectional sample) OLS regression (cross-sectional) & paired two samples t-test	Size and industry type	No	Negative	LT	USA
20	Cho et al. (2012c)	77	Net KLD social score and net KLD environmental score	Content analysis: Graphs disclosure	No	Binomial probability test (cross-sectional)	Size, industry type.	No	Negative	LT	USA
21	Cho et al. (2012d)	120	Grouping (good performers & poor performers)	Content analysis: Graphs disclosure	No	Tobit regression (cross-sectional)	None	No	Negative	Impression management	International
22	Cho et al. (2006)	119	KLD environmental concern scores.	Wiseman disclosure index	No	OLS regression (cross-sectional)	Size and industry type	No	Negative	LT	USA
23	Cho et al. (2010)	190	KLD environmental concern scores.	Content analysis: Tone-oriented using DICTION.	Computer assisted	OLS regression (cross-sectional)	Size, FP, industry type, capital intensity, age	No	Positive & Negative	LT	USA
24	Clarkson et al. (2008)	191	(1) Toxic waste treated as a percentage of total toxic waste generated. (2) ratio of TRI to total firm sales	GRI-based level + specificity + compliance disclosure index.	No	Logit regression (cross-sectional)	Size, FP, leverage, capital intensity, asset newness, stock price volatility, Janis-Fadner coefficient of imbalance (JF), and Tobin's Q	No	Positive	VDT	USA

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
25	Clarkson et al. (2011)	51	Pollution propensity: toxic releases per dollar of sales.	(1) Total disclosure score based on Clarkson (2008); (2) the ratio of hard-to-total disclosures.	Yes	OLS regression (cross-sectional)	Size, FP, leverage, capital intensity, asset newness, stock price volatility, Janis-Fadner coefficient of imbalance (JF), and Tobin's Q	No	Positive	VDT	Australia
26	Cong and Freedman (2011)	50	(1) risk-related metric RRR (composite measure of chemical release, pollution pathway, toxicity, surrogate dose and the exposed population). (2) hazard-based measure MHPR (accounts for the three most fundamental factors: chemical release, toxicity and the exposed population.)	Extensiveness disclosure (breadth and depth disclosure index).	No	OLS regression (cross-sectional)	Size	No	No relation	LT	USA
27	Cong et al. (2014)	2008 (n=83); 2009 (n=75)	(1) Environmental Impact Score (EIS) from Newsweek Green Ranking. (2) hazard-based measure MHPR (accounts for the three most fundamental factors: chemical release, toxicity and the exposed population.)	CA: Tone-oriented	No	OLS regression (cross-sectional)	Size, green policy score, reputation survey score	No	Negative	LT	USA

contd. table 2



S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
28	Cowen et al. (1987)	134	Binary: absence/absence of social responsibility committee.	CA: Total disclosure and disaggregated disclosures.	No	OLS regression (cross-sectional)	Size, FP and industry type	No	Positive	No theory	USA
29	Darrell and Schwartz (1997)	53	Grouping (good performers & poor performers)	CA: Disclosure quantity and quality.	Yes, employed two independent coders	Wilcoxon rank-sum test	NR	NR	Negative	LT	USA
30	Dawkins and Fraas (2008)	217	KLD concern and strength scores	Standard & Poor's Transparency and Disclosure Index	No	Ordinal regression analysis (cross-sectional)	Size, FP and industry type	No	Positive & Negative	LT & SHT	USA
31	Dawkins and Fraas (2011a)	363	Net KLD concern and strength scores	Compliance-oriented - ordinal scaling.	No	Nonlinear regression analysis (cross-sectional)	Size, FP (ROA) and industry type	No	Curvilinear	LT & VDT	USA
32	Dawkins and Fraas (2011b)	344	Z-scores of combined KLD and Truecost scores	Not CA: responses to the climate change mitigation questionnaire sent by CERES.	No	OLS regression (cross-sectional)	Size, FP and industry type	No	Positive	VDT	USA
33	Deswanto and Siregar (2018)	211	Five-point ranking	A scoring technique based on GRI, G3.1 or G4 index	No	Structural Equation Model	Size, leverage, media exposure, Strategic holdings; financial activities	NR	Positive	VDT	Indonesia
34	de Villier and van Staden (2011)	120	(1) Net KLD concern and strength scores. (2): Binary (TRI crisis).	CA: Sentence count (volume)	No	OLS regression (cross-sectional) & paired two samples t-test	Size, FP and industry type	No	Negative	LT	USA
35	Dragomir (2010)	60	(1) Size normalized direct and indirect energy consumption. (2) Size normalized Carbon emission.	CA: Compliance-oriented GRI-based.	Yes	OLS regression (cross-sectional)	Size and various FP measures	No	Positive	SHT	EU

