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Climate Change Adaptation Disclosure Among the Companies in the Asia-Pacific Region:

A Study Selected From the Forbes Global 2000 Leading Companies List

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ABSTRACT

Climate change, due to its significant global impact, has been the focus of many recent researches. Many businesses adapt their activities to be more compliant with climate change control, and these efforts are disclosed to the stakeholders and society at large. This research is conducted on leading companies in the Asia-Pacific (APEC) region from the Forbes Global 2000 Leading Companies list. From 13 APEC countries, besides the impact of culture, based on the results, the presence of CSR committee is positively related to the climate change adaptation disclosure, and companies collaborating with NGOs reported a positive relationship with climate change adaptation. Conducting the study in APEC region and having a comprehensive view of the countries located in this region on one hand and considering the most successful companies on the other hand are among the originalities of the research. Also, considering variables such as national culture, NGO alliances, CSR committees, and top management's commitment beside "climate change adaptation disclosure" is new in academic literature.

KEYWORDS

Adaptation Disclosure, Asia-Pacific Region, Climate Change, CSR Committees, Global 2000, Governance, National Culture, NGO Alliances, Top Management's Commitment

INTRODUCTION

Climate change has become a recent hot topic among governments, businesses, and NGOs and after the Copenhagen Conference on Climate Change (December 2009). This is why different businesses and public figures are getting involved in climate control endeavors (ACCA & GRI, 2009; CIMA, 2010; Eberlein & Matten, 2009; Kolk, Levy, & Pinkse, 2008; Rahman Belal et al., 2010).

One of the main symptoms of climate change is the increasing global average temperature, also defined as global warming (UNFCCC, 2007). As pointed out by the Intergovernmental Panel on

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Climate Change (IPCC), this increase began in the mid-20th century due to the increased concentration of greenhouse gas (GHG) emissions (IEA, 2009; Amran et al., 2014).

Climate change is fast becoming a major social issue. According to the IPCC, the planet's structure is affected by human activities during the course of energy generation for powering global mobility and commerce, which subsequently affects the climate (IPCC, 2001). The Stern Report on the Economics of Climate Change (Stanny & Ely, 2008; Vijn et al., 2007) stated that the global gross domestic product (GDP) will decrease if the amount of carbon emission does not decrease in the near future. Increased awareness on the significance of climate change has prompted many companies to carefully define their operations and quantify their activities.

Over the past two decades, governments have begun implementing or drafting policies to measure and address climate change, including the reduction of GHG emissions. In addition to the climate change management systems, businesses have begun developing innovative ways to decrease GHG emissions, improve waste management systems, and increase usage of renewable energies (Kolk & Pinkse, 2007, Sullivan, 2010; Amran et al., 2016). These activities influence the brand image of companies, which makes it easier for them to expand in the near future. (Esty, 2007; Wittneben and Kiyer, 2009, Sie and Amran, 2021). This is why many companies try to come up with strategies for climate change and use them as tools for managing environmental and sustainable development (Baumgartner, 2014; Amran et al., 2016).

As pointed out earlier, many organizations recognize climate change as an important criterion in their governance systems (Sullivan, 2009; Amran et al., 2016), as it presents them with the opportunity to enhance their competitive advantage and grow their businesses (Lash & Wellington, 2007; McKinsey, 2008; Amran et al., 2016, Ooi et al., 2019). In this context, many businesses began disclosing their climate change adaptation activities in their respective CSR and annual reports. There are many questions arising from these activities, such as who is adapting and how they are doing it, and whether adaptation differ between countries/regions (Berrang-Ford et al., 2011; Jaaffar et al., 2019). The Asia Pacific (APEC) region is one of the most important economic regions in the world, and it faces major climate change effects (ADB, 2009; Amran et al., 2016). Most regional governments began taking actions to decrease and contain the effect of climate change, such as reducing GHG emissions (WRI, 2010). We selected the APEC region as the research population, and the data were collected from some selected companies listed on the Forbes global 2000 leading companies of the APEC region.

This study examines the relationship between national culture and governance vis-à-vis climate change adaptation activities conducted by companies using disclosed activities on climate change in their respective sustainability reports. This study is expected to identify factors influencing climate change adaptation by companies based on their respective annual and CSR reports. The findings of this study would benefit companies and help them improve their respective organizations' retention strategies vis-à-vis climate change adaptations.

LITERATURE REVIEW

Climate change is not only an environmental issue, it affects many (other) social and economic facets of societies and organizations (ACCA, 2009; Rahman Belal et al., 2010). Keeping in mind the importance and role of climate change, a serious question arises: How are companies responding to the issue on hand. One common answer is to account for and report their respective activities (Hopwood, 2009; Rahman Belal et al., 2010; O'Neill et al., 2020).

The Triple Bottom Line Reporting works alongside the CSR, focusing on the economic, social, and environmental bottom lines. Sustainability reporting can be defined as a public disclosure activity where an organization voluntarily discloses the impact of its operations and products/services on society and the environment.

There is a diverse range of researches on the relationship between multiple firm attributes and climate change disclosure in CSR/annual reports (Ahmad et al., 2003; Freedman and Jaggi, 2005; Moon, 2007; Prado-Lorenzo et al., 2009; Amran et al., 2014; Cong et al., 2020). In this research, we determine the link between two main dimensions; External (four types of national culture) and Internal or Governance (including CSR committee existence, NGO alliances, and top management commitment) on climate change adaptation disclosure. We also designate two control variables: firm size and domicile.

