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Table of Contents:

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Conceptual Framework to Improve Carbon Performance via Carbon Strategies and Carbon Accounting

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Abstract:

Rapid transformation from agriculture to industrialized economy in Malaysia has evidently attributed to the accelerated increase in carbon emissions. Carbon emission growth that led to climate change is a very complex spectacle and that is when carbon accounting has emerged. The emergence of carbon accounting has assisted and motivates organizations in achieving their carbon reduction objectives because the system is considered essential in combating climate change. Despite that, the accounting methodology used for climate change remains poorly understood in the current business sphere. As such, it is argued that if carbon strategy is deliberated properly by an organization, carbon accounting will effectively outlines the effects on carbon performance. Enhancing profits is the focal point, but the focus on the sustainable development of the business in the future is crucial. This paper discusses interlinks of corporate carbon strategies, carbon accounting and carbon performance of organizations in Malaysia.

***Keywords*:** carbon accounting; carbon strategy; carbon performance, environmental management accounting (EMA).

JEL Classification: L25; Q56.

Introduction

Climate change implies one out of the six major sustainability problems besides deforestation, scarcity of drinking water, poverty, and loss of biodiversity and population growth (*The Global Risks Report 2017 12th Edition*). Pollutants in the air are not always visible and come from many sources. Air pollutants that caused the decline in air quality are the catalyst to climate change. Regardless of the other types of greenhouse gas emission, carbon dioxide (CO2) emission is scientifically proven with evidence that it is the supreme cause of Earth's increase in temperature (Andrew and Cortese 2011, Wolff *et al.* 2014). Carbon dioxide traps heat in the atmosphere and contribute to climate change. Business activity and behavior would be affected substantially by carbon emissions

(Saka and Oshika 2014), therefore business organizations need to limit and control their CO2 emissions and consider the climate traits in strategies of corporation (Gallego-Álvarez, Rodríguez-Domínguez and García-Sánchez 2011). Changing the behaviors that deteriorate the health of the Earth needs extensive understanding of climate change and its influence (Daud, Mohamed and Abas 2015) and Malaysia is not an exception.

The immediate modernization and urbanization in Malaysia increased the concerns on environmental issues (Ong, Teh, Goh and Thai 2015) evidently with the mean surface temperatures in Malaysia have increased from 0.6°C to 1.2°C over 50 years since 1969 and are expected to keep on intensify from 1.5 to 2°C by 2050 (Begum 2017). According to the Malaysian Ministry of International Trade and Industry in 2017, industrial is identified as one of the main contributors of carbon dioxide (CO2) emissions in Malaysia facilitated by business reluctance to sustainability and to keep up with usual business activities had driven carbon dioxide (CO2) intensifications. The reluctance in sustainability efforts by businesses as considered to be costly, complicated and subjective to measure (Kasbun, The and Ong 2016) led to sustainability skepticism. Despite the hesitant and complexity in obligating to sustainability efforts, climate change awareness and its efforts have been gaining momentum in Malaysia (Bakar, Abdullah, Ibrahim and Jali 2017) this include the role of accounting that has evolved over time emphasized different information grows and the priorities have change toward the demanding and challenging environmental and social issues.

Malaysia's ranking in Environmental Performance Index (EPI) which recorded once in every two years nonetheless keeps on dropping since 2014. Based on the Environmental Performance Index (EPI), Malaysia was ranked at position 75 out of 180 countries in 2018, 63 in year 2016 and ranked at 51 in year 2014 (2018 Environmental Performance Index). Based on the ranking, the initiatives done to reduce carbon emissions are yet achievable for Malaysia and it is impossible for Malaysia to tremendously reduce its CO2 emission by 40% in 2020 as pledged during United Nations Summit on Climate Change in Copenhagen, similar with the 45% target to achieve reduction of carbon emissions by the year 2030 is still ambiguous. Other issues regarding carbon emissions in Malaysia include the low participation in previous MyCarbon program, companies are reluctant to invest into carbon strategies, organizations assume there will be more of the downside to implementation of carbon accounting rather than benefits and there is no empirical evidence that indicates carbon performance will positively impacting organizational performance.

