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Have Courage, Be Kind: The Drivers of Corporate Water Commitment

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Abstract
Purpose: This paper aims to examine the drivers or factors of corporate governance towards corporate water commitment for the selected sample of global top 50 electric utilities companies. The study also investigate the relationship between corporate governance and corporate water commitment in achieving corporate sustainability through committing to the SDG6.
Design/methodology/approach: The research is based on data collection from the Thomson Reuters database for the sample companies for two consecutive years, 2017 – 2018. The sample collected from the top 50 or market capitalization in global electric utilities industry.
Findings: Board size, board gender, CEO simultaneously the chairman of the company and corporate social responsibility sustainability committee and ISO 14000 or EMS were significantly correlated to item of corporate water commitment such as water efficient policies, water efficient targets and total amount of water pollutant.
Research limitations/implications: Corporate governance and corporate water commitment are based on secondary data and only for the period of two years. Future studies may consider longitudinal analysis and collecting data from other reports such as sustainability reports, annual reports or any stand-alone reports.
Practical implications: As the demand for water increase, industries and businesses should play important roles. Corporate water commitment must be further enriched to achieve Sustainable Development Goal, especially the SDG6.
Originality/value: This paper may enhance current literatures on corporate water commitment for electric utilities companies.

Keywords: Corporate governance, Corporate Water Commitment, Stakeholder Theory, Electric Utilities Companies, Market capitalisation

Introduction

The climate is changing and will continue to change (IPCC, 2018), leading to a significant impact to the environment and community. This occurs directly through changes in the hydrological systems that are affecting water availability, water quality and extreme events, and indirectly through changes in water demand, which in turn can have impacts on energy production, food security and the economy, among others (UN, 2020). Climate change will influence the spread of water-related diseases and will affect the attainment of a number of

other Sustainable Development Goals (SDGs) (World Bank, 2016), particularly the SDG 6. Water risks and challenges globally will in turn affect world economic prosperity, health and development, and environmental sustainability.

Water crises are often primarily governance crises (OECD, 2011). UN (2017) reported that the world is not on track to meet its goal of ensuring the availability and sustainable management of water and sanitation for all, or SDG 6. Despite the increase in water demand in various sectors, achieving the dedicated SDG 6 requires transformation from business as usual to a more sustainable and realistic approaches by investors, companies, governments, cities and states. Good governance involves adhering to principles of human rights, including effectiveness, responsiveness and accountability; openness and transparency; participation in the performance of key governance functions relating to policy and institutional arrangements; planning and coordination; and regulation and licensing (UN, 2020). Thus, good corporate governance implicates best policies for employees in observing the rules relating to institutional system and corporate strategies.

Corporate sustainability strategies must embed water commitment into corporate governance. Although, sustainability and environmental professional could make suggestion to improve the corporate's water performance, the strategic decision making lies on the CEO and the Board. Setting the tone at the top will indeed transform consequences for water security issues. The decision process in a company related to product development, resource allocation, supply chain process, market expansion and waste management will potentially reduce the negative impact on environment, especially the water impact. A rising number of companies are taking progressive action to achieve positive results, for example by using less water in manufacturing, which lead to reduce energy used for water treatment. Businesses are exposed to water risks such as (1) operational risk (for example, water stress that affect operation of business causing damage to facilities); (2) reputational risk (for example, perception by customers, investors and stakeholders on adaptation and mitigation strategies by businesses whereby the negative image may lead to bad press and unable to operate) and (3) regulatory risk (for example, increasing operational cost and reporting corresponding to compliance of regulatory changes governing water use, water allocation and water pricing). Therefore, business should weigh the costs and benefits in having corporate water commitment and policies in the company. Such consequences can be monetarized in a net effect by comparing the costs of action (e.g. flood protection of buildings) that might be shared or shifted (e.g. to insurance) with the cost of inaction (e.g. energy disruption due to floods) (ISO, 2019).

Water is essential for basic human needs, as described in the SDGs on the human rights to water and sanitation for all (SDGs 6, 5), but also for marine (SDG 14) and land (SDG 15) ecosystems, for producing food (SDG 2) and energy (SDG 7), supporting livelihoods (SDG 8) and industry (SDGs 9, 12), and providing sustainable and healthy environments to live in (SDGs 1, 3, 11) (Sweden, 2018). Water has a critical role to play in both mitigation of and adaptation to climate change (SDG 13) and, in that capacity, contributes to building resilient, just, peaceful and inclusive societies (SDG 16) (White, 2018). The Figure 1 below depicted the connection of SDG6 and other SDGs.