Climate Change Adaptation Disclosure

Customer awareness of the potential negative impact of social and environmental crises that occur globally has forced corporations to be responsive and focus on climate change adaptation disclosure (Adams and Larrinaga-Gonzalez, 2007). Ahmad and Hassan (2003) studied 299 Malaysian listed companies, and posited that environmental information in an annual report is negatively linked to firms' financial leverage. Among the other variables that been evaluated were firm size, profitability, effective tax burden, and sensitive industry membership, all of which demonstrated no significant relationship with the environment voluntary disclosure activities (Ahmad and Hassan, 2003; Lee et al., 2020). However, it should be pointed out that there are no consensus pertaining to these findings, and there is a need for more research on the subject. Other researchers believe that larger firms have a more extensive disclosure relative to smaller ones (Freedman and Jaggi, 2005; Prado-Lorenzo et al., 2009; Amran et al., 2014). In 1992, Cooke reported that Japanese manufacturing firms tend to provide more information relative to non-manufacturing companies, but the level of disclosure was not quantified (Cooke, 1992). In the same vein, Alsaeed (2006) reported no significant correlation between the type of industry and the level of disclosure. They showed that manufacturing firms disclose more relative to non-manufacturing firms (Alsaeed, 2006).

Due to the opposite findings on climate change adaptation disclosure related variables, there is a need for a more extensive research on the subject.

EXTERNAL DIMENSION

Despite the inconsistencies on the definition of culture, Muwazir (2011) outlined 160 definitions. Hofstede's research on the national culture is regarded as probably the most comprehensive study on the topic (Muwazir, 2011). He created a four-dimension model of culture, which included power distance, individualism, masculinity, and uncertainty avoidance (Orij, 2010).

Power distance is defined by Hofstede (1983) as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" Basically, power distance describes the degree how a culture could accept power to be unevenly distributed (Nord, 2007). However, subordinates from high power-distance countries will have problems approaching their managers. They are reliant upon their superiors to a much higher extent, and are less likely to question them (Bode, 2012).

Hofstede (1983) defined uncertainty avoidance as "the degree to which the individuals from a society feel undermined by equivocal or obscure circumstances" (Nord, 2007). The next dimension, individualism, is suggested as the extent to which people view themselves as part of a group, family, or organization, which is the cultural patterns/norms where individuals are required to take responsibility for their or their groups' interests (Ringov & Zollo, 2007). Hofstede (1983) suggested that the masculinity dimension encompasses gender-associated values and beliefs. Specifically, masculinity emphasizes achievement, heroism, assertiveness and material success, while feminine societies emphasize relationships, modesty, caring for the weak, and quality of life (Ringov & Zollo, 2007). Further explanation on masculine/feminine societies indicate that the former tends to pursue power and economic status, while the latter emphasizes nurture and care for societal goals, such as relationships, helping others, and the environment (Baughn et al., 2007; Nord, 2007).

Some environmental change adjustment related researches accounted for the Hofstede's National Culture, confirming that culture is vital towards clarifying the variety of CSR reporting practices across the globe. Hofstede's study makes the most prominent contribution due to the establishment of Hofstede National Cultural Index, which measures the national culture distinctiveness quantitatively. The index has helped many scholars investigate and compare national cultures (Bode, 2012; Nord, 2007; Cheung et al., 2020; Lu and Wang, 2021). Hofstede's National Culture Index remained the most commonly used and cited model when analyzing national cultures (Bode, 2012).

From the perspective of information disclosure, a highly individualistic society is more independent, which makes it less likely to share values with others and more likely to prioritize personal interests over social responsibility, such as the concern for environment and social conditions (Ciccarini, 2011). Numerous studies have also reported the negative relationship between individualism and CSR disclosure and reporting. Van der Laan Smith et al. (2005) found that individualism has significant negative effects on CSR and environmental performance.

However, literature also contain inconsistent evidences on the influence of individualism on corporate disclosure reporting. Orij (2010) investigated 600 large companies from 22 countries to elucidate the relationship between national cultures and corporate social activities disclosure levels, and pointed out that individualism is positively related to disclosure. In the context of disclosure of CSR information, Orij (2010) contended that CSR disclosure is positively linked to social orientation. However, high masculinity represents a weaker social orientation, which may influence corporate CSR practices and disclosures (Orij, 2010).

With regards to climate change adaptation practices, it was argued that societies with low uncertainty avoidance tend to be more innovative and less rigid when disclosing climate change issues relative to high uncertainty avoidance societies where climate change concerns are stimulated by social coercion and structured rules (Adelopo et al., 2013)

Internal Dimension (Governance Dimension)

Previous academic researchers showed that corporate governance influences the extent of climate change disclosure in annual/CSR reports of a company (Kolk and Perego, 2008; Galbreath, 2009; Amran et al., 2014). The general definition of corporate governance is an institutional arrangement that affect the decision-making process in an organization (Ball and Brown, 1968). There are also some other definitions pertaining to corporate governance. It has been described as the total control system of a company, which helps managers handle activities (Haron, 2006; Amran et al., 2014).

This research evaluates three main dimensions pertaining to corporate governance; CSR Committee existence, NGO alliances, and top management commitment.

