European Proceedings of
Finance and Economics
EpFE

www.europeanproceedings.com

e-ISSN: 2672-8958

DOI: 10.15405/epfe.23081.3

**ISEBA 2022**
**International Symposium & Exhibition on Business and Accounting 2022**

# DOES NATIONAL CULTURE DIVERSITY IMPACT CORPORATE WATER PERFORMANCE?

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## Abstract

This paper aims to test the influence of national cultural divergence on corporate water performance. Corporate water management is usually internally driven, but a wider context should be looked into to govern this natural resource. Drawing on the institutional governance systems theory, we investigate the basis of country-specific factors that contribute to corporate water performance. This result can be enlightened because corporate sustainability performance is responsive to forces, risks, and rewards, which eventually shaped by the cultural setting. Using 340 observations of electric utility companies from the years 2015 to 2019, we find that certain cultural dimensions do impact corporate water performance, namely, masculinity (femininity) and long-term (short-term) orientation. The other four dimensions of national culture, including individualism, indulgence, power distance and uncertainty avoidance, indicate an insignificant relationship with corporate water performance. The study suggests that culture, as one of the institutional governance attributes, could play a significant role in enhancing the water performance of companies.



*Keywords:* Corporate water performance, electric utility ındustry, national culture, ınstitutional governance systems theory

https://doi.org/10.15405/epfe.23081.3
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eISSN: 2672-8958

## 1. Introduction

Water crises are often primarily a form of governance crises (OECD, 2011) and water scarcity is part of a greater risk of challenges faced by corporate management including other crucial reserves such as energy and materials (Deloitte, 2012). It is also known that there is robust scientific agreement concerning human influence on climate change, including GHG emissions or greenhouse gases and global warming with an increase of 1.5-degree Celsius (IPCC, 2014; 2018). Climate change influences global water reserves (Bates et al., 2008) and temperature changes will also have an effect on the global water budget (Schewe et al., 2014). These effects are the challenges of sustainable water resources management that many regions are now under serious stress to conform (WWAP, 2012).

The World Economic Forum (WEF) has identified the top ten risks in terms of impact and likelihood, and water crises remain as the top five risks in terms of impact from the year 2015 (WEF, 2021). WEF has defined water crises as "a significant decline in the available quality and quantity of fresh water, resulting in harmful effects on human health and/or economic activity". Recently, the WEF (2022) reported in the Global Risks Report that natural resources, including water risks, is the global top tenth severe risks in the next decade. Government is not the sole actor for water governance, whereby companies can also involve and response to water sustainability challenges which incorporated in 17 Sustainable Development Goals (SDGs) under United Nations 2030 Agenda.

Corporate governance can be categorised into internal (e.g., board governance) and external (e.g., country governance) mechanisms. Thus, in governing water sustainability the perspective can be seen from the two mechanisms. Due to the importance of adapting and mitigating climate change issues related to water sustainability,, a number of studies investigates determinants of water governance (e.g., Rowbottom et al., 2022), water performance (Chopra and Ramachandran, 2021), water disclosure (Liu et al., 2021) and water footprint (Ibáñez et al., 2017). Previous literature focused on a general water issues on various context, for example water issues in the cities (Abu-Rayash & Dincer, 2021), small towns (Fielmua, 2021), river basin (Talukder & Hipel, 2020) and region (Delgado et al., 2021). But the issue of corporate water performance is still underexplored in the literatures. Several studies explored water issues in mining industry (Gilsbach et al., 2022) agriculture (Wicaksono & Setiawan, 2022), food and beverages (Weber & Saunders-Hogberg, 2018) and various industries (Zhang et al., 2021). This study provides novel insight into corporate water performance in global electricity utility industry.

Electricity or power industry business were among the high water-risk profile industries. Water shortages and rising water temperature can lead to limitation of electric power generations (Liao, 2020). "Water use requires energy; therefore, any reduction in water use has the potential to reduce the water sector's energy demand and thus, help mitigate climate change (if the energy source is from fossil fuels). Conversely, energy production also requires water" (UN, 2020, p. 5). The CDP (2018) the three reported sectors with the largest financial impacts were mineral extraction (US$20.5 billion), power generation (US$9.6 billion) and biotechnology, healthcare and pharmacy (US$3.5 billion). As the top three industry with highest financial impact, this study aspires to examine the corporate water performance in the electricity industry enhances the burgeoning research that relates to corporate water performance.

