



The determinants of corporate social responsibility disclosure: evidence from Vietnam's listed companies in chemical industry

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Abstract

This paper aims to observe corporate social responsibility (CSR) disclosure and to identify the determinants of CSR disclosure (CSR D) of Vietnam's listed companies in chemical industry from 2014 to 2017. A rating system was built by incorporating the comprehensive Global Reporting Initiatives (GRI) reporting framework to measure firm's CSR disclosure. The financial data was collected from FiinPro and manually collected from annual reports. The findings show that CSR D in Vietnam's chemical companies is still inadequate, and most of the firm disclosure is far below the international standards. In addition, it is found that firm size, profitability and female board members have a positive correlation with CSR disclosure. On the other hand, CEO gender has a significant relationship with CSR disclosure. The results strengthen the previous studies and give more detailed implications to managers in this industry.

Keywords: Corporate governance, Corporate social responsibility, Firm performance, Chemicals

1. Introduction

A common trend in corporations worldwide is to develop sustainably, which can be achieved through engaging in corporate social responsibilities (CSR activities and disclosing them). CSR, however, is a relatively new concept in Vietnam. In the current situation, as Vietnam is integrating into the world economy, under the threats of climate changes and environmental damage, the need for a change in society's awareness towards social responsibilities is becoming more significant. In Vietnam, Circular No. 155/2015/TT-BTC issued by the

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Ministry of Finance is the first legal document requiring listed companies in Vietnam's stock market to publish information on sustainable development. Most recently, in August 2019, the State Securities Commission introduced the first Corporate Governance Principles for listed companies, requiring the integration of CSR issues as environment, society in the business strategy, meanwhile encouraging further disclosure and transparency of non-financial information for the investors, governing bodies and community.

Comparing with other industries, chemical industry has several special characteristics that make it a suitable target to conduct a research about CSR. First and foremost, products containing chemicals are indispensable in daily life and, therefore, these products have inevitable influences on health and safety of people. Moreover, chemical products have significant impact on the society and environment. It can be seen that chemical industry obviously has lots of wastes and impact the environment in a great way. The entire life cycle of resource use, from extraction and manufacturing through consumption to post consumption disposal, produces undesirable environmental impacts from emissions and waste. The impacts also include unintended side effects such as endocrine disruption, which directly interferes with growth and development in most animals and human life. The 2018 data from World Health Organization (WHO) estimates that 1.6 million lives and 45 million disability-adjusted life-years were lost in 2016 due to exposures to selected chemicals. Unintentional poisonings are now estimated to cause approximately 100,000 deaths annually, in which the major part (78,000) is considered preventable (WHO, 2006).

The above reasons explain the current practice that chemical companies tend to disclose CSR activities to the stakeholders. However, to the best of our knowledge, there is no study that examines the degree of CSR disclosure in the chemical industry as well as its driving factors. We aim to fill this gap. This research focuses on three main purposes. Firstly, we investigate the level of CSRD at Vietnamese chemical companies by rating their disclosing performance. Secondly, we investigate the determinants of CSRD. Finally, based on the findings, we suggest some practical recommendations for Vietnamese firms in the chemical industry in order to enhance the CSR disclosure.

The remaining of this paper is organized as follows. Section 2 focuses on theories on CSR and CSRD. Section 3 describes the research hypothesis, data collection process and variables. Section 4 presents research methodology and section 5 describes regression results and diagnostic tests. Section 6 proposes recommendations and give suggestions for further study.

2. Literature review

2.1 Corporate social responsibility and corporate social responsibility disclosure

CSR is a complex concept. The definition of Hopkins (2003) seems to be the most general definition: "CSR is concerned with treating the stakeholders of the firm ethically or in a responsible manner. Ethically or responsible means treating stakeholders in a manner deemed acceptable in civilized societies". Giannarakis (2014) mentions that "the concept of CSR is

constantly changing over time, and it means different things to different stakeholders and companies in different countries”. His argument was supported by other researchers, such as Kitchin (2002) and Welford *et al.* (2007).

One of the most wellknown CSR model is probably the Carroll’s Pyramid. Carroll’s four-part definition of CSR was originally stated as follows: “Corporate Social Responsibility encompasses the economic, legal, ethical, and discretionary (philanthropic) expectations that society has of organizations at a given point in time” (Carroll, 1979 and 1991). The four-part definition of CSR was originally published in 1979. In 1991, Carroll extracts the four-part definition and recasts it in the form of a CSR pyramid as in Figure 1.



Figure 1. Carroll’s Pyramid of CSR

Source: Carroll (1991)

CSR is defined as the communication of the social and environmental impacts resulting from an organisation’s economic actions on particular interest groups and on society at large (Gray *et al.*, 1996). In 2001, the authors update their definitions about CSR as the information that a company discloses about its environmental impacts and its relationship with its stakeholders by means of relevant communication channels. This definition is supported by Campbell (2004). With Guthrie and Mathews (1985), CSR is the provision of financial and non-financial information relating to an organisation’s interaction with its physical and social environment. According to Gray *et al.* (1987), it is “the process of communicating the social and environmental effects of an organisation’s economic action to particular interest grouping within society and to the society at large”. CSR has played a significant role in business, through enhancing corporate transparency, developing corporate image and providing useful information for investment decision making (Owen *et al.*, 1997; Friedman and Miles, 2001; Deegan and Blomquist, 2006).