The formation of a committee for companies' CSR activities has been deemed as a representative and effective approach for firms' CSR governance in business environments (Baldwin et al., 2011). Literature contain works on the influence of the presence of CSR committee on the board towards climate change adaptation. For example, Wahyuni et al. (2009) argued that companies with an environment committee are more likely to voluntarily disclose GHG emissions information relative to companies lacking one (Wahyuni et al. 2009). In a similar vein, Liao et al. (2014) studied 329 of the largest companies in the UK, and reported that companies with environmental committees tend to be ecologically transparent (Liao et al., 2018). Researchers mostly concentrated on the characteristics of CSR committees (Finegold et al., 2007; Amran et al., 2014). Overall, the CSR committee on the board has the responsibility of making sure that top managers behave in a manner that provides the best value for stakeholders via CSR related activities and reporting (Coles et al., 2001).

Besides primary stakeholders, Clarkson (1995) also classifies secondary stakeholders as groups influenced/affected by and sometimes influence and effect corporations. They are usually not engaged in any part of the corporations' formal activities, and include the media and any other interest groups, such as NGOs (Clarkson, 1995). The pressure, as well as help from NGOs, can enhance climate change adaptation levels in companies. Deegan & Blomquist (2006) reported a tendency in NGOs

to collaborate with businesses by providing monitoring services. It was also clear that this influence CSR activities and reporting (Deegan & Blomquist, 2006).

Yang Spencer et al. (2013) suggested that the top management commitment can act as a strong driving force towards enhancing corporate environmental performance. Climate change adaptation is an effective way for companies to respond to environmental and social risks, which is reflective of the top management commitment towards social responsibilities (Yang Spencer et al., 2013). Asif et al (2013) developed a framework for the top-down approach of CSR governance, and suggested that such top-down approach helps fulfill CSR responsibilities, communicate with stakeholders, and translate strategic goals into actual practices (Asif et al., 2013).

FIRM SIZE AND DOMICILE

The two control variables used in this research are the firm size and domicile. Both variables are crucial towards climate change adaptation, and its introduction are rationalized below.

Previous studies reported a positive association between firm size and firm domicile with environmental disclosures (Ahmad et al., 2003; Stanny & Ely, 2008; Freedman & Jaggi, 2009; Monteiro & Aibar-Guzmán, 2009). Freedman and Jaggi (2005) stated that there is a positive correlation between firm size and GHG pollution disclosure in companies' reports (Freedman and Jaggi, 2005). They believed that larger firms, due to pressure from media and society, follow requirements more adequately and disclose their activities and outputs in their reports. On the other hand, there are also researches reporting a negative correlation between firm size and environmental disclosure (Patten, 2000). Diverse and opposite results in different studies are common; Tan (2006) reported an insignificant relationship between firm size and CSR activities, but Ismail and Rahman (2011) reported a significant correlation between firm size and its compliance with MASB environmental regulations (Ismail and Rahman, 2011). Similarly, Jill Hooks and Van Staden (2011) and Sobhani et al (2012) stated that larger manufacturing firms experience higher climate change adaptation and disclosure.

We are aware of the fact that environmental concerns form a global concern, but the extent to which different countries and companies deal with it varies based on regulations, cultures, and general public awareness in their respective business environment (Liena et al., 2007)

As per the domicile of the companies, we are aware that supportive regulations, together with societal concerns among the society influence strategies and activities of companies vis-à-vis climate change (Kolk & Pinkse, 2004). National policies and regulations are very important towards climate change activities' disclosure (Pinkse & Kolk, 2012). Previous works confirmed that firms domiciled in developed countries tend to obey regulations and also disclose climate change related activities in their CSR and annual reports relative to their counterparts in developing countries (Amran et al., 2014)

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

The research's theoretical framework is shown in Figure 1, followed by the hypotheses pertaining to this work.

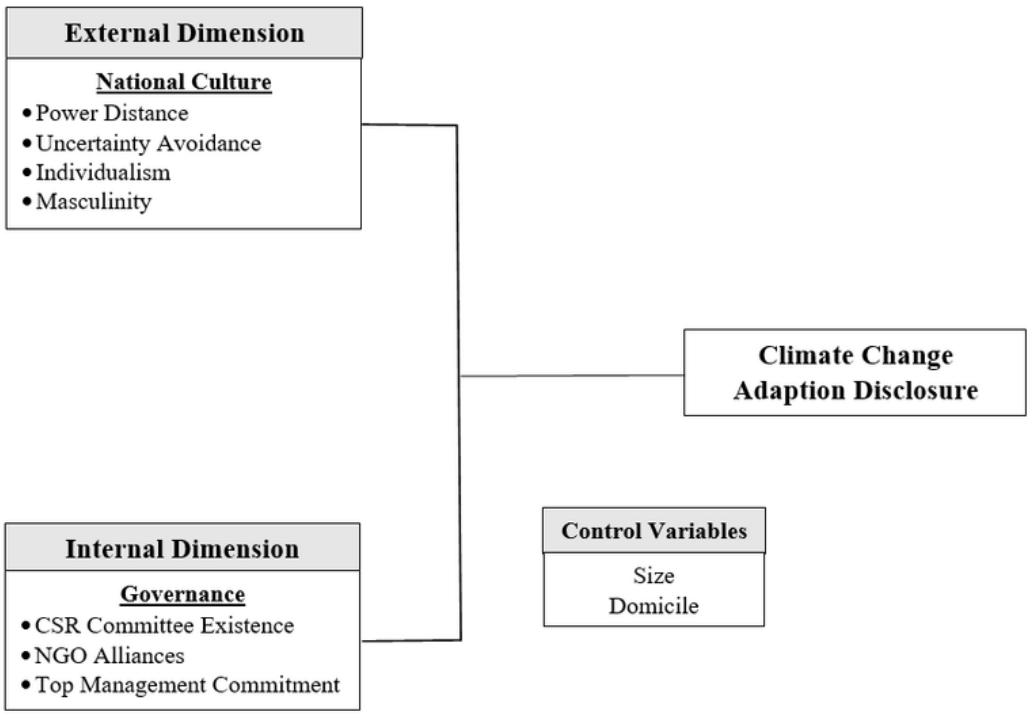
Our main theory in this research is the stakeholder theory, and we present this theory and detail the associated conceptual model.