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
36	Elijido-Ten (2004)	40	(1) Binary: Existence of environmental committee. (2) Binary: ISO 14001 Certification (ISO) binary	CA: Disclosure quantity (sentence count) and quality (Wiseman index).	No	OLS regression (cross-sectional)	Size, age,	No	Positive	SHT	Malaysia
37	Fekrat et al. (1996)	26	Council on Economic Priority (CEP) rating.	CA: Wiseman Total disclosure index	Yes, engaged an independent coder	Pearson's correlation	NR	NR	No relation	VDT	International
38	Freedman and Jaggi (1982)	31	Council on Economic Priority (CEP) rating.	CA of annual reports items check list	No	Spearman's rank and Pearson's correlation	NR	NR	No relation	No theory	USA
39	Freedman and Wasley (1990)	50	Council on Economic Priority (CEP) rating.	Annual report and 10-K items rating - Similar to Wiseman.	No	Spearman's rank correlation	NR	NR	No relation	No theory	USA
40	Fry and Hoek (1976)	135	Social & environmental responsiveness in annual reports	CA of annual report disclosures.	No	OLS regression (cross-sectional)	Size	No	Positive	No theory	USA
41	García-Ayuso and Larrinaga (2003)	n=112; y=5	Binary: Environmental sensitivity	Disclosures level.(line and space)	No	OLS regression (Cross-sectional) & Pooled OLS	Size, media exposure, FP, Leverage	Yes	Negative	LT	Spain
42	Gelb and Strawser (2001)	n (firm-year) = 233	Council on Economic Priorities (CEP) rating	AIMR Reports on rankings of firms' disclosure practices (disclosure levels)	No	Pooled OLS	Size, FP, volatility of past stock returns and frequency of securities offerings	Yes	Positive	SHT	USA
43	Guenther et al. (2016)	3,631 firm-year observations	Size-normalised CO2 emissions	Carbon disclosure score based on CDP	Yes, attempted to justify the reliability of CDP.	Panel data regression	Size, FP, leverage, media exposure, stock price volatility, capital investment, code law	No	Positive	SHT	International

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
44	Hassan and Ibrahim (2012)	100	Business in the community environmental award.	Percentage of disclosure presence.	NO	Simple Percentage	NR	NR	Positive	No theory	United Kingdom
45	Hassan and Kouhy (2013)	y= 45	Kg of carbon dioxide emitted due to gas flaring.	CA: Number of words	No	Time-series OLS in first difference	Oil produced, gas utilization investment, gas-to-oil ratio	Yes	No relation	No theory	Nigeria
46	Hassan and Kouhy (2014)	n=11; y=13	DEA environmental performance index.	CA: Number of words and specificity	No	Prais-Winsten regression with panel corrected standard errors	size, gas price, company type, gas-to-oil ratio, gas utilization investment	Yes	Positive & Negative	LT & VDT	Nigeria
47	Hassan and Romilly (2018)	1,607	Green House Gas Emissions	proprietary Bloomberg score	No	Panel data	Panel data regression – simultaneous equation approach	No.	Positive & Negative	LT and VDT	International
48	He and Loftus (2014)	100	Binary: environmental award	Clackson et al. (2008) index.	Tested reliability across coders and over time.	OLS regression (cross-sectional)	Size, FP, leverage, media exposure, stock price volatility, State ownership and foreign ownership.	No	Positive	VDT	China
49	He, Tang and Wang (2013)	181	Total carbon emission per \$ of sales.	Carbon Disclosure Project (CDP) disclosure scoring.	No	Simultaneous equations (cross-sectional)	Size, FP, capital intensity, leverage, litigation, Tobin-Q.	No	Negative	LT & VDT	USA
50	Herbohn, et al. (2014)	336	Modified International Finance Corporation's (IFC) Sustainability Performance Index	Sustainability Reporting Scorecard (2006) developed by Deloitte Touche.	No	OLS regression (cross-sectional)	Size, visibility, strategic posture, exposure to future environmental costs, resources and opportunities, and rate of growth.	Yes	Positive	SHT	Australia
51	Hughes et al. (2001)	51	Council on Economic Priorities (CEP) rating	CA: Specificity	No	Discriminant analysis and paired two	NR	No	Negative	LT	USA