National culture is frequently considered as a country's environmental aspect (Lee et al., 2022). Empirical studies have uncovered that culture influences growth of a country (Gorodnichenko & Roland,

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2011), economic situations (Gallego-Álvarez & Ortas, 2017), national environmental (Roy & Goll, 2014), environmental innovation (Ullah & Nasim, 2021), finance (Lv et al., 2021), environmental performance (Wang et al., 2022), environmental disclosure (Gallego-Álvarez & Pucheta-Martínez, 2020), and corporate behaviour and managerial decisions (Peng & Zhang, 2022). Motivated by these literatures, we argue that shared values that guiding the people philosophies affect the corporate water performance.

Besides studying national culture, this paper endeavours to attain a theoretical contribution through expanding Griffiths et al. (2007) and Griffiths and Zammuto (2005) to incorporate national culture as a potential factor of corporate water performance. Established under institutional governance systems theory, the state governance mentioned how politics affect the sphere of markets. As a result, it is anticipated to see significant internal variance across European governments related to how they negotiate actions and outcomes in response climate change (Griffiths et al., 2007). For instance, according to Griffiths et al. (2007), the methods used by the Netherlands and Sweden to operationalize and handle climate change challenges differ substantially. The extent to which diversity of cultures between say for example, Japan and Malaysia may impact the implementation of water strategies. The results of this study should assist managers and stakeholders to appreciate the cultures of a country and strategize initiatives towards water goals.

## 2. Theoretical Foundation

### 2.1. Institutional governance systems theory

Divergences in the responsibilities of different institutional governance systems in the development of industrial transformation was explained Griffiths and Zammuto (2005). Adapting and mitigating to climate change issues, industry response may vary according to the attributes of a country. Furthermore, Institutional Governance Systems framework principally wanted to explain differences in national competitiveness results (Griffiths et al., 2007). The authors clarified the framework from two perspective, namely firm-centric and state-centric perspectives. For the major part of justification for competitive outcomes spotlights on firm capabilities, strategies and resources or industry structures and attributes (McGahan & Porter, 1997; Oliver, 1997). In addition, country characteristics and conditions are critical determinants of company performance (III & Waring, 1999). This study deduced that corporate water performance strategies differs depending on competencies and sources of the firms, the nature of the industry, and the country's characteristics.

This paper limits the context in investigating corporate water performance determinants from the attributes of country governance which is the national culture of a country that the company domiciled in. In fact, focusing the path that national cultural beliefs and values establish corporate water performance efforts is essential for firms seeking to support stakeholders' demand with their philanthropic practices of corporate sustainability performance. However, water commitment goes beyond conventional CSR activities, addressing water withdrawal and aiming for global sustainability. "Collective programming of the mind", or culture (Hofstede, 1980), determine the way of thinking and principles of the people which differs among stakeholders makes it possible to distinguish individuals of one human group from another within different geographic regions.

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The beliefs hold by the people who governed a country will form the principles and rules objectively. Though cultures seems as an indirect determinants impacting environmental performance of a country, national cultures contribute towards governance systems. Another strand of research categorise national culture as informal institution, while legal system as the formal institution. Previous studies found that culture able to justify a number of the cross-country differences we examine in companies' attributes, for example corporate governance system (Breuer & Salzmann, 2012; Griffin et al., 2017), managers' strategic decisions (Chui et al., 2002), ownership concentration (Sacristán-Navarro, et al., 2022), corporate risk-taking (Li et al., 2013), firm financial and governance outcomes (Hooghiemstra et al., 2015), and board tenure diversity (Ji et al., 2021).

## 3. Corporate Water Performance and National Culture

Corporate water performance refers to the quantity, effectiveness, and other aspects of water consumption by businesses. It assists businesses in implementing more responsible water management strategies that reduce bad effects (or produce good effects), reduce business risks associated with water use, and take advantage of possibilities (CEO Water Mandate, 2014). Corporations should have internal water-related policies and targets in realising optimum amount of water withdrawal for the company's operation. In particular, to describe and explore corporate water performance need reliable measurement which reported in a suitable approach by companies to the stakeholders. Researchers are looking into the variables that influence managers' use of water reports to contextualise or explain their water performance (Zhang et al., 2021).