The stakeholder theory has been used to elucidate corporate governance, business ethics, strategic management, and organizational effectiveness. As part of the management theory and practice, the stakeholder theory takes a number of forms, and it is important to begin elucidating aspects of the theory most relevant to the analysis of corporate governance. According to Donaldson and Preston (1995), the stakeholder theory is a set of theories for management of stakeholders, and it cannot be regarded as a single theory. Mitchell, Agle and Wood (1997) argued that definitive stakeholders' status is determined by simultaneous presence of three factors; 'legitimacy', which refers to socially accepted and expected behaviors, 'power' in its utilitarian sense, which refers to the ability to control

resources, and 'urgency', which exist when there is a pressing need for attention. Literature on stakeholder theory propose a range of refinements and improvements, or at least implicit explanatory assumptions to enable the correct interpretation of the framework to be made (Fassin, 2008). In short, stakeholder theory research explained how stakeholder management is particularly important to businesses, especially with new demands on environmental issues, corporate governance, and CSR, or interests among stakeholders when making strategic decisions. The theory focuses on the performance outcomes of the firms' highly ethical relationships with stakeholders, defined by high levels of cooperation, information sharing, and trust (Jones, et al., 2018; Nejati et al., 2020).

The conceptual model of our research has one internal and one external dimension as its independent variable. The former discusses governance, and consists of three sub dimensions: CSR Committee existence, NGO alliances, and top management commitment. The External Dimension discusses the National culture vis-à-vis the sub dimensions: Power distance, Uncertainty Avoidance, and individualism and masculinity. As pointed out previously, the dependent variable is climate change adaptation disclosure, and we also took into account two control variables; size and domicile.

Figure 1. Theoretical framework



HYPOTHESES DEVELOPMENT

Hofstede (1983) suggested that societies with high power distance usually suffer from a lack of close relationship between superiors and subordinates. In these societies, superiors are not eager to maintain

constant communication with subordinates. In terms of social concerns, low power distance society is made up of more social attitudes, and limits inequalities as much as they can (Ali & Rizwan, 2013). In the context of climate change practices, (Ringov & Zollo, 2007) pointed out that social and environmental activities are more likely to emerge and openly discussed if the power distance is low(er). Previous studies reported a negative relationship between power distance and climate change adaptation disclosure (for example: Orij, 2010; Ringov & Zollo, 2007; Huafang & Jianguo, 2007), which led to the following hypothesis:

H1: There is a significant relationship between companies based on the culture of high power distance and climate change adaptation disclosure.

Uncertainty avoidance represents the extent in which people could tolerate uncertainties or unknown situations (Bode, 2012). Societies with high scores in uncertainty avoidance tend to be more rule-oriented. Their people are more likely to prefer stable rules and social norms, seeking a sense of security (Nord, 2007). Stable social norms and highly structured bureaucracies are of great help in achieving avoidance of uncertainties (Ringov & Zollo, 2007). Therefore, it is reasonable to expect that firms based in a culture of high uncertainty avoidance are better at nurturing climate change related rules and norms while also adapting better climate change reporting and disclosure, which led to the following hypothesis:

H2: There is a significant relationship between companies based on the culture of high uncertainty avoidance and climate change adaptation disclosure.

Hofstede (1983) suggested that highly individualistic societies are less cohesive. People in highly individualistic culture value their personal interests and self-actualizations over that of social concerns and responsibility (Adelopo et al., 2013). It can be concluded that firms operating in highly individualistic culture will be less concerned about social issues, and prefer corporate privacy and secrecy, which would impede adaptation of climate change efforts, and ultimately influence the climate change adaptation of a company. Adelopo et al. (2013) reported that firms in a collectivistic society will be more willing to adapt to climate change endeavors relative to those operating in individualistic societies. The following hypothesis was developed:

H3: There is a significant relationship between companies based on the culture of high individualism and climate change adaptation disclosure

Masculinity can play an important role in companies' climate change practices due to its inherent attributes. Highly masculine society emphasize economic development, power, and material wealth over social concerns such as caring for people and the environment, which are definitive traits of a feminine society (Ringov & Zollo, 2007). Orij (2010) pointed out that a highly masculine society lack social orientation, which means that caring and nurturing are less valued (Orij, 2010). Several studies also reported the negative relationship between masculinity and climate change adaptation and disclosure (Ringov & Zollo, 2007; Van der Laan Smith et al., 2005), which led to the following hypothesis:

H4: There is a significant relationship between companies based on the culture of high masculinity and climate change adaptation disclosure.