Nevertheless, several studies previously have investigated organizational carbon strategies, carbon accounting and carbon performance. For example, Alrazi and Husin (2016) investigated companies from electricity industry in Malaysia and pressure from stakeholders on climate change performance. Damert, Paul, and Baumgartner (2017) studied on a complex set of actions to reduce the impact of a firm's business activities on climate change and to gain competitive advantages over time. Cadez and Guilding (2017) concentrated on a firm's potential to reduce its level of CO2 emissions by improving carbon efficiency and reducing total CO2 emissions in energy sector firms; improving carbon efficiency; improving carbon efficiency in other manufacturing firms. Luo and Tang (2014) studied the concept of carbon accounting, which encompasses the associations between carbon performance, carbon disclosure, and carbon management system. However, many companies are still not convinced by the benefits of environmental accounting (Ong, Heng Teh, Ng and Soh 2016) and the overall discussions of this field and the results from prior studies remained to be inconclusive for not only developed countries but for developing countries particularly Malaysia.

This paper aims to investigate the linkages between the corporate carbon strategies, using carbon accounting to improve corporate carbon performance. Corporate carbon strategy is important to assist companies' carbon improvement process effectively (Schaltegger and Csutora 2012). However, there is a close interchange between carbon strategy and carbon accounting (system) that makes them interdependent. According to Luo and Tang (2016), carbon accounting system is a method to materialize a company's carbon strategy to increase efficiency in mitigating carbon emission. It is therefore, according to Wijethilake, Munir and Appuhami (2016), the organizational performance would not directly resulted from implementation of the strategy but performance is better when carbon accounting is practiced through corporate carbon strategies to achieve superior organizational performance.

4. Literature Review

1.1 Corporate Carbon Strategies

In the perspective of business, a strategy is typically concerned with the setting of long-term corporate objectives, allocating resources on various business activities and efficient internal control will facilitate the firm to realize their desired goals (Cadez and Guilding 2012). Corporate carbon strategy defined by Damert, Paul and

Baumgartner (2017) as a set of actions to decrease the influence of a company's business actions on climate change then to advance competitive advantages over time. The importance of corporate carbon strategy goes as far as to aid and assure that the corporate carbon improvement progression becomes and continues to be effective in the company implementation process (Schaltegger and Csutora 2012). According to Wahyuni & Ratnatunga (2015), this strategy includes on how carbon management empowers organization in determining the sources of carbon emissions and its measurement and further search for alternative to reduce emissions levels. If the carbon strategy is deliberated properly, an effective carbon strategy can afford an outlines to not only adapt but to comply with the new carbon-constraint regulations, but at the same time save costs from energy efficiency and stay competitive in the shifting background of sustainability. Therefore, Malaysia is in need for prudent strategies related to the carbon emissions reduction to reach sustainability goals.

1.2 Carbon Accounting

Carbon accounting is fundamentally a new concept which emerged in the accounting literature since the last few years. Carbon accounting emerged as a field of interest to both academicians and practitioners. Many facets in accounting should be considered in the matter of climate change in order to face the challenges. Undeniably the focal aspect is the environmental aspects, but social and economic aspects should be considered as well. Carbon accounting covers a wide range of activities correlated to the calculation, verification, reporting, measurement, etc. of carbon emissions (Burritt and Tingey-Holyoak 2012). While Luo & Tang (2016) deliberate carbon accounting as a mean to operationalize company's carbon strategy and policy to improve input used efficiency, lessen risk and emissions as well as to evade compliance costs and to enhance competitive advantage. The greenhouse gas accounting concept could be used for accounts that include various kind of greenhouse gases whilst if only carbon dioxide emissions were mentioned, then carbon accounting is the one that is used (Schaltegger and Csutora 2012). Carbon accounting was created in order to mitigate carbon footprints by measuring and monitoring carbon emissions level of a company, as such carbon accounting is focused on carbon emission first (Gibassier and Schaltegger 2015). In earlier study by Perego & Hartmann (2009) observed that the affiliation between environmental strategy and the environmental performance measurement systems operationalization is not direct, but somehow interceded or mediated by the environmental management accounting systems features such as its sophistication and properties of the measurement systems. This is parallel with the focus of this paper to observe the mediation effects of carbon accounting in the relationship between the corporate carbon strategies and organization carbon performance.