Source: Developed by the Stockholm Environment Institute for Sweden (2018).

Figure 1: Connecting SDGs with SDG 6

In addition, SDG 6, like other SDGs has targets that are globally developing. However, each government must decide how to incorporate them into national planning processes, policies and strategies based on national realities, capacities, levels of development and priorities (UN, 2018). In order to be legitimately operate and sustainable in the business world, companies must adapt and mitigate the water security issues as this will affect other targets of the firms and global sustainable development goals.

Therefore, this paper aims to (1) identify the factors of the energy companies to have water commitment in place and (2) investigate the relationship between corporate governance and corporate water commitment for energy companies.

Literature Review

Water and Energy Industry

According to AQUASTAT (n.d.), industries including energy sector for thermoelectric and nuclear power plant cooling withdraws 19% of the world's freshwater resources and IEA (2016) reported that energy industry was estimated as taking about 10% freshwater withdrawal. The pressure is no doubt a worrying situation and rising as emissions of greenhouse gases (GHGs) (UN, 2020).

Energy generation is potentially impacted by all types of water stressors (Table 1) (IEA, 2012). For instance, the water levels and river can fall below intakes at hydropower stations and thermal facilities which may stop the operations. Furthermore, cooling processes may be affected by increased water temperatures and thus lowering efficiency of thermal either by reducing or exceeding the critical thresholds. This situations occur in many different geographical areas. Seasonal variation for the areas also affect the thermal generation capacity even though the areas are good with water availability (UN, 2020). According to Van Vliet (2016), the impact on electricity generation for a global scale may vary as a result of climate change which could generate a reduction in hydropower in the 2050s of 1.2-3.6%, especially in South America and Australia, and a 7-12% thermoelectric power in most region.

Table 1: Impact to power generation by country

Location (Year)	Impact on Power Generation
Kenya (2017)	Frequent shortages of power and higher prices of electricity since drought in 2017.
USA (2016)	Also due to drought, the generating capacity was decreased to 30% in the Hoover Dam.
Brazil (2016)	The country was forced to another thermoelectric plants which were more expensive after the hydroelectric power producers such as the Itaipu Dam was affected by drought.
Ghana (2016)	Due to drought, the country's main source of energy, the Akosombo Dam, operated at minimum capacity.
India (2013–2016)	The shutdown of 20 largest thermal utilities In India which cost US$1.4 billion due to water shortages. In Sri Lanka, there were 14 Terawatt-hours of thermal power generation were lost in 2016 which equal to the annual electricity demand.
India (2012)	Blackouts lasting two days and affecting over 600 million people because of a delayed monsoon which raised electricity demand (for pumping groundwater for irrigation) and reduced hydropower generation.
Romania (2011)	Hidroelectrica, a state-owned hydropower producer cut production by 30% due to depleted reservoirs affected by a prolonged drought.
China (2011)	Drought restrained hydropower generation by the Yangtze River, causing to higher demand of coal (and prices) and making some provinces to apply strict energy efficiency measures and rationing of electricity. Extreme drought cut hydropower output by half in Yunnan Province and made 1000 dams to defer operations.
Viet Nam, Philippines (2010)	Reduced hydropower generation and causing electricity shortages because of the El Niño weather phenomenon which the drought lasted for several months.
Southeast USA (2007)	The Tennessee Valley Authority decreased hydroelectric power generation during a drought, to conserve water and reduced output from fossil fuel-based plants and nuclear.
Midwest USA (2006)	The high temperature of water in the Mississippi River caused a heat wave and forced nuclear plants to reduce their output.
France (2003)	An electricity company Électricité de France (EdF), affected by extended heat wave which forced them to limit nuclear power output equal to 4–5 reactors losses, costing an €300 million approximately importing the electricity.
	Energy Production (Primary)
China (2008)	Abandoned dozens of planned CTL or coal-to-liquid projects because of concerns that they would engage heavy burdens on scarce water reserves.
Australia, Bulgaria, Canada, France, USA	Potential environmental influence on unconventional gas production (including on water) has risen the public concern and encouraged additional regulation and short term bans or moratoria on hydraulic fracturing in some jurisdictions.

Sources: Based on UN (2020), IEA (2012, table 17.3), with complimentary information from Wang et al. (2017) and Kressig et al. (2018).

