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Evaluation of Factors Affecting Carbon Accounting Information Disclosure: A Case of ASEAN Countries

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Abstract

The study mainly investigates and evaluates the factors that influence carbon accounting information disclosure with respect to the case of ASEAN countries. The approach that is taken for collecting the data is through a primary approach where the instrument that is relevant to the research paper is the questionnaire survey. Thus, the questionnaire survey is developed on the basis of the variables that are identified from the literature, along with the utilization of the Likert scale. The sample size selected for the questionnaire collection is 425 samples, of which 385 participants have provided complete information. The SEM was utilized through the tool Smart PLS. Moreover, the path analysis results show that the governance, industry characteristics, organizational efficiency, scale of operations and transparency level have significant and positive effects on carbon accounting information disclosure. Thus, this reflects that the factors that are highly important for carbon accounting information disclosure among the ASEAN countries are governance, industry characteristics, organizational efficiency, the scale of operations, and transparency level. The qualitative study can also be incorporated to gain deep insights into the factors that are influencing CAID. Other than that, a similar approach can be undertaken among other countries such as BRIC or Middle Eastern countries.

Keywords

Carbon accounting information disclosure; Governance; Transparency; Industry characteristics; Organizational efficiency; Climate changes; ASEAN countries

1. Introduction

Climate change is considered a major environmental issue all over the world. It is because rapid economic development has intensified the environmental pollution and much attention of the consumers has been paid to the association between the ecological environment and enterprise business activity (Yang et al., 2017). Making the full and systematic disclosure of the carbon accounting information has been a significant means for the enterprise to emphasize environmental protection. Conducting the carbon accounting disclosure can imitate resource utilization and environmental pollution management for the enterprise (Brooks & Oikonomou, 2018). In terms of decision-making, enterprise stakeholders require comprehensive carbon accounting information following the rapid development of scientific information. It is to realize sustainable development and improve its social image, which has become the enterprise's trend to reveal systematic and comprehensive carbon accounting information. On the other hand, corporations and academicians have well accepted and researched the concept of carbon accounting. The regulators, government, and authoritative bodies are more concerned regarding the increasing carbon emission and its implications on the environment and society. With respect to the ASEAN countries, manufacturing practices have increased over the years due to rapid development.

The increase in manufacturing practices has immense benefits for the ASEAN countries, leading to economic development for most countries. However, the major disadvantage of the increased manufacturing practices is increased carbon emissions. It has also been argued in the study of Bakhsh et al. (2017) that the increase in manufacturing practices also leads the country towards increased carbon emissions. In this manner, it negatively impacts the country as environmental pollution is high in terms of numbers. In addition, most countries do not disclose the information about carbon emissions as they fear a negative reputation in the country and the loss of information. In this manner, this study has focused on determining the factors that affect the disclosure of carbon accounting information concerning the ASEAN countries. The results of this study will help the ASEAN countries to restrict carbon emissions and effectively disclose the information associated with carbon accounting.

2. Literature Review

The considerations for greenhouse gas business decision-making have gained huge attention in the corporate world and have been widely discussed in the existing literature. This section aims to offer the significance of carbon information development and accounting or disclosure through auditing methods. According to Csutora & Harangozo (2017), the notion of carbon accounting is commonly used by scientists in several disciplines and is certainly found in discussions of the integration of climate aspects into accounting. Carbon accounting is regarded as an area of economics that covers a wide range of activities including monitoring and measuring business activities with carbon emissions. As per the study of Stechemesser & Guenther (2012), the main reason behind carrying out the activities of carbon accounting is to enhance the overall system and standards of accountability and transparency control in order to make proper disclosure of carbon information. The

study by Egbunike & Emudainohwo (2017) explains environmental, or carbon accounting as a part of accounting specifically designed to address the methods, systems, and activities, and also involves analysis, reporting, and recording of environmentally included financial influence on the defined economic system.

The significance of carbon accounting has been well acknowledged and widely recognized in previous studies. As mentioned in the study of Burritt and Tingey-Holyoak (2012), carbon accounting plays a crucial role in promoting sustainable actions, which promises to make a greater impact on the overall governance mechanism of the company. According to Tranberg et al. (2019), with growing environmental issues and increasing pressure on businesses with respect to carbon control has led towards increasing the demand separate accounting system for effectively carrying out the operations of carbon management system. Hence, the practices of carbon accounting have gained huge attention in the corporate world. In accordance with the study of Bowen and Wang and Chen (2018), one of the key objectives of carbon emission is help the company's managers to formalise the strategies of carbon change, recognise and manage the climate change opportunities and risks, enhance the overall system of carbon management, and accomplish carbon reduction goals. However, to ensure the successful implementation of carbon accounting, it is important to identify some of the important factors that can directly influence carbon accounting information disclosure.