CSR committees (placed as board members) can be regarded as a new approach towards managing CSR issues such as climate change adaptation (Asif et al., 2013). Based on the inferences

from the stakeholder and legitimacy theory, companies could demonstrate their CSR commitment to stakeholders by creating a CSR committee, which formulates the direction for the company to meet stakeholders' demand and follow societal norms and values, ensuring the companies' legitimacy (Wahyuni et al., 2009; Amran et al., 2012). The presence of a CSR committee can play a vital role in climate change adaptation practices. There are studies on the influence of CSR committee on climate change adaptation disclosure. For example, Liao et al. (2018) reported that companies with environmental committees on its board tend to be more ecologically transparent and disclose their activities more frequently (Liao et al., 2018). The hypothesis below was duly developed:

H5: There is a significant relationship between company's CSR committee existence and its climate change adaptation disclosure.

In the context of the stakeholder and legitimacy theory, NGOs, which is another important group of stakeholders, can have interests and influences on organizations' strategies, initiatives, and performance on fulfilling social and environmental accountability for legitimacy and business survival (Deegan & Blomquist, 2006; Adnan et al., 2009). NGOs can increase awareness on CSR activities of companies and encourage them to take actions pertaining to the environmental and social impacts from their activities and pursuits (Sobczak & Martins, 2010). Moreover, as an external observer, NGOs can also act as a watchdog to effectively oversee companies' practices and performance on social accountability and environmental stewardship (Sobczak & Martins, 2010). Organizational alliance with NGOs will help enhance climate change adaptation disclosure. Previous researches detailed the influence of NGOs on companies' climate change adaptation disclosure (Azizul Islam & Deegan, 2008), which led to the following hypothesis:

H6: There is a significant relationship between company's NGO Alliances and its climate change adaptation disclosure.

Top management commitment is regarded as the strongest driving force towards facilitating performance improvement of the company. Such a commitment plays a significant role in directing business operations of the company. Moreover, the top management commitment impacts the way a company responds to raised issues related to the company and how it solves these issues. The stakeholder and legitimacy theory also indicated that it can increase interactions with corporate stakeholders, which can be a channel for better understanding stakeholders' demand (Asif et al., 2013). As such, despite various cultural contexts, the significance of commitment from the top management is applicable across the globe. Top management commitment is also vital towards altering corporate policy, as they need to change the operational philosophy of the company, which incidentally include the CSR policies (Jizi et al., 2014). This leads to the following hypothesis:

H7: There is a significant relationship between company's Top Management's Commitment and its climate change adaptation disclosure.

Two other independent variables, size and domicile, were incorporated as control variables because they have been shown to be determinants of climate change adaptation disclosure.

RESEARCH METHODOLOGY

Investigation of research questions and the data collection process was based on the secondary data sources, such as CSR report and Annual Report from publicly listed companies in the APEC region. As pointed out by Akhtaruddin (2005), although there are many methods of gathering information

about companies, annual reports are of great significance, and are regarded as a major and common method. Therefore, in this study, the information about the companies are gathered by reviewing the companies' annual, CSR, environmental, and sustainability reports. For those lacking a separate CSR report, sections on climate change disclosure in the annual reports were investigated. As per Roscoe's rule of thumb, each independent variable requires at least 10 samples. This study used 12 variables, from a total of 120 selected companies, which met the requirements of multivariate research (Sekaran & Bougie, 2010).

This study is regarded as a correlation study. The initial sample of this study comprises of 120 selected companies from the Forbes Global 2000 Leading Companies list, from 13 APEC countries, such as Japan, China, Australia, South Korea, India, Taiwan, Singapore, Philippines, Hong Kong, Malaysia, Indonesia, and New Zealand. New Zealand was dropped from the sample due to the fact that the companies there lack the criteria needed for this study. The main factors prompting some of the samples to be dropped include the lack of reports in English, undisclosed CSR in its annual report, and missing information on its annual report. Table 1 details the origin of the companies.

Table 1. Number of sample companies

No	Countries	Number of selected companies	Percentage
1	China	5	4%
2	Hong Kong	6	5%
3	India	13	11%
4	Indonesia	3	2.5%
5	Japan	25	20%
6	South Korea	11	9%
7	Philippines	2	1.5%
8	Singapore	9	7.5%
9	Taiwan	14	11.5%
10	Thailand	8	6.5%
11	Malaysia	12	10%
12	Australia	12	10%
13	New Zealand	0	0%
	Total	**120**	**100**

Measurement of Variables

Table 2 shows a brief view of the variables in this research and their corresponding sources.

The measurement of the variables, similar to the methods used in previous works, follows the logic of presence/absence of certain predetermined activities in the disclosure reports (Joseph and Taplin, 2011). Climate change adaptation related activities were measured by the presence/absence of several activities, such as NGO alliances, the presence of CSR committee, and top management commitment, as per the climate change adaptation disclosure index. The climate change adaptation disclosure index measurement technique uses a total score for each company where a higher score represents a better level of disclosure activities in the company (Joseph & Taplin, 2011).

Table 2. Source of the variable's measurement system

Independent Variables	Code	Measurement
Power Distance	PD	Hofstede's National Cultural Index (Hofstede, 2001)
Uncertainty Avoidance	UA	Hofstede's National Cultural Index (Hofstede, 2001)
Individualism	IND	Hofstede's National Cultural Index (Hofstede, 2001)
Masculinity	MAS	Hofstede's National Cultural Index (Hofstede, 2001)
CSR Committee Existence	CSR	(Amran et al.,2013)
NGO Alliances	NGO	(Amran et al.,2013)
Top Management Commitment	TOP	(Akadiri et al. (2013)
Firm Size	FS	Firm size is the Normal Score of total asset using Warden's Formula. (Ahmad et al., 2003; Freedman & Jaggi, 2005, 2009; Monteiro & Aibar-Guzmán, 2009; Amran et al., 2013)
Domicile	Dm	Status of the country is categories either as "1" if developed country or "0" when it is emerging market.