2.2 Studies on the determinants of corporate social responsibility disclosure

Researchers from various countries have investigated the determinants of CSR disclosures, such as Trotman and Bradley (1981), Cowen *et al.* (1987), Reverte (2009), Webb *et al.* (2009). They discover the main factors that influence CSR disclosure. We can divide them into two main areas: financial characteristics and corporate governance.

The financial determinants are firm size, financial performance, leverage, media visibility. Cowen *et al.* (1987) conduct their paper upon a comprehensive sample of 134 US companies drawn from ten different industries. They find that corporate size appears to have a significant impact on disclosure information. Using the CSR rating information on Spanish listed companies, Reverte (2009) shows that, comparing to firms with lower CSR scores, companies with higher CSR ratings are bigger in size, have higher media visibility, and belong to more environmentally sensitive industries.

Moreover, from the viewpoint of legitimacy theory, CSR disclosure is a tool for profitable firms to maintain a good reputation. Thus, more profitable firms are expected to exhibit better CSR disclosure. Brammer and Pavelin (2008) present an argument about the impact of leverage on CSR disclosure. According to Brammer and Pavelin (2008), a low degree of leverage could ensure that creditor stakeholders will seek to constrain managers' discretion over CSR activities less because such activities are only indirectly linked to a firm's financial success.

The corporate governance determinants are board diversity, Chief Executive Officer (CEO) characteristics, Board of Directors (BOD) characteristics. Besides, other factors such as industry category, systematic risk, information asymmetry, regulatory requirements also affect CSR disclosure. Haniffa and Cooke (2005) conduct a research on non-financial companies listed on the main board of the KLSE (Kuala Lumpur Stock Exchange) in 1996. Their findings reveal the significant relationship between executive directors and chair with multiple directorships with CSR. These relationships prove that the ones aware of the business environment make disclosure decisions for a purpose.

Khan (2010) investigates the level of CSR reporting of listed private commercial banks in Bangladesh for the period 2007-2008 using content analysis. It also aims to reveal the impact of corporate governance elements on the level of CSR information reported by banks. The results demonstrate that two corporate governance elements, such as non-executive directors and existence of foreign nationalities have the significant impact to explain the CSR reporting in Bangladesh. Majeed *et al.* (2015) show that there are positive relationships of ownership concentration and firm size with the degree of disclosures.

3. Hypotheses development

There are seven hypotheses in this study. The authors divide them into two groups according to the nature of the variables: financial and corporate governance characteristics. Financial characteristics include company size, profitability and leverage ratio. Corporate governance

characteristics include CEO gender, CEO duality, size of BOD and percentage of women on board.

Company's size.

There are many researchers from various countries examined the relationship between firm size and CSR. Ho and Taylor (2007) indicated that the extent of the Three Bottom Lines disclosure report (including economic, social and environmental categories) is higher for firms with larger size. Larger companies have lower cost of preparing CSR disclosure report due to economics of scale as well as the cost of disseminating disclosures because the media are more likely to report stories about larger firms (Lang and Lundholm, 1993). Another reason for the positive correlation is explained by the agency theory (Jensen and Meckling, 1976). Larger firms tend to have higher agency costs because of higher information asymmetry between principles (shareholders) and agencies (managers). Also, as the outside capital increases, agency costs have a tendency to increase. Therefore, to reduce agency costs, larger firms are likely to disclose more information.

Following the preceding discussion, the authors would expect a positive relationship between firm size and CSR disclosure.

H1: Firm size has positive relationship with the extent of CSR.

Company's profitability

Profitability is amongst the most common factors affecting CSR disclosure. However, the results regarding the relationship between profitability and the CSR disclosure are mixed. The positive correlation between profitability and CSR disclosure can be due to the fact that a profitable company has the freedom and the flexibility to expose its CSR practices more extensively to the stakeholders, and thus legitimize its existence (Haniffa and Cooke, 2005; Khan, 2010). On the other hand, Ho and Taylor (2007) find that companies with less profit tend to provide more information to present that their business operations contribute to social values and to society.

Since there is mixed results about the impact of profitability on CSR, it is hypothesized that there is a significant association between profitability and the extent of CSR disclosure.

H2a: Firm's profitability positively affects the extent of CSR.

H2b: Firm's profitability negatively affects the extent of CSR.

Financial leverage

An effective company should take advantage of their leverage, which means that they should borrow in an appropriate manner. Therefore, it is of great importance to build and maintain good relationships with creditors. The level of a corporate financial leverage can be used as a proxy for creditors' power (Liu and Anbumozhi, 2009). However, if companies want the creditors to lend them money, they should public more information to convince the creditors to trust them. Alsaed (2006) claims that those leveraged firms should disclose more information

to satisfy the expectations of creditors for information. Purushothaman *et al.* (2000) claim that companies with high leverage may have close relationship with their creditors and use other means to disclose social responsibility information. Ho and Taylor (2007) show that firms with higher levels of leverage seem to increase the level of corporate disclosure to reduce the agency costs.