Water is undeniably important for the ecosystem, overall quality of life and public health. As a result, reviews on water management challenges, for example water risk management (Boholm & Prutzer, 2017) water disclosure (Zhang et al., 2021), water risk assessment (Schaefer et al., 2019) are developing and water impact on business (Weber & Saunders-Hogberg, 2018). It is still difficult to determine what must be governed at which level and the type of cross-level collaboration required in order to accomplish sustainable management (Gupta & Pahl-Wostl, 2013). Considering the local norms, mixed of rules, governance mechanisms and institutions, some countries are commonly characterised having high access to water and sanitation like European countries, while countries like Africa, the access to water services are rigorously pressured. According to UN (2020), water stress can halt the production of energy or interrupt industry, which can affect the raw materials delivery, supply chains, and damage equipment and facilities. Hence, seeking best governance mechanisms with culture tolerance could assist business in improving water sustainability.

## 4. Research Hypotheses

Prior studies have applied the national culture model by Hofstede (1980), Hofstede (2001). The model also be implemented in this paper to offer an informed standpoint of national culture impact the institutional pressure and companies' commitment to water performance, to attain similar results so that it can be compared with previous studies, and to quantify culture in a numerical means. The impact of national culture is typically investigated employing the six dimensions namely power distance, individualism,

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masculinity, uncertainty avoidance, long-term orientation, and indulgence (Hofstede, 2001). The six cultural elements offer the basis for examining the association between country's culture and water performance. In light of the bases of the academic research and considered theory, several dimensions of national culture may influence the way companies design their corporate water performance strategies. Hence, we briefly argue the extent to which the six cultural dimensions might link to water performance and hence we develop the hypotheses in the next section.

### 4.1. Power distance

This cultural dimension communicates the level to which the people of a country that are less powerful anticipate and believe that unequal distribution of power. The underlying concern here is how to manage inequalities among people in a society. Accepting a hierarchical order in which everyone has a position and which requires no further reasoning exhibited by people in societies with a high level of power distance. While people struggle to balance the sharing of power and necessitate explanation for power inequalities related to societies with low Power Distance. Previous studies found a mixed results of power distance link with corporate environmental performance. Gallego-Álvarez and Ortas (2017), Peng et al. (2014) and Orij (2010) discovered power distance is negatively relate to corporate environmental sustainability reporting practices. Similarly, Ullah and Nasim (2021) negatively related to environmental innovation. Meanwhile, Ho et al. (2012) found a positive relationship although the authors hypothesized a negative link. According to Peng and Zhang (2022), societies in stronger power distance might be less encouraged to pressure corporate environmental responsibility on managers and firms. As a result, a high power distance undertake lower water performance. Hence, we formulate the hypothesis as follows:

H1: There is negative relationship between power distance and corporate water performance.

### 4.2. Individualism

This dimension of individualism related to people in societies that care for themselves and immediate families for the high level group. As oppose to individualism, the people in society with collectivism expect their relative or other person to care for each other, in exchange for wholehearted loyalty. It is expected that individualism society in a country might demonstrate less interests for environmental issues as they concern more about themselves than others (Ullah & Nasim, 2021). Research found that in some circumstances individualism directs corporate social performance (Ioannou & Serafeim, 2012). However, Ho et al. (2012) stated a negative relationship between individualism and CSR performance. Likewise, García-Sánchez et al. (2016) argued that collectivism people in a country inclined to disclose environmental and social information to the stakeholders, or negatively related to CSR disclosure (Gallén & Peraita, 2018). Another strand of research claimed that individualism associated with high risk taker (Frijns et al., 2022), and this study inferred that collectivism would be a lower risk taker, thus avoiding water-related risks. Managers and board of directors would be caring for society, adapting to climate change related to water issues. Accordingly, we hypothesise as follows:

H2: There is negative relationship between individualism and corporate water performance.