As per the study of Chen et al., (2017), the characteristics of industry is considered as one of the important factors that play a crucial role in analysing the disclosure of carbon accounting information. As per the same study, the sharing of environmental information is highly subjected to the nature of industry, in which a particular company operates, as the trends of carbon accounting information disclosure tend to vary industry to industry. Therefore, industry characteristics can be an important factor that can influence the carbon accounting disclosure information. On the other hand, the study conducted by Abd Rahman et al., (2014), identifies corporate governance as another factor that can influence the carbon accounting information disclosure practices of the companies. In accordance with the same study, corporate governance deal with regulating the overall functions of the company and prepare the companies to properly regulate all the important elements to offer an effective respond to external environment. Similarly, as per the study of Kılıç & Kuzey (2019), the growing concerns regarding carbon emission have influenced the environmental practices of the companies, and corporate governance is now paying more attention towards evaluating the useful information that can be used to affect the firm's function.

According to Ganda (2018)., the organisational efficiency of the companies tend to have a significant influence on carbon accounting information disclosure. The same study also argues that in recent years, majority of the companies have realized that sustainable financial performance is crucial for the success of business. In this regard, following the environmental requirements imposed by government, companies are looking to allocate significant amount of financial wealth to the carbon information disclosure. Therefore, organisation approach towards bringing organisational efficiency is a crucial aspect that directly influences the practices of carbon accounting information disclosure. On the other hand, the study conducted by Morris (2017), highlight scale of operations and transparency level as two other

important factors that can influence the carbon accounting information disclosure. Based on the overall analysis of previous literature, following hypothesis are developed for this study:

H1: There is a significant impact of Industry characteristics on carbon accounting information disclosure
H2: There is a significant impact of governance on carbon accounting information disclosure
H3: There is a significant impact of Organisational Efficiency on carbon accounting information disclosure
H4: There is a significant impact of Scale of Operations on carbon accounting information disclosure
H5: There is a significant impact Transparency Level on carbon accounting information disclosure

3. Theoretical Framework

Since this study is based on determining the factors which affects the carbon accounting information disclosure within the context of ASEAN countries, therefore, the legitimacy theory has been adopted for this purpose. It has been argued in the study of Lokuwaduge and Heenetigala (2017) that the legitimacy theory helps the organisation in terms of implementing while developing the voluntary environmental and social disclosures for the purpose of fulfilling the social contract. It allows the companies with the gratitude of their objectives along with their survival in turbulent and agitated environment. In addition to this, the legitimacy theory posits that it is essential for the company to continue its operations in the industry, it must align its actions in congruence with the norms and values of the society and environment. In this manner, it will help the long term survival of the company in the industry while minimising the carbon emissions. Moreover, the decreasing carbon emissions will also allow the ASEAN countries in order to disclose the carbon accounting information.

4. Conceptual Framework

The Figure 1 depicts the conceptual framework of the study which shows the variables adopted in this study. In this manner, it can be determined from the below Figure 1 that the dependent variable of the study is carbon accounting information disclosure which is measured with respect and in context to the ASEAN countries. On the other hand, the factors those affect the carbon accounting information disclosure of ASEAN countries have been treated as the independent variables of the study. These variables include industry characteristics, governance, organisational efficiency, scale of operations and transparency level. In this manner, the effect of all the independent variables has been tested on the carbon accounting information disclosure of ASEAN countries.