Corporate Water Governance and Water Commitment

Water governance is the set of rules, practices, and processes (formal and informal) through which decisions for the management of water resources and services are taken and implemented, stakeholders articulate their interest and decision-makers are held accountable (OECD, 2015). Thus, corporate water governance indicates company may has set of rules, processes and system to manage water resources whereby the stakeholders and decision makers of the company including the CEO and the Board are deemed liable for the water issues.

Early water governance efforts emphasized the local and regional scales, but the scope and complexity of water challenges, highlight the need for a more comprehensive and coordinated global effort (Cooley et. al., 2014). Company performance can be achieved by enhancing an organizational culture that can be done by applying the principles of Good Corporate Governance (GCG) (Dwianika, et al., 2020). Dwianika et al (2020) found that water awareness, accountability awareness and corporate governance using the ASEAN Corporate Governance Scorecard supported firm performance.

Although the state, public and stakeholders can take major parts in ensuring water issues have been taken as a governance issues, this paper focuses on corporate management on water commitment. As stated by Rudeback (2019), among the multiple actors engaging in this governance structure, companies are emerging as key players. This is apparent from the increasing existence and contribution in various high-level water events where the global agenda for water is set, like the Stockholm Water Week, the World Water Forum, and the Financial Times Water Summit (Newborne and Dalton 2016).

This paper aims to examine the extent to which the global electric utilities companies encourage policy coherence related to water through effective coordination especially between policies for water and environment, and targets for water efficiency. It is not expected that industry use zero water withdrawal, but corporate are seen as one of the actors to be water efficient by reducing the amount of water used either by recycling water or treating water waste. The rising production in meeting customer demand may increase the water withdrawal and water use by companies. Therefore, corporate water commitment may be seen from water recycled from the total amount of water use. Though the initiatives by companies are lacking in many ways, all parties and actors must engage in water commitment. Thus, it really takes courage to be kind.

Theoretical Framework and Hypothesis Development

Stakeholder Theory

The stakeholder theory posits that effective management of the firm's relationship with its stakeholders is a crucial factor in the firm's success (Almagtome et al., 2020). According to Freeman (1984), a firm should be portrayed by its relationship with its stakeholders. Freeman defines stakeholders as "any group or individual who can affect or is affected by the achievement of the organisation's objectives". In terms of accountability, stakeholder theory argues that a firm is accountable to multiple stakeholders rather than merely to its shareholders as stated by Deegan (2013). This creates various relationship and network to different group of interested parties to achieve firm's mission. The firms' relationships with stakeholders tend to last longer (Dyer, 1996), which lead to generate greater value. Indicating that the firms are accountable for their action to the stakeholders on water issues, firms will show to them that their water commitment. Thus, this paper suggest a hypothesis as follows:

H1: There is significant relationship between corporate governance and corporate water commitment.

Method

This paper selects the global top 50 market capitalization in electric utilities companies. The company's data are obtained through Thomson Reuters database. Data collected for the year 2017 and 2018, as these are the latest available data for all companies. The measurement of the data collected for sample companies are depicted in Table 2 below. For any data in the database that stated TRUE and FALSE, this study will indicate the value as 1 and 0 respectively. Elsewhere the other data will be stated as the true value reported by the companies.

Table 2: Variable and measurement

Variable	Measurement
Board functions policy	Does the company have a policy for maintaining effective board functions? 1 = TRUE; 0 = FALSE
Corporate governance board committee	Does the company have a corporate governance board committee? 1 = TRUE; 0 = FALSE
Board Size	The total number of board members at the end of the fiscal year
Board Gender Diversity	Percentage of female on the board
Independent board members	Percentage of independent board members as reported by the company
CEO Chairman	Does the CEO simultaneously chair the board or has the chairman of the board been the CEO of the company? 1 = TRUE; 0 = FALSE
CSR Sustainability Committee	Does the company have a CSR committee or team? - Board level or senior management committee responsible for decision making on CSR strategy. 1 = TRUE; 0 = FALSE
ISO 14000 or EMS	Does the company claim to have an ISO 14000 or EMS certification? Any of the individual site that has an ISO 14001 certification is qualified information – merely stating adherence to ISO 14000 or following ISO 14000 policies does not qualify, certification is required. 3 = BOTH; 2 = ISO14000; 1 = EMS; 0 = NO.
Policy water efficiency	Does the company have a policy to improve its water efficiency? - In scope are the various forms of processes/mechanisms/procedures to improve water use in operation efficiently – system or set of formal documented processes for efficient use of water and driving continuous improvement. 1 = TRUE; 0 = FALSE
Targets water efficiency	Has the company set targets or objectives to be achieved on water efficiency? In scope, are the short term or long term reduction target to be achieved on efficiently using the water at business operations? 1 = TRUE; 0 = FALSE
Water discharged	Total volume of water discharged in cubic meters. Water discharged for which there is no further use by the company is considered waste water – treated waste water and discharged information is also in scope
Water pollutant emissions	Total weight of water pollutant emissions on tonnes. Substances discharged into water system like PRTR (pollutant release and transfer registers) substances, BOD (biochemical oxygen demand), COD (chemical oxygen demand) or TSS (total suspended solids).