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### 4.3. Masculinity

The preference of the people in society of a country for assertiveness, achievement, material rewards for success and heroism related to masculinity dimension. The society generally is more aggressive or competitive. Femininity is the inclination for modesty, cooperation and concern with quality of life and concerned for the weak. The society in general is more consensus-oriented. Peng et al. (2014) believe that people in high masculine society value such as their career development. Prior studies found that masculinity is negatively linked with CSR initiatives (Orij, 2010) and corporate social responsibility disclosure (Gallén & Peraita, 2018). Prior studies indicated that low-masculinity (high-femininity) culture and corporate environmental reporting are positively related (e.g., Gallego-Álvarez & Ortas, 2017). However, more recently, Ullah and Nasim (2021) stated that masculinity dimension increase environmental innovation. The prior findings are not conclusive. As masculinity is more competitive and aspired by reward, while femininity at large is more of compromise attitude and demand quality of life, corporate water performance would be likely higher in femininity society as the major aim much related to water sustainability or global nature reserves. Based on the discussion above, the subsequent hypothesis is developed:

H3: There is negative relationship between masculinity and corporate water performance.

### 4.4. Uncertainty avoidance

The uncertainty avoidance dimension corresponds the level of society members feel uneasy with ambiguity and uncertainty. In countries with strong uncertainty avoidance preserving strict codes of conduct, intolerance with unorthodox ideas and behaviour. Countries in which uncertainty avoidance is lower uphold a more easy-going attitude whereby practice weighs more than principles. Ben-Amar and Chelli (2018) reported an association negatively related to uncertainty avoidance and the likelihood of voluntary water-related disclosure, or weak uncertainty avoidance dimension with increase corporate social responsibility disclosure (García-Sánchez et al., 2016), but Orij (2010) found a neutral effect of uncertainty avoidance and corporate environmental sustainability. Companies domiciled in countries with high uncertainty avoidance could possible prevent any matters being publicly known especially regarding corporate water withdrawal, consumption and the discharge amount of water. Therefore they may putting less effort in water performance. As previous research show a mixed result, the result is still yet to finalise. We hypothesised the following based on the discussion above:

H4: There is negative relationship between uncertainty avoidance and corporate water performance.

### 4.5. Long term orientation

While dealing with the matters of the current and the future, each civilization should hold some bonds to its personal history. These two observed objectives have diverging degrees of social importance. Societies with weak scores in this field, for instance, favour supporting established customs and conventions while being careful of societal change or fulfilling social obligation. On the other hand, high-scoring cultures promote efforts as a means of future saving (economy) preparation, or leaning toward potential rewards, such as perseverance, thrift and adaptation (Ma et al., 2022). Short-term inclination societies are

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more determined on instant benefits than future returns (Tata & Prasad, 2015). Thus, focusing on direct returns, individuals are expected to depart from the rules and norms and act resourcefully (Vitolla et al., 2021). The emphasis on the short term implicates a lack of consideration regarding the outcomes of the actions (Vitolla et al., 2019). Thus, even in societies with short-term orientation, the water performance presumes a substantial value.

H5: There is negative relationship between long term orientation and corporate water performance.

### 4.6. Indulgence

This dimension of indulgence allows the society reasonably free pleasure of human drives in having fun and enjoying life. As oppose to restraint dimension allows society dominates pleasure of demands and controls it by ways of stringent social standards. Gallego-Álvarez and Ortas (2017) stated that this culture dimension has negative relationship with environmental reporting. Meanwhile, Ullah and Nasim (2021) also observed negative link between indulgence and environmental innovation. In countries with stronger indulgence people, individuals believe they ought to have wide own freedoms (Coulmont et al., 2015). This cultural dimension based on the way the people in the country are raised in terms of controlling their desire. Lower indulgence is a weaker control and higher restraint is a stronger control. We consider that it is probable that companies in indulgent countries are fewer troubled concerning water security in climate change adaptation. In other words, companies domiciled in restraint dimension engage more in water performance. Thus, we proposed the hypothesis as follows:

H6: There is negative relationship between indulgence and corporate water performance.