The equation below represents the scoring system in measurement of climate change adaptation disclosure (Akhtaruddin, 2005).

$$TD = \sum_{I=1}^{n} d_i$$

Where TD = Total disclosure score, d = one if the item d1 is disclosed the items in developed Climate Change Adaptation Disclosure index, and zero if not disclosed.

The first four independent variables are measured based on the national culture index scoring in the dimensions of uncertainty avoidance, individualism, power distance, and masculinity, while in the case of the internal dimension, the governance, which consists of CSR committee existence, NGO alliances, and Top Management Commitment a binary approach is used. 1 is given if the company has the criteria, and zero if it does not (Amran et al., 2013). Two control variables are measures as shown below. In the case of the size variable, the company's total assets are measured, while in the case of the domicile of the firm, the value of 1 is given to developed countries, and 0 to developing countries.

Model Specification

Incorporating all of the aforementioned variables, the full regression model becomes:

$$CCA = \beta_0 + \beta_1 PD + \beta_2 UA + \beta_3 IND + \beta_4 MAS + \beta_5 CSR + \beta_6 NGO + \beta_7 TOP + \varepsilon$$

Where:

CCA: Climate Change Adaptation disclosure, PD: Power Distance, UA: Uncertainty Avoidance, IND: Individualism, MAS: Masculinity, CSR: CSR Committee Existence, NGO: NGO Alliances, TOP: Top Management Commitment and finally ε is the error term.

Results

The outputs of several statistical analyses conducted in this study and attempts to understand the relationship between the variables and climate change adaptation disclosure are presented. A total of 120 companies has been finalized and represents the final sample. Table 3 shows the overall climate change adaptation disclosure index for the 120 companies.

Table 3. Climate change adaptation disclosure index

	N	Minimum	Maximum	Mean	Std. Deviation
DV: Climate Change Adaptation	120	0	9	3.73	2.146

Descriptive Analysis

The results of descriptive analysis for all of the variables, including the dependent variable, ten independent variables, and two control variables are shown in Table 4. As per the preceding table, the climate change adaptation had a mean of 3.73, meaning that out of 28 necessary Climate Change Adaptation items from the CSR disclosure index, 3.73 items, on average, were disclosed by sample companies in the APEC region.

Table 4. Descriptive analysis results of continuous variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Climate Change Adaptation	120	0	9	3.73	2.146
PD	120	36	104	65.93	17.918
UA	120	8	92	57.44	26.220
IND	120	14	90	36.02	21.909
MAS	120	32	95	58.93	20.293
FS	120	1.10	385.50	35.9050	49.31945
Dm	120	0	1	.64	.482
CSR	120	0	1	.78	.419
NGO	120	0	1	.63	.486
TOP	120	0	1	.79	.408
Valid N (list wise)	120				

The Pearson product-moment correlation analysis was used in this study to examine the correlations among variables. Usually, correlation analysis is used to describe the direction and strength of the linear relationship between two/a group of variables (Pallant, 2010). The direction of the correlation is determined by the sign of the correlation coefficient, while its strength is determined by the value of this coefficient. The results of this correlation analysis without the control variables is shown in Table 5.

Based on Table 6, the framework is valid and it proposed a regression model 2 by taking into account the control variables being statistically significant with a Sig F equal to 0.000. The R^2 value for model 2 is 0.407, meaning that 40.7 percent of the variance in the dependent variable can be explained by independent variables. The R Square change value is 0.378, suggesting that the independent variables still explains 37.8% of variance in climate change adaptation disclosure when the effects of firm size and domicile are statistically considered.

a. Predictors: (Constant), CV2: Dm, CV 1: FS
b. Predictors: (Constant), CV 2: Dm, CV 1: FS, IV 6: NGO, IV 5: CSR, IV 2: UA, IV 7: TOP, IV 1: PD, IV 3: IND, IV 4: MAS

Table 5. The results of correlation analysis without control variables

		DV:Climate Change adaptation disclosure	IV 1: P_Dis	IV 2: Un_ Av	IV 3: Indiv	IV 4: Masc	CV 1: Size	CV 2: Dom	IV 5: CSR	IV 6: NGO	IV 7: TOP
Climate Change adaptation disclosure	Pearson Correlation	1									
PD	Pearson Correlation	-.114	1								
UA	Pearson Correlation	-.004	-.538**	1							
IND	Pearson Correlation	.140	-.524**	.086	1						
MAS	Pearson Correlation	-.039	-.348**	.468**	.442**	1					
FS	Pearson Correlation	-.166*	-.177*	.227**	.092	.315**	1				
Dm	Pearson Correlation	.010	-.729**	.415**	.177*	.346**	.194*	1			
CSR	Pearson Correlation	.435**	-.027	.154*	.105	.220**	.191*	.014	1		
NGO	Pearson Correlation	.359**	.016	.064	.190*	.163*	.079	-.004	.325**	1	
TOP	Pearson Correlation	.414**	-.216**	.193*	.285**	.220**	.215**	.173*	.657**	.323**	1