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
52	Hummel and Schrick (2016)	195	Sustainability performance rating based on selected GRI Environmental and Social indicators.	CA: Quality disclosure indexing based on GRI.	No	OLS regression (cross-sectional)	Size, FP, external assurance, Tobin's Q, country effect and industry type.	No	Positive & Negative	LT & VDT	International
53	Iatridis (2013)	529	10 Sales-normalised total amount of hazardous waste produced in tonnes (2) Binary: initiatives to reduce, reuse, substitute or phase out toxic chemicals.	(GRI)-based environmental disclosure score and proxies for environmental disclosure quality based on Clarkson et al. (2008)	No	OLS regression (cross-sectional)	Size, FP, industry type, volatility, media exposure, Tobin's Q and capital intensity.	Yes	Positive	Agency theory	Malaysia
54	Ingram and Frazier (1980)	50	Council on Economic priority (CEP) rating.	CA: Qualitative disclosure index.	Yes, Reported coefficient of reliability	Pearson's correlation and cross-sectional linear regression	None	No	No relation	No theory	USA
55	Jaggi and Zhao (1996)	100	Managers perception (rating)	CA: Annual report 7-items check list.	No	Interpretive comparative analysis	NR	NR	No relation	No theory	Hong Kong
56	Liao et al. (2015)	329	(1) The percentage of female directors on the board. (2) Binary: board-level environmental committee	Binary (participation/nonparticipation) Based on CPD.	NO	OLS regression (cross-sectional)	Size, FP, industry type, leverage and many other variables.	No	Positive	SHT	United Kingdom
57	Li et al. (1997)	106	Binary variable for environmental performance.	Binary: Municipal and Industrial Strategy for Abatement (MISA)	NO	Logit regression (cross-sectional)	External perception of proprietary information and proprietary cost.	No	Positive	VDT	Canada

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Hetero.	Relation	Theory	Location
58	Luo (2017)	1,956 firm-year observations	Natural logarithm of sales-normalized ratio of total scope 1 and scope 2 GHG emissions	CPD disclosure scoring.	No	Pooled OLS	Size, FP, industry type, leverage, capital shareholder orientation, and Tobin's Q	No	Negative	Legitimacy	International
59	Luo and Tang (2014)	474	Carbon emission performance and carbon mitigation performance	Carbon disclosure leaders Index (CDLI) of the CDP.	No	OLS regression (cross-sectional)	Size, FP, industry type, leverage and country dummies.	No	Positive	VDT	USA, UK and Australia
60	Lu and Taylor (2018)	450	environmental impact score and environmental management score	Environmental disclosure score	No	Simultaneous equations – 3stage least squares	Size, leverage, ROA and cash flow from operation.	No	positive	SHT	USA
61	Meng et al. (2014)	533	Binary: Good/poor performance	CA: Specificity	No	OLS regression (cross-sectional)	Size, FP, ownership, leverage and industry type.	Yes	Positive & Negative (curvilinear)	LT & VDT	China
62	Michelon (2011)	57	(1) Ordinal rating: GRI description of stakeholder engagement. (2) Binary: Existence of CSR committee.	(1) GRI-based disclosure index. (2) Sentence count.	No	OLS regression (cross-sectional)	Size, FP, industry type, age, leverage, Dow Jones Sustainability Index membership.	No	Positive	SHT	International
63	Monteiro and Guzman (2010)	109	Binary: environmental certification	CA: Disclosure level (BXD) 16-items check list	Yes, conducted reliability test across coders.	OLS regression (cross-sectional)	Size, FP, industry, stock Exchange listing, foreign ownership.	No	No relation	No theory	Portugal
64	Oates and Moradi-Mohtagh (2016)	76	Diversification rates for individual local governments.	GRI disclosure index based on Clarkson et al. (2008)	NO	OLS regression (cross-sectional)	Size, FP, inner suburbs vs non-inner suburbs,	No	Positive	LT	Australia
65	Patten (1991)	128	Level of public pressure.	Volume: Proportion of page percentage	No	OLS regression (cross-sectional)	Size, and FP	No	Negative	LT	USA