On the other hand, Branco and Rodrigues (2008) argue that the higher level of leverage lead to less the published information about disclosure. Reverte (2009) shows that leverage cannot explain differences of CSR disclosure initiatives in Spanish market. We hypothesize that there is a significant association between profitability and the extent of CSR disclosure.

H3a. The financial leverage positive effect on the extent of CSR disclosure.

H3b. The financial leverage negative effect on the extent of CSR disclosure.

The duality of CEO

As per the stewardship theory, CEO duality refers to the situation where the CEO of a company is also its chairperson (Rechner and Dalton, 1991). Gul and Leung (2004) demonstrate that CEO duality was associated with lower level of corporate voluntary disclosures in a sample of Hong Kong's listed companies; thus, CEO duality decreases the likelihood of companies to communicate CSR extensively. Huafang and Jianguo (2007) show that CEO duality is associated with lower levels of voluntary disclosure for a sample of listed Chinese companies. As a solution, the separation of CEO position and chairperson position is recommended (Li *et al.*, 2010). This study hypothesizes that companies with CEO duality are expected to present a lower level of CSR disclosure.

H4: CEO duality has a negative effect on the extent of CSR disclosure.

Size of Board of Directors

Zainon *et al.* (2012) claim that the size of BOD can be a proxy to measure the board governance, which means the effectiveness of the board. Jensen (1993) shows that the more members the board contains, the less effective it is, as the coordination, communication and decision-making are more difficult to be controlled by the CEO. There are a number of prior studies investigated the relationship between the board size and CSR disclosure. Abeysekera (2010) shows that a larger board brings diverse and vital resources, meeting global challenges more effectively and efficiently. Siregar and Bachtiar (2010) find that the extent of CSR disclosure has a positive and non-linear relationship with the board size. It is supported that the larger the board size, the more effective the monitoring process. Esa and Mohd Ghazali (2012) investigate whether corporate governance attributes, such as the board size, affect the extent of CSR disclosure in Malaysian government-linked companies. Results show that the board size is positively associated with the extent of CSR disclosure. However, Cheng and Courtenay (2006) focus on companies that are listed on the Singapore Stock Exchange and find no association between the board size and the voluntary disclosure. As there is more evidence

on the positive correlation compared to that with negative one, the authors hypothesize that board size has a positive effect on the extent of CSR disclosure.

H5: Board size has a positive effect on the extent of CSR disclosure.

Board gender diversity

Diversity in the board, according to Deloitte (2015), takes various forms and can be categorized into some elements, such as gender, independence, geography, ethnicity or age. Diversity is believed to promote better understanding of the marketplace, increase creativity and innovation, produce more effective problem-solving, enhance the effectiveness of corporate leadership, and promote more effective global relationships (Robinson and Dechant, 1997).

The presence of female members on the board of directors can be used as a proxy of board diversity (Carter *et al.*, 2003). Female directors, unlike their male counterparts, are more inclined to promote their firms' social practices because of their psychological characteristics, unlike their male counterparts, that may make them more sensitive to different groups of stakeholders' claims (Jain and Jamali, 2016; Harjoto *et al.*, 2015; Boulouta, 2013; Zhang *et al.*, 2013). That is usually attributed to the fact that women's decisions tend to be more socially oriented than that of men. Hence, they tend to address more effectively CSR issues and stakeholders' needs (Bear *et al.*, 2010).

It is argued that women's experiences may force the board to meet a wider variety of customers' expectations and establish more effective stakeholder management (Daily and Dalton, 2003; Zhang *et al.*, 2013); thus, the implementation of CSR initiatives is more feasible. As a result, boards of socially responsible companies have significantly more women than boards of non-socially responsible companies (Webb, 2004). Wang and Coffey (1992) state that the presence of women and other minority directors tend to be more corporate social performance-oriented which is positively significant to firms' charitable giving. Based on the above discussion, we hypothesize that the percentage of women on the board of directors has a positive effect on the extent of CSR disclosure.

H6: The percentage of women on the board of directors has a positive effect on the extent of CSR disclosure.

H7: Companies with female CEO disclose more CSR information than companies with male CEO.

From seven hypotheses above, the authors build a model to test the determinants of CSR disclosure. The model is as follow:

$$CSR D_i = \beta_0 + \beta_1 \times FIRMSIZE_{it} + \beta_2 \times PROFIT_{it} + \beta_3 \times CEODUAL_{it} + \beta_4 \times BOARDSIZE_{it} + \beta_5 \times WOMEN_{it} + \beta_7 \times CEOGEN_{it} + \beta_6 \times LEV_{it} + \varepsilon_{it} \quad (1)$$

CSR disclosure index

The authors use a disclosure index to measure the CSR disclosure level. A disclosure index is an instrument to measure the extent of information reported in a particular disclosure

vehicle(s) by a particular entity(s) according to a list of selected items of information (Marston and Shrides, 1991). Hassan and Marston (2010) conduct a review of a sample of 40 studies from 1990 to 2008 and find that 32% of the papers used disclosure indices method, which accounted for the highest proportion of methods applied.