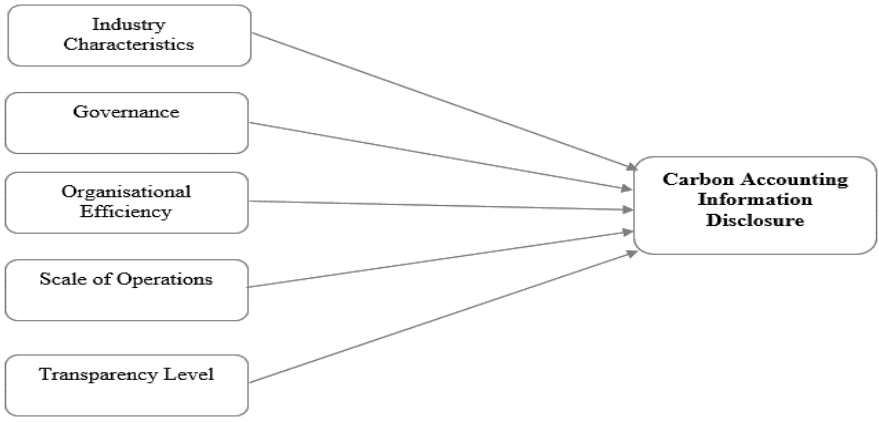

Figure 1: Conceptual Framework of the Study

5. Methodology

The study mainly investigates and evaluates the factors that are influences on carbon accounting information disclosure in respect to the case of ASEAN countries. The approach that is taken for collecting the data is through primary approach where the instrument that is relevant with the research paper is the questionnaire survey. Thus, the questionnaire survey is developed on the basis of the variables that are identified from the literature along with the utilization of Likert scale. The distribution of questionnaire survey is mainly among the ASEAN countries which comprises of 10 members which are Singapore, Thailand, Malaysia, Brunei, Cambodia, Vietnam, Myanmar, the Philippines, Indonesia and Laos. The sample size selected for collection of questionnaire is 425 sample in which 385 participants has provided with complete information that accounts for 90.5%.

The analysis of the questionnaire survey is mainly conducted through applying the statistical analysis techniques in which the Smart PLS software is utilized for revealing the findings. The structural equation model (SEM) is adopted in the study along with the confirmatory factor analysis for measuring the relevancy and validity of the variables. In addition, the discriminant validity is also incorporated in the study for determining the level of distinctiveness among the identified variables. The SEM was utilized for examining the factors that are affecting carbon accounting information disclosure along with testing the hypothesis for determining its acceptance or rejection.

6. Results and Findings

6.1. Confirmatory Factor Analysis

CFA is incorporated on the data for ensuring that the reliability and validity criteria are met for conducting the SEM. There are several tests that are involved in the CFA which comprises of factor loading, Cronbach's alpha, composite reliability and average variance extracted (AVE). Shau (2017); Harun et al. (2016) has depicted that the function of factor loading is to determine the contribution of the items on

the variables where the criteria for meeting absolute contribution is 0.6. As per the results in table 1, the factor loading of the items are found to be above 0.6 which indicates that it has made absolute contribution to its respective variables. The Cronbach's alpha main function is to evaluate the internal consistency of the variables where the value 0.6 or above depicts that the items are internally consistent with the variable (Sawlani and Susilo, 2020; Rahmat et al., 2019). The value of Cronbach's alpha of the variables is found to be above 0.6 which depicts that the variables are internally consistent. Similarly to Cronbach's alpha is composite reliability which also assesses the internal consistency of the variable where the threshold criterion is 0.6 (Xue et al., 2018). It was identified that the values of the composite reliability among the variables is higher than 0.6 which depicts its reliability. AVE is used for assessing the variance of the variables where it is critical that the values must be above 0.5 for depicting its reliability (Alnaser et al., 2018). As per the results, it is identified that all the variables meets the threshold value of 0.5.

Table 1: Convergent validity and reliability

Variables	Items	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Carbon Accounting Information Disclosure	CAID1	0.90	0.89	0.93	0.82
	CAID2	0.93			
	CAID3	0.88			
Governance	GOV1	0.89	0.87	0.92	0.79
	GOV2	0.92			
	GOV3	0.86			
Industry Characteristics	IC1	0.74	0.79	0.88	0.71
	IC2	0.92			
	IC3	0.86			
Organisational Efficiency	OE1	0.90	0.89	0.93	0.81
	OE2	0.92			
	OE3	0.89			
Scale of Operations	SC1	0.86	0.85	0.91	0.76
	SC2	0.91			
	SC3	0.85			
Transparency Level	TL1	0.91	0.91	0.94	0.84
	TL2	0.94			
	TL3	0.91			