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
66	Patten (1992)	21	Binary: Ownership in Alyeska/otherwise	Volume: Change in proportion of page.	No	OLS regression (cross-sectional) & paired two samples t-test	Size	No	Negative	LT	USA
67	Patten (2002a)	131	Size-normalised toxic release inventory (TRI).	10-K 8-items presence rating (BXD) - content.	No	OLS regression (cross-sectional) & paired two samples t-test	Size and industry type	Yes	Negative	LT	USA
68	Patten (2002b)	122	Size-normalised toxic release inventory (TRI).	10-K 6-items presence rating (BXD) - content.	Yes, reported inter-rater reliability score.	OLS regression (cross-sectional)	Size	No	Negative	LT	USA
69	Qian and Schaltegger (2017)	284	CPD actual carbon emission intensity scores	CPD carbon disclosure scores	No but first differences clearing heteroskedasticity	Lag-lead OLS in first difference.	Size, leverage, financial risk, sales growth, capital intensity, R&D intensity & environmental exposure	No	Positive	LT	International
70	Reverte (2009)	46	Environmental Impact sensitivity	Content analysis: Compliance to GRI	No	OLS regression (cross-sectional)	Size, FP, ownership, media exposure	Yes	Positive	SHT	Spain
71	Roberts (1992)	80	(1) Binary: support for philanthropic foundation. (2) Binary: Pu	Ordinal scoring based on CEP rating.	No	Logit regression (cross-sectional)	Size, FP, industry type and age.	No	Positive	SHT	USA
72	Rockness (1985)	26	Council on Economic priority (CEP) rating.	Respondents rating of environmental disclosures.	No	Spearman's rank correlation	NR	NR	No relation	No theory	USA

contd. table 2

S/N	Study	Sample Size	SEP Measurement	SED Measurement	SED Reliability Tests	Measure of association	Control variables	Test for Heterogeneity	Relation	Theory	Location
73	Rover et al. (2015)	91	Binary sustainability index.	Content analysis: 80-items check list (presence) rating.	No	Panel data regression	Size, FP, leverage, Tobin's Q and ownership.	No	No relation	VDT	Brazil
74	Sutantoputra et al. (2012)	53	(1) Sales normalised pollution inventory based on Australian NPI. (2) Corporate monitor environmental performance rating	Clackson' et al. (2008) disclosure index	Yes, Interrater reliability rate of 89% reported.	OLS regression (cross-sectional)	Size, FP, leverage, capital intensity, asset newness, stock price volatility, Janis-Fadner coefficient of imbalance (JF), and Tobin's Q	No	Positive & Negative	VDT	Australia
75	Tadros and Magnan (2019)	y=15; i=78	KLD rating for environmental performance	Multi-construct measure of environmental disclosure	No	Panel data regression	Size	No	Positive & Negative	LT & VDT	International
76	Vurro and Perrini (2011)	n=38; y=4	AccountAbility Rating of corporate social performance.	Disclosure Extensiveness: depth, breadth and concentration. Annual reports 18-items check list (presence) rating covering both volume and quality.	No	Pooled OLS	Size, FP, industry type, reporting experience and country.	Yes	Positive	SHT	International
77	Wiseman (1982)	26	Council on Economic Rating (CEP).		Involvement of 2 independent raters	Pearson's correlation	NR	NR	No relation	No theory	USA

OLS: Ordinary least squares. LT: Legitimacy theory  
 SHT: Stakeholder theory VDT: Voluntary disclosure theory Hetero: Heteroscedasticity  
 NPI National pollution inventory KLD: Kinder Lydenberg and Domini CPD: Carbon Disclosure Project

Similarly, Meng et al. (2014) claimed to have controlled for firm size and industry type to account for firm heterogeneity.