The dependent variable CSR_D represents the sum of CSR disclosure items of each company in each year. The variable is collected by scoring items in the CSR rating system. The authors assign score for each item by investigating annual reports and sustainability reports on the Internet. This study focuses on published annual reports because annual reports are found to be the main medium for the disclosure of CSR practices to stakeholders (Cowen *et al.*, 1987). Belal (2000) demonstrates that annual reports are considered as the most important way for the communication of information about the company. Therefore, the choice of annual reports as a source for data is consistent with other prior researches.

Because of the strength and popularity of GRI Guidelines, the authors decided to build a rating system according to the criteria from this Guidelines. The CSR disclosure index used in this research is based on the rating system of Sutantoputra (2009) who followed GRI 2002 Guidelines. However, the authors have made some changes so that the index is suitable to Vietnam business environment. Several items were eliminated because they are not appropriate for Vietnamese companies. Besides, the rating system of Sutantoputra (2009) does not include items of environment disclosure, therefore, the authors added a new variable named environmental performance indicators in hard disclosure items. This new variable is appropriate to the CSR_D index of Clarkson et al (2006). Details about each item are as follows.

Table 1. CSR disclosure index

Items	Content	Rating Rules
Hard disclosure items		
<i>H1</i>	<i>Governance structure and management system</i>	
H1.1	Existence of a department or management positions for addressing firm’s social impacts (0-1)	1: There is a department or positions in the firm structure for determining firms’ impacts 0: Otherwise
H1.2	Existence of a social and/or a public issues committee in the board (0-1)	1: There is a committee under the BOD for taking care of firm CSR 0: Otherwise
<i>H2</i>	<i>Credibility</i>	
H2.1	Firms acknowledge the use of GRI sustainability reporting guidelines (0-1)	1: Firm complies and discloses CSR information following GRI Guidelines 0: Otherwise

Items	Content	Rating Rules
H2.2	Independent verification/ audit on social information disclosed in the report/social performance/ social systems (0-1)	1: Firm has independent audit verify their CSR information 0: Otherwise
H2.3	Product certification with respect to product safety (0-1)	1: Firm's products receive award or certificate about product safety 0: Otherwise
H2.4	External labor performance awards (0-1)	1: Firm receives awards on labor performance granted by external organizations or associations 0: Otherwise
H2.5	Participation in labor organization/association to improve labor practices (0-1)	1: Firm participates in labor organizations or associations 0: Otherwise
Social performance indicators (SPI)		
<i>H3 Labour practices</i>		
H3.1	SPI on employment information (0-2)	1: Firm mentions information on employees 2: Firm provides details such as type, numbers of employees by region and average turnover 0: Otherwise
H3.2	SPI on labour/ management relations (0-2)	1: Firm mentions information on labor union within the firm 2: Firm provides specific details 0: Otherwise
H3.3	SPI on health and safety (0-2)	1: Firm mentions information on health and safety of labor 2: Firm provides specific details such as occupational accidents and diseases, standard injury, lost day, and absentee rates and number of work-related fatalities 0: Otherwise
H3.4	SPI on training education (0-2)	1: Firm mentions information on training for labor 2: Firm provides specific details such as average hours per year per employee 0: Otherwise
H3.5	SPI on diversity and opportunity (0-2)	1: Firm mentions diversity and opportunity for labors 2: Firm provides specific details such as the equal opportunity among employees 0: Otherwise

Items	Content	Rating Rules
<i>H4</i>	<i>Human rights</i>	
H4.1	SPI on strategy and management (0-2)	1: Firm mentions the rights of labors 2: Firm provides specific details such as firms policies related to the universal declaration and the fundamental human rights 0: Otherwise
H4.2	SPI on non-discrimination (0-2)	1: Firm mentions the existence of discrimination among labors 2: Firm provides specific details such as the prevention of discriminations 0: Otherwise
H4.3	SPI on freedom of association and collective bargaining (0-2)	1: Firm mentions the freedom of labors to raise voice 2: Firm provides specific details such as the encouragement for employees to contribute their opinions 0: Otherwise
H4.4	SPI on child labour (0-2)	1: Firm mentions the use child labor 2: Firm provides specific details such as the exclusion of child labour usage directly from firms' internal operations and/or indirectly from firms' suppliers 0: Otherwise
H4.5	SPI on forced and compulsory labor (0-2)	1: Firm mentions forced and compulsory labor 2: Firm provides specific details such as the prevention of using forced and compulsory labor 0: Otherwise
<i>H5</i>	<i>Society</i>	
H5.1	SPI on community (0-2)	1: Firm mentions the impacts of firms on community 2: Firm provides specific details such as how much firm's operation affects community 0: Otherwise
H5.2	SPI on bribery and corruption (0-2)	1: Firm mentions bribery and corruption 2: Firm provides specific details such as the prevention of bribery and corruptions 0: Otherwise
H5.3	SPI on political contributions (0-2)	1: Firm mentions political contributions 2: Firm provides specific details such as the contribution on politics and prevention of political lobbying 0: Otherwise