*. Correlation is significant at the 0.05 level (1-tailed)
**. Correlation is significant at the 0.01 level (1-tailed)

Table 6. The outcomes of Model Summary

Model Summary[c]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.171[a]	.029	.013	2.132	.029	1.765	2	117	.176	2.193
2	.638[b]	.340	.340	1.743	.378	6.814	10	107	.000	

c. Dependent Variable: DV: Climate Change Adaptation Disclosure

Also, despite the low R Square value, it should be pointed out that a low R^2 or low Adjusted R^2 is a rather common phenomenon in disclosure researches. This is consistent with previous works, Gul and Leung (2004) obtained an Adjusted R^2 range of 0.14 - 0.19 in the relationship between board leadership, outside directors' expertise, and voluntary corporate disclosure, and Elijido-Ten et al. (2010) obtained an Adjusted R^2 of 0.191 - 0.23 by examining the determinants of environmental disclosure.

As shown in Table 7, there is a significant positive relationship between CSR committee existences; NGO alliance and Top Management Commitment with the climate change adaptation as p-value for the three variables is less than 0.05. From the same model, we can see that there is a

Table 7. The results of hierarchical multiple regression analysis of direct effect

Coefficients[a]													
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.873	.338		11.447	.000	3.203	4.543					
	FS	-.008	.004	-.174	-1.876	.043	-.016	.000	-.166	-.171	-.171	.963	1.039
	Dm	.193	.414	.043	.466	.642	-.627	1.012	.010	.043	.042	.963	1.039
2	(Constant)	6.149	1.984		3.100	.002	2.217	10.082					
	FS	-.011	.004	-.246	-2.948	.004	-.018	-.004	-.166	-.274	-.219	.794	1.259
	Dm	-1.041	.612	-.233	-1.701	.092	-2.253	.172	.010	-.162	-.127	.294	3.402
	PD	-.045	.020	-.376	-2.246	.027	-.085	-.005	-.114	-.212	-.167	.198	5.049
	UA	-.011	.009	-.140	-1.234	.220	-.030	.007	-.004	-.118	-.092	.429	2.328
	IND	-.009	.012	-.091	-.735	.464	-.033	.015	.140	-.071	-.055	.360	2.778
	MAS	-.008	.011	-.078	-.722	.472	-.031	.014	-.039	-.070	-.054	.477	2.095
	CSR	1.548	.534	.302	2.898	.005	.489	2.607	.435	.270	.216	.509	1.966
	NGO	1.205	.367	.273	3.281	.001	.477	1.933	.359	.302	.244	.801	1.249
	TOP	1.106	.566	.210	1.594	.043	-.016	2.228	.414	.186	.145	.479	2.087

significant negative relationship between Power Distance and climate change adaptation. Other than these relationships, there are no significant relationships between variables and the climate change adaptation disclosure due to the high p-value. By taking the control variables into account, the results showed that firm size made a statistically significant contribution due to its low p-value, while Firm Domicile had no statistically significant contribution on climate change adaptation disclosure due to its high p-value.

a. Dependent Variable: DV: Climate Change Adaptation Disclosure

CONCLUSION AND DISCUSSION

Descriptive analysis showed that the mean of climate change adaptation disclosure in the APEC region is 3.73. To a certain extent, this could indicate that the adaptation of climate change in the region is moderate, as 13.32% of principal climate change adaptation items (3.73 items out of 28 items in total) were disclosed by the sample companies. The moderate disclosure adaptation could be mainly attributed to the rapidly growing awareness of CSR and the increasing tendency towards climate change adaptation disclosure by companies in the APEC region. KPMG (2005) reported that CSR activities, especially on climate change adaptation, are receiving increasing public attention in Asia. Specifically, the APEC region is made up of several emerging markets with tremendously rapid recent economic development, such as China, India, and Malaysia. The continuously improving CSR awareness and climate change adaptation disclosure from these emerging markets due to increasing stakeholder and social pressure contributes to the entire disclosure adaptation of the APEC region. For example, China-listed companies are more likely to volunteer CSR information in their annual reports relative to the previous decade (Qu and Leung, 2006). Other than China, the Indian government took actions to mandate companies to spend at least 2 percent of their net profits

on CSR activities. Programs issued by the government was called the "CSR Bill", with the express purpose of enhancing Indian corporations to indulge in CSR practices that include climate change adaptations (Hadfield-Hill, 2014).

The continuously improving CSR awareness and climate change adaptation disclosure from emerging markets due to increasing stakeholder and social pressure contributes to the entire disclosure adaptation of the APEC region. The results confirmed that there is a significant relationship between power distance and climate change adaptation in the APEC region. This result differed from that of previous studies, which proposed that power distance is negatively related to climate change adaptation disclosure (Orij, 2010; Ringov and Zollo, 2007; Van der laan smith et al., 2005). In the case of other dimensions of culture, the significant relationship is unavailable. The significant result of this study can be primarily attributed to the difficulty of achieving homogeneity of various national cultural contexts to study culture affecting climate change adaptation. This is supported by Kimber and Lipton (2005), pointing out that one cannot generalize the APEC region, due to the substantial variation between the countries in the context of economic development, political systems, and cultural values (Kimber and Lipton, 2005). The substantial economic, political, and cultural distinction among the APEC countries is reflected in the various levels of climate change adaptation activities endorsement, and will ultimately lead to the heterogeneity of climate change adaptation disclosure (Welford, 2005).