Findings

The data collected from the global top 50 market capitalization for electric utilities companies. The descriptive statistic related to frequencies of the sample companies are states in Table 3 below. The 22 countries make up the sample of this study. Most companies in the top 50 market capitalization were from United States.

Table 3: Number of Top 50 Market Capitalisation Electric Utilities Companies by Country

Country	Frequencies	Country	Frequencies
Austria	1	Japan	2
Bermuda	1	Malaysia	1
Brazil	1	New Zealand	1
Canada	3	Portugal	1
Chile	1	Russia	1
China (Mainland)	1	Saudi Arabia	1
Czech republic	1	South Korea	1
Finland	1	Spain	3
Hong Kong	3	Thailand	1
India	1	United Kingdom	1
Italy	2	United States	21

Table 4 shows the Spearman correlation for the variables. This study aims to investigate the relationship between corporate governance and corporate water commitment for electric utilities companies. From the Table 4, Bsize, or board size was found negatively significant with Twatef or targets water efficiency, $p < 0.05$. This may indicate that a smaller size of board are more focus on water efficiency targets of the company. Big number would not always be good to manage the related issues in some circumstances. This is applicable for water targets for the sample companies. The other variable for corporate governance represented by Bgen or board gender is the percentage of female on the board. The result shows negative correlation between Bgen and Wpol, or water pollutant, $p < 0.05$. The higher the number of female on the board will reduce the amount of water pollutant emission in tonnes.

Table 4: Spearman correlation

Variable	1	2	3	4	5	6	7	8	9	10	11	12
(1) Bfun	1.00	.560**	-.053	.302**	.265**	.171	.091	-.174	.018	-.004	.057	-.059
(2) CGcom		1.00	.087	.323**	.635**	.428**	.200*	-.365**	.039	.031	-.095	-.187
(3) Bsize			1.00	-.149	-.072	.042	.024	.067	-.009	-.249*	.095	.120
(4) Bgen				1.00	.403**	.184	.194	-.039	-.153	-.075	-.014	-.223*
(5) Bindp					1.00	.440**	.245*	-.483**	.005	-.020	-.048	-.178
(6) CeoCh						1.00	.296**	-.211*	.401**	.072	-.051	-.072
(7) CSRcom							1.00	.081	.396**	.122	.147	.093
(8) ISO								1.00	.248*	.242*	.344**	.032
(9) Pwatef									1.00	0.265**	.279**	-.086
(10) Twatef										1.00	.184	-.111
(11) Wdis											1.00	-.004
(12) Wpol												1.00

Note: Bfun = Board functions policy; CGcom = Corporate governance board committee; Bsize = Board Size; Bgen = Board Gender Diversity; Bindp = Independent board members; CeoCh = CEO Chairman Separation; CSRcom = CSR Sustainability Committee; ISO = ISO 14000 or EMS; Pwatef = Policy water efficiency; Twatef = Targets water efficiency; Wdis = Water discharged; Wpol = Water pollutant emissions.
Note: ** significant at 1% level; * significant at 5% level

The CeoCh, or the variable that shows whether the chairman of the board also being the CEO of the sample companies. CeoCH indicates a positively significant relationship, $p < 0.000$ with Pwatef, or the policy water efficiency for electric utilities companies. It holds true in this study that if the CEO also the chairman of the companies they will focus more on the water efficiency policies in place. The CSRcom, or corporate social responsibility sustainability committee was found positively significant, $p < 0.000$ with Pwatef. It shows the importance of the committee if companies were to aim for having water efficiency policies in the organisation

Having said that, the standard operating procedures as guided by ISO 14000 or EMS or both, are significantly positive with water commitment – Pwatef, Twatef and Wdis. This findings indicated that ISO 14000 supported water efficient policies, targets and water discharged. The water discharged includes treated waste water which also in scope. Then, question remains whether policies and target for water efficiency were correlated to each other in this study. Pwatef was found positively significant with Twatef and Wdis, $p < 0.000$. Thus, to have water efficient targets in the companies as to coordinate the teamwork of the employees to achieve water commitment, companies must have the water policy in place. Water target and water policies are significantly correlated.