Items	Content	Rating Rules
<i>H6 Product responsibility</i>		
H6.1	SPI on customer health and safety (0-2)	1: Firm mentions customer health and safety 2: Firm provides specific details such as the protection of customer health and safety during the use of firms' products and services 0: Otherwise
H6.2	SPI on products and services (0-2)	1: Firm mentions their products and services 2: Firm provides specific details such as the information and labelling of products 0: Otherwise
H6.3	SPI on respect for privacy (0-2)	1: Firm mentions customer privacy 2: Firm provides specific details such as the protection of consumer privacy 0: Otherwise
<i>H7 Social spending</i>		
H7.1	Summary of money saved from social initiatives to the company (0-1)	1: Firm mentions the amount of money they saved from CSR 0: Otherwise
H7.2	Amount spent on community, political contributions to enhance social performance (0-1)	1: Firm mentions the amount of money they spent on CSR towards community and/or politics 0: Otherwise
H7.3	Amount spent on fines related to social litigation/issues (0-1)	1: Firm mentions the amount of money they are forced to pay by the law due to crimes on CSR 0: Otherwise
<i>H8 Environmental performance indicators (EPI)</i>		
H8.1	EPI on energy/water/land/resources use of efficiency/biodiversity/ conservation (0-2)	1: Firm mentions the conservation of energy and natural resources 2: Firm provides specific details such as the amount saved 0: Otherwise
H8.2	EPI on air emission (0-2)	1: Firm mentions the emission of air 2: Firm provides specific details such as the amount of toxic air discharged 0: Otherwise
H8.3	EPI on discharge/release/ spill (0-2)	1: Firm mentions the discharge of other waste 2: Firm provides specific details such as the amount of waste emitted 0: Otherwise

Items	Content	Rating Rules
H8.4	EPI on waste management (0-2)	1: Firm mentions waste treatment 2: Firm provides specific details such as the waste treatment system 0: Otherwise
H8.5	EPI on environmental impact of product and services (0-2)	1: Firm mentions the impact of products and services on environment 2: Firm provides specific details such as how much their products affect environment 0: Otherwise
Soft disclosure items		
<i>S1 Vision and strategy claims</i>		
S1.1	CEO statement on social performance in letter to shareholders and/or stakeholders (0-1)	1: Firm mentions the amount of money they are forced to pay by the law due to crimes on CSR 0: Otherwise
S1.2	A statement of corporate social policy, values and principles, codes of conduct (0-1)	1: Firm mentions the policies or codes of conduct on CSR 0: Otherwise
S1.3	A statement about formal management systems regarding social risk/ performance (0-1)	1: Firm mentions the management system regarding CSR 0: Otherwise
S1.4	A statement of measurable goals in terms of future social performance (0-1)	1: Firm mentions the goals about CSR in the future 0: Otherwise
<i>S2 Social profile</i>		
S2.1	A statement about the firm's compliance with specific social standards (0-1)	1: Firm mentions the compliance about CSR 0: Otherwise
S2.2	An overview of social impact of the industry (0-1)	1: Firm mentions the overview of industry impacts on society 0: Otherwise
S2.3	An overview of how the business operations and/or products and services impact the society, employees and customers (0-1)	1: Firm mentions the overview of firm impacts on society 0: Otherwise
S2.4	An overview of corporate social performance relative to industry peers (0-1)	1: Firm mentions the overview of firm CSR comparing with peers 0: Otherwise

Items	Content	Rating Rules
<i>S3</i>	<i>Social initiatives</i>	
S3.1	A substantive description of employee training in social management and operations(0-1)	1: Firm mentions the idea on training employees about CSR 0: Otherwise
S3.2	Existence of response plans in case of social incidents (0-1)	1: Firm mentions the plans to deal with social incidents 0: Otherwise
S3.3	Internal social awards (0-1)	1: Firm has awards for labors, employees or customers in terms of CSR 0: Otherwise
S3.4	Internal social audits (0-1)	1: Firm has internal audit within the firm 0: Otherwise
S3.5	Community involvement and/or donations related to society (0-1)	1: Firm donates or raises fund for the society 0: Otherwise
	Total	65

Source: Authors' collection

Independent variables

All independents variables can be illustrated the calculation in the table below.