However, the remaining nine studies reported formal tests for heteroscedasticity and how they accounted for it. For instance, Vurro and Perrini (2011), Braam et al. (2016) and Arena et al. (2015) clustered the standard errors across units to control for heteroscedasticity. Similarly, Herbohn et al. (2014), García-Ayuso and Larrinaga (2003), Gelb and Strawser (2001) and Iatridis (2013) reported White-heteroscedasticity-consistent *t*-statistics. Similarly, to account for the problem, while Hassan and Kouhy (2013) reported first difference time-series models, Hassan and Kouhy (2014) estimated panel corrected standard errors models.

**Table 3**  
Summary of studies by findings

<i>Relation found</i>	<i>Number of studies</i>
Positive	35
Negative	22
Positive and negative	9
Neutral (no relation)	11
Total	77

## 6. Discussion

Mixed findings in the SEP-SED-relationship research niche have been evident since the publication of pioneer research in the area. The period 1991-2001 witnessed publications of several studies reporting mixed results. Although, the period 2002-2019 witnessed a couple of studies that documented no-association, it was dominated by studies that reported significant negative and positive relationships. In sum, over the 41 years covered by our review, 35 studies reported positive relation; 22 studies documented negative relation; 9 studies reported both positive and negative relationships and 11 studies established lack of association.

We identified a number of methodological weaknesses associated with several studies in the area. Firstly, recent studies are still facing problems associated with measurements of SEP and SED. Many studies have measured both variables using binary rating representing the lowest level of measurement. Furthermore, researchers have employed diverse strategies in measuring both variables. Slightly worrisome is the discovery that very few studies have considered reporting reliability and validity checks for using content analysis to measure SED. There is some evidence of irregularities on the applications of appropriate econometric measures of



association by some studies. For instance, ignoring or failing to test and correct for heteroscedasticity is rather an alarming issue associated with the use of cross-sectional regression. Thus, 74% of the studies that used regression analysis involving cross-sections neither tested nor corrected for heteroscedasticity. Consequently, there is the possibility that some of these results might not represent the true relationship between the two variables (Bowen and Wiersema 1999). In addition, different combinations of control variables are associated with differing results indicating that the choice of control variables is likely to compound mixed results.

Progress made in this research area has certainly deepened our understanding of various managerial disclosure practices and the likely motivations behind such practices. Theories in the area are used independently, competitively or complementarily with each theory proposing a distinct motivation for SED based on SEP. Indeed, LT and SHT explain changes in SEDs in inverse and positive response to stakeholder behaviours respectively, with LT explaining a special case of stakeholder management in times of crisis. Conversely, VDT underpins and explains the release of social and environmental information in positive response to SEP via variations in economic performance, for most studies using the theory have controlled for at least one measure of financial performance. This shows that the positive relation between the two variables is mediated by market value, profitability or management compensation. This informs our view that VDT is appropriate in underpinning the positive relation between SEP and SED, when it is established that financial performance or management compensation strengthens such relationship. However, STH theory may be more appropriately used if financial performance or management compensation does not mediate the positive relation between the two variables. This appears true when the exclusion or inclusion of economic performance and/or management compensation does not affect the significant positive relation between the two variables. Consequently, SHT and VDT could be seen as independent theories. Finally, we observe that while the studies that have applied VDT focus exclusively on the environmental aspects of the performance and disclosure pro-SHT studies often take into consideration both the social and the environmental impacts in measuring the performance and disclosure variables.

## **7. Conclusion and future direction**

Although several findings have been discussed in section 4, major among them are summarized as follows. Firstly, lack of systematic guidance on the selection and application of theories might have contributed to the inconsistent findings documented to date. Secondly, measurements of SED

and SEP at nominal level and adoptions of diverse measurement strategies contribute to the documentation of a few recent insignificant relationships and mixed findings. Thirdly, the reluctance by researchers to conduct and report reliability checks on the use of content analysis to measure SED, represents a crucial issue. Fourthly, the reluctance by researchers to test and correct for heteroscedasticity in cross-section-related regressions represents another methodological concern. Fifthly, focus by some studies on social aspects of performance and disclosure only, while others consider environmental component only, with others focusing on the combination of social and environmental aspects are other possible sources of mixed findings in the niche.