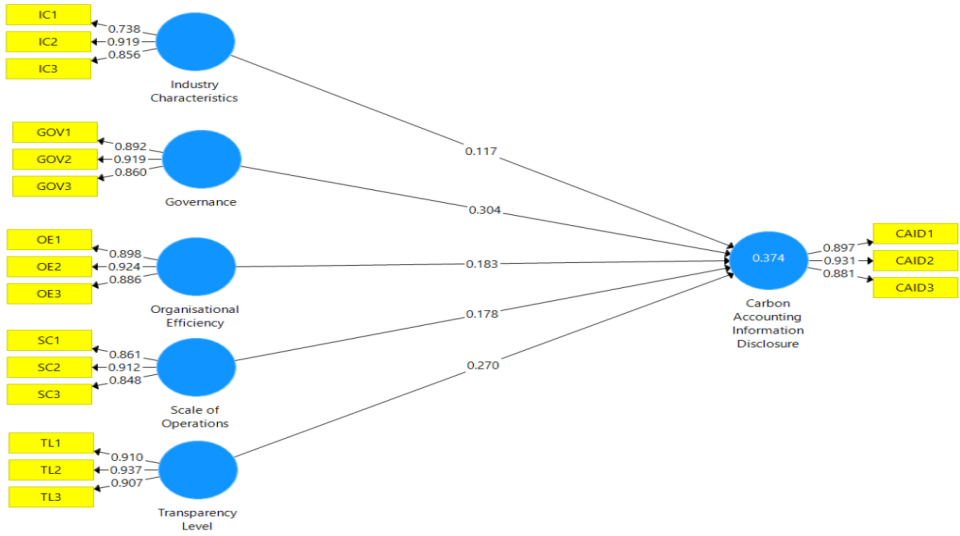

Figure 2: CFA

6.2. Discriminant Validity

The discriminant validity main purpose is to assess the level of distinctiveness among the variables where high level of correlation among the variables can lead to problem with the results (Rahi et al., 2020; Samar et al., 2017). The association of the variables for evaluating the differences is conducted through the heterotrait-monotrait (HTMT) ratio. The threshold point for determining that the variables has a certain degree of distinctiveness is 0.9 (Zatar, 2020; Fadzil et al., 2019). Thus, the values on the HTMT ratio must not exceed than 0.9. The results of the HTMT ratio are provided in table 2 which depicts that the variables' association was below 0.9; thus the evidence points to the variables having a distinct level of association with each other.

Table 2: Discriminant validity (HTMT Ratio)

	CAID	Governance	Industry Characteristics	Organisational Efficiency	Scale of Operations
CAID					
Governance	0.59				
Industry Characteristics	0.41	0.68			
Organisational Efficiency	0.49	0.76	0.59		
Scale of Operations	0.18	0.59	0.65	0.62	
Transparency Level	0.52	0.48	0.30	0.36	0.12

6.3. Path Analysis

As per the results of HTMT ratio and CFA, it is clear that the variables are reliable and valid; thus, the path analysis can be performed for assessing the factors affecting carbon accounting information disclosure (CAID) among the ASEAN countries. The significance threshold for determining statistically significant among the variables is based at three confidence interval which are 99% (0.01), 95% (0.05) and 90% (0.10). As per the literature and conceptual framework, the independent variables involved in the study are governance, industry characteristics, organizational efficiency, scale of operations and transparency level whereas the dependent variable of the study is CAID. According to results in table 3, governance has significant and positive influence on CAID (B=0.304; p=0.000). Moreover, industry characteristics (B=0.117; p=0.025), organizational efficiency (B=0.182; p=0.006), scale of operations (B=0.180; p=0.000) and transparency level (B=0.272; p=0.000) are found to have significant and positive influence as the beta value is in positive while p-value meets the confidence interval point. Thus, on the basis of the results, the factors governance, industry characteristics, organizational efficiency, scale of operations and transparency level are found to have significant and positive effect on the carbon accounting information disclosure among ASEAN countries.

Table 3: Path Analysis

	Beta	**T-Stats**	**P-Values**
Governance -> Carbon Accounting Information Disclosure	0.304***	4.18	0.000
Industry Characteristics -> Carbon Accounting Information Disclosure	0.117**	2.24	0.025
Organisational efficiency -> Carbon Accounting Information Disclosure	0.182***	2.74	0.006
Scale of Operations -> Carbon Accounting Information Disclosure	0.180***	3.52	0.000
Transparency Level -> Carbon Accounting Information Disclosure	0.272***	4.80	0.000

**** Significance at 1%; ** Significance at 5%; * Significance at 10%*

6.4. Model Quality and Predictive Relevance

The quality of model is identified by the coefficient of determination or R-square which mainly evaluate the variance that can be predicted or explained by the explanatory variable (Song et al. 2019; Nakagawa et al., 2017). The R-square value is computed as 37.37% which illuminates that the variance explained or predicted by the independent variables on carbon accounting information disclosure is by 37.37%. In addition, the predictive relevance is measured by the Q-square value which is computed as 0.296 where the value must be above zero for determining predictive relevance among the variable (Hydari et al., 2020).