Table 2. Calculation of variables

No	Variables	Explanation	How to calculate
1	CSRDIS	CSR disclosure score	Sum of CSR disclosure items scores
2	FIRMSIZE	Size of firm	Ln(TA)
3	PROFIT	ROA	Net income/Total assets
4	LEV	Leverage ratio	Total liabilities/Total assets
5	CEODUAL	Duality of CEO	1 for same CEO and chairman, 0 for different CEO and chairman
6	BOARDSIZE	Size of BOD	Sum of number of BOD members
7	WOMEN	Percentage of female members	Number of females/Number of members
8	CEOGEN	Gender of CEO	1 for male CEO, 0 for female CEO

Source: Authors' collection

4. Research methodology

4.1 Sample selection

This research investigates the extent of CSR disclosure in Vietnam's listed firms in chemical industry from 2014 to 2017. There are 68 companies in this industry. Some companies, however, have not been listed on Vietnam stock market since 2014, thus their annual reports

are not public. In some other cases, we cannot access the annual reports or the information of BOD. There are 64 companies with 190 observations in the final sample.

4.2 Data analysis method

The authors compare different rating systems in the literature and then build CSR disclosure rating system based on Sutantoputra (2009) and Clarkson *et al.* (2006) who follow GRI Guidelines, which are the most reputable standards in disclosing CSR around the world. Then the information is collected by observing the annual reports and sustainability reports of companies before being transformed into corresponding scores.

After having CSR disclosure presented in the form of scores, the authors build a regression model between CSR disclosure and seven independent factors namely firm size, profitability, leverage ratio, CEO duality, CEO gender, percentage of females in BOD and size of BOD. Other variables is collected from FiinPro platform and by hand from annual reports. The authors also run various tests to check the reliability of the model.

5. Research results

5.1 Index reliability test: Cronbach's Alpha

To test the credibility of CSR disclosure index, the authors use Cronbach's Alpha test. As mentioned above, CSR disclosure is measured through eight hard disclosure variables and three soft disclosure variables. Table 3 shows the result of the test.

Table 3. Cronbach's Alpha test result

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
H1	190	+	0.3436	0.289	0.4051722	0.8293
H2	190	+	0.6097	0.515	0.3526446	0.8124
H3	190	+	0.7091	0.5618	0.2999585	0.8134
H4	190	+	0.6442	0.5702	0.3564764	0.8101
H5	190	+	0.6306	0.5732	0.3706587	0.8139
H6	190	+	0.5559	0.4732	0.3692602	0.817
H7	190	+	0.6098	0.5332	0.3622055	0.8129
H8	190	+	0.8299	0.6961	0.2480163	0.809
S1	190	+	0.6788	0.5961	0.3421863	0.8058
S2	190	+	0.6587	0.6151	0.3769164	0.8152
S3	190	+	0.6772	0.5836	0.3358198	0.8057
Test scale					0.3472105	0.8276

Source: Data is handled from Stata

It is found that the Cronbach's Alpha value is 0.8276, suggesting the Index is reliable. However, the item-rest correlation of variables H1 (Governance structure and management system) is at 0.289, which is smaller than 0.3, and the Alpha of H1 is higher than the Alpha of the Index. It means that if we remove this variable, the value of Cronbach's Alpha would increase slightly. So, the authors take the test the second time without H1. In this second test, all variables have the item-rest correlation bigger than 0.3, and the Alpha of the Index is 0.8293, higher than 0.7. Besides, no variables result in higher alpha than 0.8293 if it is eliminated. Therefore, the authors come to the conclusion that this Index is reliable, after the removal of variable H1.

5.2 Descriptive statistics

Table 4 summarizes the variables used in the model between 2014 and 2017. There are 190 observations in total. The average CSR disclosure index over four years is approximately 10.82 points/65 points with the minimum value of 1 and maximum value of 45 points. It is observed from the period that the CSR disclosure index of all companies showed an upward trend throughout the 4-year period. However, in general, the CSR disclosure scores are still low compared to the requirements of GRI. Figure 2 shows the average values of CSR disclosure out of the maximum score in variables.