1.3 Carbon Accounting as Mediator

Referring to the study by Tang (2017), carbon accounting should be conceived as a system beyond the mere technical calculation of physical greenhouse gas emissions. Carbon accounting should be the kind of system that adequately account for and report carbon-related assets and liabilities to inform the both internal and external users for decision making processes. This new accounting system should use new theoretical methodologies and be guided by innovative, scientific approaches (Tang 2017). According to Lohmann (2009), Association of Chartered Certified Accountants (ACCA) recognized the vital role of environmental accounting information systems or Environmental Management System (EMS) in assisting organizations to advance their corporate environmental performance (Lohmann 2009). Environmental accounting information affects decision makers' awareness and encourages them to be aware about the environment. Recent studies on Environmental Management Accounting (EMA) from different perspectives reflect the importance of accounting when pursuing environmental management strategies (Schaltegger, Gibassier and Zvezdov 2013). Carbon accounting has the same characteristics as EMA to perform as a system, where the use of EMA in an organization basically leads by the existence of company's environmental strategy. Study by Phan, Baird and Su (2017) findings specify the EMA's important roles in improving the environmental performance of organizations. Focusing on this close interplay between EMA and environmental performance, it strengthens the belief in this study that carbon accounting implementation by an organization plays a significant role to improve carbon performance of a company.

1.4 Carbon Performance

Carbon performance is described as both, reduction of the absolute amount of discharges into the environment (absolute reduction of GHG emissions), as well as improving efficiencies or intensities through the reduction of emissions per kilogram of product or functional unit of a company (Schaltegger and Csutora 2012). Company's carbon management accounting can be a strategic device for organizations to measure and monitor carbon

performance of a company (Schaltegger and Csutora 2012). According to Lewandowski (2017), the companies face little incentive to improve their carbon performance beyond a minimum level of carbon performance. However, the action to improve carbon performance somehow brings opportunity by transforming negative to positive associations which then they are benefited financially because of their carbon performance, the study further stated that the result from carbon performance may help the company to understand why despite the growing of regulatory pressure to report carbon performance, companies still remain ineffective in tackling climate change even though it is clearly indicated that financial performance benefited from better carbon performance resulted by companies (Lewandowski 2017). A further investigation by Damert *et al.* (2017) asserted that the outcomes of carbon performance potentially bring rewards despite ambiguous empirical results.

5. Theory of Resource-Based View

The Resource-based View (RBV) theory is an important idea in strategy as it suggests the potential to explain sustained competitive advantage which the process is of delivering long run returns to shareholders (Toms 2010). Such returns can be conveyed through accessing resources, including for example monopoly control by having a competitive heterogeneity (*e.g.* carbon strategy), or the creation of difficult to replicate resources as in the RBV. According to Hart & Dowell (2011), resource-based view proposes an association between the natural environment and company's resources and capabilities. RBV perspective highlights that superiority of performance generated from organizational ability to create valuable strategy that allows utilizations of distinctive corporate resources and capabilities (Wahyuni and Ratnatunga 2015). Consistent with the RBV theory, this study discusses the view of how carbon accounting materializes a company's carbon strategy to increase efficiency and performance in mitigating carbon emissions. The mediator model of carbon accounting is proposed in Figure 1.

Figure 1 – Conceptual Framework

The conceptual framework interlinks the corporate carbon strategies, carbon accounting and carbon performance of a company. The whole framework is supported by the RBV. Carbon accounting is the mediator between carbon strategies and carbon performance. Based on the past research by Ong, Magsi, and Burgess (2019), the organizational culture can promote environmental practices and ultimately lead to the development of an environmental management control system and better environmental performance. Similarly, focusing on the issue of carbon emissions, the role of carbon accounting will eventually lead to sustainability improvements, which this deliberation supports the management in deciding the most effective measure to be considered in curbing carbon emissions, and how to achieve its improvements in the most economical way.