Uncertainty avoidance, which is another important national culture dimension, was found to have no significant relationship with the climate change adaptation disclosure, while individualism was found to have a negative relationship with climate change adaptation disclosure. It was also found that there is no significant relationship between masculinity and climate change adaptation disclosure. This could be due to the variance of methods/means implemented by different countries vis-à-vis CSR practices, including climate change adaptation disclosure, which boiled down to the substantial distinctiveness of national cultural contexts (Baughan et al., 2007; Adnan et al., 2009). Also, distinct country contexts and climate change adaptation practices could lead to interference in the results, reflecting an insignificant cultural effect of uncertainty avoidance on climate change adaptation disclosure (Welford, 2005).

Based on the result obtained from this study, it was noted that individualism has a negative relationship with climate change adaptation disclosure. The results confirmed that companies from countries with higher levels of individualism reported lower adaptations of climate change disclosure. This negative relationship is in line with that of previous works (Nord, 2007; Adelope et al., 2013). The negative relationship could be due to several factors. People from highly individualistic societies are more self-oriented, and prioritizes self-interests and personal development (Adelopo et al., 2013), and are less likely to share values and social concerns with others (Ciccarini, 2011).

There is no significant relationship between masculinity and climate change adaptation disclosure. The findings are inconsistent with that of literature, where the latter reported a negative relation between masculinity and climate change adaptation disclosure (Orij, 2010; Ringov and Zollo, 2007; Van der Laan Smith et al., 2005). This could be due to the inherent modesty that is characteristic of Asian culture, which makes climate change adaptation disclosure less likely to be explicitly recognized by stakeholders (Welford, 2005). This could also be due to the diverse means and practices of CSR among countries, which interfere with the cultural effects of climate change adaptation disclosure in the APEC region as a whole. This proposition is supported by Kimber and Lipton (2005), which stated that there are substantial variations of economic, political, and cultural conditions from one Asian country to another.

Based on the results, the presence of CSR or a committee is positively related to the climate change adaptation disclosure, which is in line with (Adnan et al., 2009; Wahyuni et al., 2009; Liao et al., 2014). The positively significant results could be due to the theoretical and pragmatic functional perspectives. From the stakeholder theory, the presence of CSR-related committee helps the company balance and utilize limited organizational resources optimally, prompt the company towards a more environmentally and socially transparent and voluntary disclosure so that it retains long-term

value for various stakeholders (Hassan and Ibrahim, 2012; Liao et al., 2018). Also, in line with the legitimacy theory, Wahyuni et al. (2009) suggested that the existence of environmental committee positively stimulates corporate voluntary disclosure of GHG emissions information, which helps organizations legitimize their business activities and safeguard their legitimacy and survival in the society. The positive role of the presence of a CSR committee is that it facilitates climate change adaptation disclosure and its inherent significant functions (Baldwin et al., 2011). On the execution level, it helps set the direction of climate change adaptation scope while also streamlining the legal and regulatory compliance endeavors (Adnan et al., 2009).

Companies collaborating with NGOs reported a positive relationship with climate change adaptation. This means that the collaboration enhances the companies' adaptation of climate change activities. The results are consistent with the arguments of previous works pertaining to the influence of NGOs on companies' operations and activities (Ali & Rizwan, 2013; Hussain-Khaliq, 2004; Azizul Islam & Deegan, 2008).

Ali & Rizwan (2013) pointed out that NGOs represent a significant group of stakeholders that are interested in CSR and environmental performance. Based on the stakeholder theory, companies provide voluntary disclosure to meet the demands and interests from stakeholders (Villiars and Staden, 2010). As such, the existence of NGOs could influence corporate disclosure on CSR information (Ali & Rizwan, 2013). This is because NGOs have tremendously contributed to increased awareness of problems while also highlighting the role and responsibilities of companies towards finding new ways of reducing the negative impacts of their activities and products (Sobezak & Martins, 2010). Therefore, NGOs can play a significant role in CSR practices while also being positively related to climate change adaptation disclosure.

Based on the stakeholder theory, top management commitment helps a company balance and utilize limited organizational resources optimally. It prompts the company towards a more environmentally and socially transparent voluntary disclosure so that retains long-term values for various stakeholders (Hassan and Ibrahim, 2012; Liao et al., 2018).

Previous works did not support the negative relationship between firm size and climate change adaptation disclosure. Large companies tend to disclose less activities due to the fact that they are more exposed and involved in many CSR activities that are public. Smaller firms tend to focus on less number of activities (Ahmad et al., 2003; Alsaeed, 2006; Freedman & Jaggi, 2005).

It is commonly assumed that large firms possesses sufficient resources for collecting, analyzing, and presenting extensive amount of data (Alsaeed, 2006). As the agency cost is higher in the case of large firms due to the widespread nature of its shareholders, additional disclosure helps them reduce potential agency cost (Alsaeed, 2006). We confirmed that firm size lacks a significant positive relationship with climate change adaptation disclosure. This could be due to the samples in this work being mainly selected from large manufacturing companies. Also, the level of climate change adaptation disclosure in a firm is not influenced by the firms' domicile. Firms from developed and developing countries reported similar sustainability reporting status in the APEC region.

Finally, we may suggest future researchers to do similar research on a wider sample size to get deeper results which makes it possible to compare their findings in different country context as well. It is also suggested to do this study in a cross-section approach to see if newer outputs are achievable or not.

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