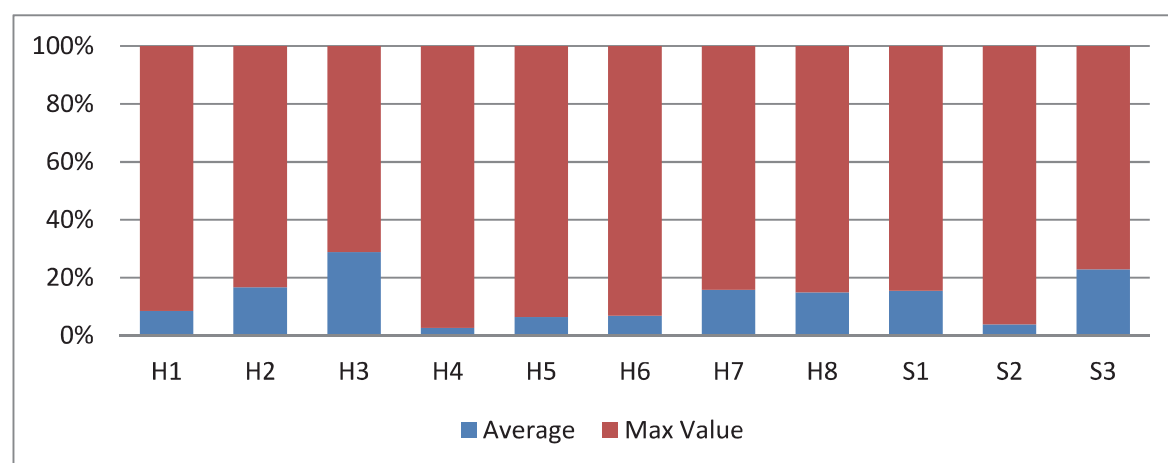


Figure 2. Average values according to variables

Source: Authors' calculation

It can be seen from figure 2 that the values of all groups of variables are far under the average level, especially for the case of H4 (Human rights), H5 (Society) and S2 (Social profile). H3 (Labor practices) shows the highest disclosure ratio, about 30%. The average size of firms observed is 1,520 billion VND with the smallest size of 49.2 billion VND and the largest one of 14,500 billion VND. In average, there is a positive mean of ROA, which is about 5.5%. The smallest ROA is -177% and the highest ROA is 22.5%. The smallest leverage ratio is approximately 5.4% while the highest ratio is 95.5%. As for CEO duality, 24.6% firms have CEO and chairman separated from each other. Regarding size of BOD, the biggest board has 11 members and the smallest one has only 3 members. In the BOD, averagely 18.11%

members are women, there are BODs with no females and the highest percentage of women in board is 60%. 81.67% CEOs are male, only 18.33% among 190 observations have female CEO.

Table 4. Summary description of variables in the model

Variables	Obs	Mean	Std. Dev.	Min Value	Max Value
CSR	190	10.79058	6.984051	1	45
TA (bil. VND)	190	1,520	2,380	49.2	14,500
ROA	190	0.0553311	0.143867	-1.778708	0.2257410
CEODUAL	190	0.2473684	0.4326226	0	1
BOARDSIZE	190	5.621053	1.334753	3	11
WOMEN	190	0.182143	0.1843529	0	0.6
CEOGEN	190	0.8157895	0.38868	0	1
LEV	190	0.4171014	0.1942998	0.0543145	0.9554065

Source: Authors' calculation

5.3 Multicollinearity of independent variables

A Pearson's product-moment correlation and Variance inflation factor (VIF) were run to check the multicollinearity between seven independent variables included in the model. Table 5 shows the results for the Pearson's correlation test. We can see that all correlation values between each pair of variables are smaller than 0.5. That means that there is no strong correlation between these independent variables and we can approve that multicollinearity does not occur in the model.

Table 5. Results of Pearson's correlation test

	FIRMSIZE	PROFIT	LEV	CEODUAL	CEOGEN	BOARDSIZE	WOMEN
FIRMSIZE	1.0000						
PROFIT	-0.0174	1.0000					
LEV	0.1974	-0.0582	1.0000				
CEODUAL	-0.0436	0.0284	0.2503	1.0000			
CEOGEN	0.0177	-0.0378	0.0423	-0.1366	1.0000		
BOARDSIZE	-0.0622	0.0620	-0.1556	-0.0750	-0.1557	1.0000	
WOMEN	0.2106	0.0439	0.0146	0.1502	-0.4626	0.1822	1.0000

Source: Data is handled from Stata

Table 6 demonstrates the results of VIF test. We can see that the VIF values are all smaller than 5 which means that there is no multi-collinear in the model.

Table 6. Results of variance inflation factor test

Variable	VIF	1/VIF
WOMEN	1.41	0.70965
CEOGEN	1.31	0.76274
LEV	1.15	0.87227
FIRMSIZE	1.13	0.8844
CEODUAL	1.13	0.88601
BOARDSIZE	1.08	0.9237
PROFIT	1.01	0.99067
Mean VIF	1.17	

Source: Data is handled from Stata

5.4 Regression results

Regression model is used to determine the relationships between dependent variable and independent variables. Table 7 shows the results of regression model.

To check the heteroskedasticity (rejecting the null hypothesis) of the regression model, the authors used White test and Breusch-Pagan/Cook-Weisberg Test. These tests examine whether the estimated variance of the residuals (the difference between the observed value and the predicted value of the dependent variable) from a regression is dependent on the values of the independent variables. In that case, heteroskedasticity with p-value is $0.066 > 0.05$ as the result of White test. Therefore we accept the null hypothesis which means heteroskedasticity does not exist.

The Breusch–Pagan test tests for conditional heteroskedasticity. If the chi squared value is significant with p-value below 0.05, then the null hypothesis is rejected and the variance of the residuals is not constant. The results of this test shows $\text{prob} > \chi^2 = 0.000$, which is smaller than 0.05, so the variance of the residuals is dependent on the value of independent variables. To correct this error, the authors adjust the standard errors for heteroskedasticity by making them robust standard errors. That changes the model into a Robust Regression model. Table 7 demonstrates the new model.