## 5. Research Method

### 5.1. Sample selection

The electric utility companies globally make up the sample for this study as the industry regarded as high water risk profile (Barton et al., 2011). Five years data were gathered from 2015 to 2019. The final data set by number of companies after deleting companies without water information was 68. The five years data count up to 340 observation. Water information prior to 2014 mainly unavailable for the sample companies. Using Thomson Reuters database, the data were collected for water related information, while national culture data obtained from the publicly available data through Geert Hofstede website. All six cultural aspects are scored using a 0–100 intuitive scale, with 50 serving as the midpoint. According to the common rule, for a score with less than 50, a culture is deemed to be relatively weak on the measure, and for any score with greater than 50, a culture is deemed to be strong on the measure (Gallego-Álvarez & Ortas, 2017). The description of the variable and also the measurement are shown in the Table 1 as follows:

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**Table 1.** Variables description and measurement

| Variable | Description | Measurement |
|---|---|---|
| Country Classification | Businesses that operate in developed, transitional (from developing to developed), and developing nations. | 3= Developed<br>2= Transition<br>1= Developing |
| *Corporate Water Performance* | | |
| Resource reduction policy | Does the firm have a policy to limit its use of natural resources, such as water, or the effect of its supplier chain? | 1 = True;<br>0 = False |
| Water efficiency policy | Does the business have a plan to improve water usage? | |
| Environmental supply chain policy | Exists a policy at the company to include supply chain in efforts to lessen overall environmental impact? | |
| Targets water efficiency | Has the business established goals for water efficiency? | |
| Water pollutant emission | Any compounds released into the water system are considered to be a load of water pollutants. | |
| Water per revenue | Divide the net sales or revenue in US dollars by the water withdrawal in cubic metres. | 1 = above median<br>0 = below median |
| Water recycled | Water recycled or used again (in cubic meters) | |
| *National Culture* | | |
| Power Distance | Power is distributed equally, as oppose to handling inequality. | Actual value of the culture dimension |
| Individualism vs Collectivism | Taking care of themselves, as oppose to taking care of each other | |
| Masculinity vs Femininity | Tough culture, as oppose to tender culture | |
| Uncertainty Avoidance | Preserving rigid codes, as oppose to a more relaxed attitudes. | |
| Long term vs Short term orientation | Oriented towards future rewards, as oppose to fulfilling social obligations | |
| Indulgence vs Restraint | Free gratification, as oppose to strict social norms. | |

## 6. Results and Discussion

Table 2 shows the sample breakdown by country. The highest observation for this study is companies in the United States (23.53%) followed by Brazil (11.76%) and Japan (10.29%). On the other hand, Australia, Austria, Colombia, Czech Republic, Denmark, Finland, India, Malaysia, New Zealand, Poland, Portugal, Saudi Arabia and Thailand had the lowest representation (1.47%) in the sample.

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**Table 2.** Companies observed by country

| Country | Number of observation | Percentage | Country | Number of observation | Percentage |
|---|---|---|---|---|---|
| Australia | 5 | 1.47 | Japan | 35 | 10.29 |
| Austria | 5 | 1.47 | Malaysia | 5 | 1.47 |
| Brazil | 40 | 11.76 | New Zealand | 5 | 1.47 |
| Canada | 15 | 4.41 | Philippines | 10 | 2.94 |
| Chile | 15 | 4.41 | Poland | 5 | 1.47 |
| Colombia | 5 | 1.47 | Portugal | 5 | 1.47 |
| Czech Republic | 5 | 1.47 | Russia | 20 | 5.88 |
| Denmark | 5 | 1.47 | Saudi Arabia | 5 | 1.47 |
| Finland | 5 | 1.47 | Spain | 10 | 2.94 |
| Hong Kong | 20 | 2.94 | Thailand | 5 | 1.47 |
| India | 5 | 1.47 | United Kingdom | 15 | 4.41 |
| Italy | 15 | 4.41 | United States | 80 | 23.53 |

The country classification of developed, transition and developing country is not significantly related with corporate water performance as displayed in Spearman Correlation in Table 3. Corporate water performance was found negatively significant with Masculinity and Long term orientation dimension, both at $p<0.00$. The other dimension of culture namely, individualism, power distance, indulgence and uncertainty avoidance are not significant with corporate water performance.