Table 4: Model Quality and Predictive Relevance

	R Square	R Square Adjusted	Q-square
Carbon Accounting Information Disclosure	37.37%	36.54%	0.296

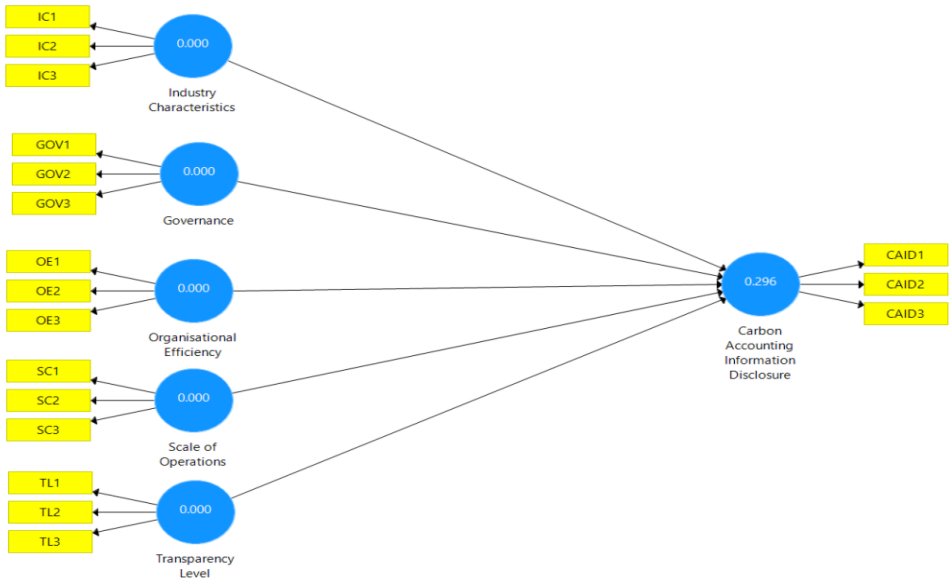

Figure 3: Q-square (Blindfolding)

Table 5: Hypothesis Testing

S. No.	Hypothesis Statement	Significance value	Result
H1	There is a significant impact of Industry characteristics on carbon accounting information disclosure	p=0.000	Accepted
H2	There is a significant impact of governance on carbon accounting information disclosure	p=0.025	Accepted
H3	There is a significant impact of Organisational Efficiency on carbon accounting information disclosure	p=0.006	Accepted
H4	There is a significant impact of Scale of Operations on carbon accounting information disclosure	p=0.000	Accepted
H5	There is a significant impact Transparency Level of carbon accounting information disclosure	p=0.000	Accepted

7. Conclusion

Climate change has become a major global environmental issue, where great attention is being paid to environmental pollution. The disclosure of carbon accounting information provides a significant means for enterprises to focus on the

protection of the environment. In addition, the disclosure of carbon accounting information also enhances sustainable development and the company's social image. The following study is mainly conducted to assess the factors that influence carbon accounting information disclosure in the case of ASEAN countries. The approach taken for conducting the study is through the questionnaire survey which is distributed among the listed firms of ASEAN countries. The analysis is conducted using the SmartPLS tool, incorporating CFA and SEM. The results of CFA have revealed that the variables are valid and reliable for conducting the SEM. Moreover, the results from the path analysis have depicted that the governance, industry characteristics, organizational efficiency, scale of operations, and transparency level have a significant and positive effect on carbon accounting information disclosure. Thus, this reflects that the factors highly important for carbon accounting information disclosure among the ASEAN countries are governance, industry characteristics, organizational efficiency, the scale of operations, and transparency level.

The limitations observed in the study is that the quantitative research is followed that is supported in determining the significant factors influencing carbon accounting information disclosure. However, the qualitative study can also be incorporated to gain deep insights into the factors influencing CAID. Other than that, a similar approach can be undertaken among other countries such as BRIC or Middle Eastern countries.

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