Conclusion

Carbon emissions reduction by corporations is obviously relevant to the sustainable development and undeniably an important issue to be taken into consideration in every single decision made by organizations. Most of business activities are directly or indirectly related to carbon emissions, therefore corporate carbon accounting is not just a responsibility for the sustainability or environmental departments but the whole organization. Carbon accounting plays a vital role as to inform not just the organizational management but political institutions to support decision-makers to design regulations and to take instant measure to mitigate carbon emissions. Although numerous developments were documented to be practiced by corporations, further research needed to develop accounting system as well as understanding which support increases in awareness, carbon emissions' potential reduction, and effective methods to implement reduction in carbon emissions. The exploration of these relationships is to help organizations in finding the best and compatible strategy, implement a decent system to achieve better performance.

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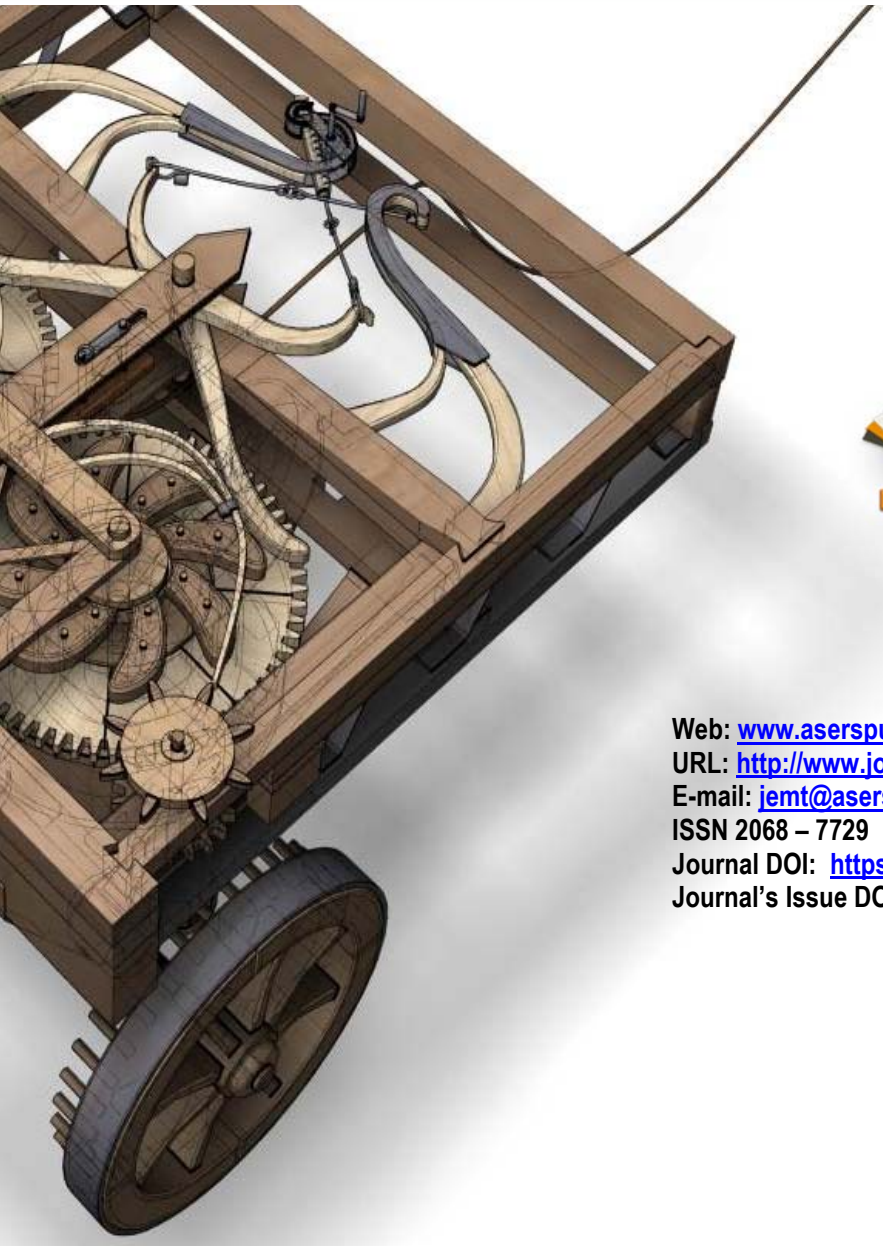

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