Table 7. Results of regression model

	Regression model	Robust regression model
	CSR	CSR
FIRMSIZE	1.852386*** (0.39)	1.852386*** (0.45)
PROFIT	4.274896 (3.23)	4.274896*** (1.31)
LEV	-3.81252 (2.55)	-3.81252 (2.51)
CEODUAL	1.190688 (1.13)	1.190688 (1.21)
WOMEN	7.02779** (2.98)	7.02779** (2.98)
BOARDSIZE	-0.795537** (0.36)	-0.795537*** (0.31)
CEOGEN	3.495643** (1.36)	3.495643*** (1.26)
_cons	-38.29635*** (10.86)	-38.29635*** (13.14)
R-square	20.18%	19.76%
Observations	190	190

Notes: Standard Errors are in parentheses; * significant at 10% level, ** significant at 5% level, *** significant at 1% level

Source: Data is handled from Stata

5.5 Regression analysis

Profitability

Profitability has a significant association with CSR disclosure and the association is positive, which means the more profit a company is, the more CSR information. The variable has the significant level of 1%. This result is consistent with Haniffa and Cooke (2005) and Khan (2010). Companies that earn higher profit might care about the trust from some primary stakeholders, such as investors or debt issuers who provide capital for the operations of the company.

Financial leverage

This last variable, which is similar to CEO duality, does not have significant meanings on determinants of CSR disclosure (p-value 0.196 > 0.05).

Company's size

The robust regression model shows a positive relationship (with the statistical significant level of 1%) between the firm size and CSR disclosure. This means that bigger companies tend to disclose more CSR information. This is consistent with the results of previous studies (Rahman *et al.*, 2011; Ho and Taylor, 2007). Stakeholder theory can be used to explain this trend. The bigger firms are more visible to the society so they attract more attention from stakeholders. They are under higher pressure from various groups of stakeholders, such as debt holders, the media, investors, regulators, about revealing information to gain trust from the stakeholders.

CEO duality

CEO duality does not have significant relation to CSR disclosure as its p-value is $0.33 > 0.05$.

Size of board

With 5% level of significant, this variable is negatively correlated with CSR disclosure. This result goes against Abeysekera (2010). Larger boards can be explained to bring more difficulties in communication and decision-making processes.

In all, we can summarize whether the hypothesis can be supported in this paper as follows:

Table 8. List of hypothesis supported

Hypothesis	Supported or not	Sign
H1: Firm size has a significant effect on the extent of CSRD.	Supported	+
H2a: Firm's profitability significant effect on the extent of CSRD.	Supported	+
H3. The financial leverage has significant effect on the extent of CSR disclosure.	Not supported	
H4: CEO duality has a negative effect on the extent of CSR disclosure.	Not supported	
H5: Board size has a positive effect on the extent of CSR disclosure.	Not Supported	-
H6: The percentage of women on the board of directors has a positive effect on the extent of CSR disclosure.	Supported	+
H7: Companies with female CEO disclose more CSR information than companies with male CEO.	Not Supported	-

Source: Authors' collection

Percentage of women

The percentage of women members on board has a strongly positive relationship with CSR disclosure (with significant level of 5%). This absolutely concurs with the previous hypothesis

H5. Gender is an important factor when analyzing the diversity of BOD (Carter *et al.*, 2003). Members with different genders will have different characteristics, viewpoints as well as reactions over matters in daily life. This may generate the innovation, improve the creativity and enhance the effectiveness of leadership (Daily and Dalton, 2003; Zhang *et al.*, 2013).

CEO gender

With 1% level of significant, gender of CEO presents a positive correlation with CSR disclosure. That is not consistent with our hypothesis H6. The explanation may come from the situation in Vietnam chemical industry, where there is minority of CEO are female.

6. Conclusion and recommendations

From the results of this study, the authors have come up with several recommendations for Vietnamese firms in chemical industry.

Firstly, chemical companies should put more attention on CSR, as well as CSR disclosure. The current situation of CSR disclosure is far below the average of international standards. Companies should provide more details (such as statistics, numbers, charts, etc) to enhance the quality of the CSR information. They should be aware of as well as follow the international standards (such as GRI Guidelines) so that it helps standardize the disclosure.

Secondly, from the impact of profitability on CSR, companies can take advantage of it if they want to improve the quality of CSR transparency.

Thirdly, firms can improve the effectiveness of the BOD by diversifying the characteristics of the members. We can see from the results that corporate governance variables (percentage of women on board, size of board) are amongst the significant determinants of CSR disclosure. At present, the number of female members in BOD is still limited while the size of BOD is relatively large. Board diversity brings about various experiences, skills, knowledge and helps increase creativity and leadership effectiveness. Companies should control the number of members on board, but simultaneously, increase the board diversity by considering experience, personal qualifications and skills and gender of the members.

Suggestions for future researches

The first direction is that future researchers can carry on studies in other industries in Vietnam. Besides, future researches can add more criteria to complete more effective and sufficient CSR rating systems. CEO gender variables can be further investigated in Vietnam context. Moreover, future researchers can use the results of this paper as a basis to investigate the great extent in other factors to determine their relationships with CSR disclosure. Some other potential factors which were investigated in foreign researches should be further considered, such as company's age, environmental performance, industry sensitivity, media visibility, ownership structure, etc.

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