Mediating the positive relation between SEP and SED by financial performance and/or management compensation variables could be a good tool to assist in determining whether a study should use SHT or VDT to explain the relationship. VDT appears most appropriate to use when any or both variables moderate a positive relationship. However, SHT appears more suitable if none of the suggested moderating variables has anything to do with the positive relationship between SEP and SED. Those in support of complementarity between VDT and LT are of the view that each theory explains a different aspect of managerial disclosure practice given SEP, without emphasis on the specificity of the disclosure. Thus, while poor environmental performers will increase the disclosure of social and environmental information to repair an impaired legitimacy (LT), better performers will increase SED to raise market value, profitability or management rewards (VDT). However, those arguing for competition emphasise specificity of SED. The relation between SEP and nonspecific SED is most probably negative and is best explained by the propositions of LT. But the relation between SEP and specific/quantitative SED will most likely be positive and is best explained through the lens of VDT.

Following the major findings highlighted in the two preceding paragraphs, we propose a four-step road-map designed to guide future research in the area. The first step involves clearly identifying and justifying the purpose for which the research seeks to examine the relationship between SEP and SED. The purpose could be any of those discussed in the introduction, or could be an entirely new purpose. The second step relates to identifying the appropriate geographical location of the study. Certainly, with 36 studies (47%) conducted using US samples, it could be argued that we have seen significant amount of evidence from the US. Therefore, we believe that the niche needs more research from other parts of the world.

In the third step, we suggest that the nature of a study entails identification of three important features including time coverage of the

study; types of SEP and SED covered and the choice and application of econometric measures of association. We describe the time coverage of a study as whether such study covers short-term period (1 year) medium-term period (2-5 years) or long-term period (6 years and above). Most studies in the niche covered no more than one year using cross-sectional samples. Obviously, this kind of analysis provides evidence for a single year as the period of analysis. Consequently, for future studies to more appropriately determine what regression model to use, it is important to clearly identify the structure of the dataset by defining the time dimension and the number of companies being considered. While the niche is thus far dominated by short-term evidence reported by cross-sectional studies mainly covering one year, only a few studies have been conducted covering three years and above using the appropriate econometric tools. Consequently, future research should seek to conduct time-series, traditional panel and long-panel data analyses to provide medium-term and long-term related pieces of evidence. This will assist research in the niche to clarify the LT and VDT complementarity-competition debate. We also suggest that while taking testing and correcting for heteroscedasticity seriously, future research should, at least, consider controlling for firm size, financial performance, industry type and media exposure found to be significantly associated with SED by many prior studies.

The fourth and the final step relates to identifying and using the appropriate theory/theories. In so doing, we suggest that where a positive relation is anticipated between SEP and SED, VDT and SHT should be considered as two potentially mutually exclusive theories to consider in underpinning the relationship. A significant positive relationship reported based on mediation by financial performance and/or management compensation should be explained using the lens of VDT. However, a significant positive relation between the two variables that has nothing to do with a mediation by financial performance and/or management compensation should be explained by SHT.

Where a research does not emphasize on the nature of SED in terms of specificity, and the direction of the relationship has not been predicted from the onset, VDT and LT should be considered as competing theories to use. However, where the research chooses to separate total social and environmental disclosures into specific textual/quantitative and nonspecific/general and measures each independently, a resultant positive relation between the specific SED and SEP should be explained through the lens of VDT. However, a resultant negative relationship between nonspecific measure of SED and SEP should be explained using LT. In this

case, each theory is being used to explain a different aspect of the SED in a complimentary fashion. This approach will result in the estimation of two regression models, one for each disclosure variable and may be suitable for short-term, medium-term or long-term analysis. In another variation of treating LT and VDT as complementary theories, a researcher may decide not to split the SED variable into specific and nonspecific components in a long-term analysis looking to establish a nonlinear relationship between the two variables. Thus, when a curvilinear relationship is documented, LT will be applied to explain the managerial disclosure practice over the negative relation range. Conversely, VDT will more suitably explain the managerial disclosure behaviour over the positive-relation period.

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