**Table 3.** Spearman correlation

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | -.088 | -.806** | .826** | .502** | -.041 | -.112* | .314** |
| 2 | | 1 | .069 | .032 | -.269** | -.043 | -.150** | -.051 |
| 3 | | | 1 | -.768** | -.343** | .369** | .336** | -.662** |
| 4 | | | | 1 | .400** | -.350** | -.414** | .508** |
| 5 | | | | | 1 | -.135* | .114* | .045 |
| 6 | | | | | | 1 | .407** | -.337** |
| 7 | | | | | | | 1 | -.711** |
| 8 | | | | | | | | 1 |

**Correlation significant at 1% level; *Correlation significant at 5% level

Note: 1 = Country Classification; 2 = Corporate Water Performance; 3 = Power Distance; 4 =Individualism; 5 = Masculinity; 6 = Uncertainty Avoidance; 7 = Long term orientation; 8 = Indulgence

Masculinity dimension shows a negative relationship with corporate water performance for electric utility industry. In business context, this culture dimension is known as “tough vs tender culture”. The lower masculinity (higher femininity) in a country leading towards greater corporate water performance. This study also in line with Gallego-Álvarez and Ortas (2017) demonstrating that businesses that operate in nations with high scores of femininity are more committed to corporate environmental sustainability reporting which can help raise public understanding of business environmental choices and effects. According to Orij (2010), who found that lower scores of femininity in a specified country signify the

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contrary of the social orientation, less stakeholder-oriented societies with restricted possibility to require corporate sustainability practises, masculinity drives the companies' developments and efforts of corporate environmental sustainability reporting practises negatively. This study argues that stronger femininity as more attached to water sustainability which echo the quality of life for the society. Corporations in these countries may adapt with the culture and strive to perform in water commitment.

As hypothesised, the other dimension that is negatively significant with corporate water performance is long term orientation. The long term culture oriented towards perseverance and thrift, while short term oriented towards respect for tradition and fulfilling social obligation. Vitolla et al (2021) investigated code of ethics (a means that consents firms to improve the focus about internal policies and compliance level with the legal system) and cultural dimension in high and non-high environmental sensitivity companies, which they found that lower long term orientation societies avoid unethical behaviours. They undertake opportunistic behaviour. Gallego-Álvarez and Ortas (2017) found a positive relationship between long term orientation or pragmatic societies and corporate environmental sustainability reporting. The inconsistent results from earlier investigations suggested that the findings were still inconclusive. This study finds, as shown from the result that short term orientation culture impact on corporate water performance. The society think that fulfilling social obligation and responsibility more important, and which water sustainability can be inferred as realising water goal with less water pollution emission to the river and thus reducing marine pollution.

Table 4 below provided the hypotheses and the summary of expected and observed effect. The two dimension with significant relationship with corporate water performance were also shown in the table.

**Table 4.** The national culture and anticipated effect vs detected effect

| National culture | Hypothesis | Anticipated effect | Detected effect |
|---|---|---|---|
| Power distance | H1 | Negative | ns |
| Individualism | H2 | Negative | ns |
| Masculinity | H3 | Negative | Negative |
| Uncertainty avoidance | H4 | Negative | ns |
| Long term orientation | H5 | Negative | Negative |
| Indulgence | H6 | Negative | ns |

Note: ns = not significant

## 7. Conclusion

From the six dimensions of culture established by Hofstede (Hofstede, 1980; Hofstede & Hofstede, 2005, Hofstede et al., 2010), there are two dimensions namely, masculinity vs femininity and long term vs short term orientation that negatively significant towards corporate water performance. The other dimension of power distance and individualism indicated an insignificant positive relationship. Meanwhile the uncertainty avoidance and indulgence displayed an insignificant negative relationship. However, this study not generalising the findings to all sectors. The time period for the sample companies were from the year 2015 to 2019. This five years study is one of the limitation for this research. This paper also not comparing other industries which could provide another perspective in understanding culture and business particularly concerning on environment and social responsibility. Future research might link the corporate

water performance in other industries while gathering more years of data and using other means such as primary data collection. The performance and commitment of corporate water may also be examined using other theoretical frameworks.

## Acknowledgments

The authors thankfully acknowledge the financial support of Universiti Tenaga Nasional (UNITEN) for the research grant (J510050002/2022017) obtained for this research.

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