This study further test the variable relationship using regression analysis as indicated in the two tables below, Table 5 – Model 1 and Model 2. Model 1 is showing the relationship between Policy Water Efficiency and variables that support processes, mechanisms, procedures to improve water use in operation efficiently for the sample chosen for this study. Meanwhile Model 2 is displaying the Targets Water Efficiency and variables that encourage achieving the water target for the sample companies. The equation was estimated as follows:

$$Pwatef = \beta 0 + \beta CeoCh + \beta\ CSRcom + \beta ISO + \beta Twatef + \varepsilon \text{.....Model 1}$$

$$Twatef = \beta 0 + \beta BSize + \beta ISO + \beta Pwatef + \varepsilon \text{ .....Model 2}$$

Whereby Pwatef denotes policy water efficiency; CeoCh = CEO Chairman; CSRcom = corporate social responsibility committee; ISO = ISO 14000 or EMS or both; Twatef = targets water efficiency; BSize = board size.

Table 5: Regression result for Model 1 and Model 2

Dependent variable	**Pwatef**	**Twatef**
Model	Model 1	Model 2
Intercept	2.104**	5.272***
CeoCh	0.385*** (4.304)	
CSRcom	0.239*** (2.733)	
ISO	0.291*** (3.288)	0.229** (2.351)
Twatef	0.136 (1.590)	
BSize		-.0258*** (-2.741)
Pwatef		0.211** (2.185)
Observations	100	100
Adjusted R^2	0.334	0.143
F-statistic	13.393***	6.509***

Note: *** significant at 1% level; ** significant at 5% level; * significant at 10% level

Referring to Table 5, Model 1 indicates a higher adjusted R square of 0.334, $p < 0.000$ than Model 2. On the other hand, Model 2 indicates adjusted R square at 0.143, $p < 0.000$. Both models are significant at 1% level which imply that the selected dependent variables are the drivers of corporate policy water efficiency and corporate targets water efficiency for the electric utilities companies in the sample as stated in Table 5. The drivers for policy water efficiency include CeoCh, CSRcom and ISO. Meanwhile, the drivers for targets water efficiency comprise of BSize and ISO.

Discussion and Conclusion

This paper aims to examine the factors of corporate governance towards corporate water commitment. The sample collected was from the global top 50 market capitalisation in the electric utilities companies. The findings section above shows that board size, board gender diversity, CEO and chairman, corporate social responsibility sustainability committee, and ISO are the variables that correlate with corporate water commitment including policy water efficiency and targets water efficiency.

The Bsize was found negatively significant with targets for water efficiency for the sample companies. A smaller number of board may signify a more focus targets especially on corporate water commitment and achieving the dedicated SDG6. Interestingly, Bgen or board gender was found negatively significant with Wpol or water pollutant. It shows that to reduce water pollutant, the higher percentage of female board is better at aiming the higher corporate water commitment.

When the CEO is also a board chair of a firm, this may help establish robust and unambiguous leadership (Pham and Tran, 2020) but it may promote CEO entrenchment (Peng, 2004). This study found that CeoCh i.e. the CEO simultaneously the same person as the chairman of the company, affect the corporate water commitment. This may indicate that having CeoCh was highly likely that water efficient policies will be in place. Thus, it assists the company to achieve the dedicated SDG while serving the electricity demand for the public or community. CSRcom was also found to be positively significant with Pwatef. An established sustainability committee contributed to realise the water efficient policies. The sustainability committee are devoted to attain a sustainable businesses and legitimate to the stakeholders. In other words, a formal structure in a company is more likely to commit with water issues.

Having both ISO 14000 and EMS are also the predictors for water efficient policies and targets for the companies. This policies include water efficient use in the processes, mechanisms and procedures in the operation of the electric utilities companies. Policies also contain the system or set of formal documentation are required by the CEO or chairman to drive for continuous growth of the sample companies. The targets are the short term and long term objectives and plans to achieve corporate water commitment. Thus, a formal system or standard operating procedures, is more likely to ensure commitment from the sample companies to mitigate water scarcity.

A research is not without its limitation. This study collected the data for a limited sample size and generalisation cannot be made. The findings may not applicable to other companies or industries. The collection data of two years 2017 and 2018 also a restrain for this study. Future study may consider a longitudinal analysis for the drivers of corporate water commitment.

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