Market Motivations for Voluntary Carbon Disclosure in Real Estate Industry

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Abstract
Climate change mitigation in developing economies is a balancing act, between economic development and environmental sustainability. The need for market friendly determinants for low carbon economy, without compromising economic development is of essence. The aim of the study is to determine market friendly factors, which motivates voluntary carbon information disclosure, in the real estate industry. The study modeled economic factor with three variables and financial market factor with three variables against voluntary carbon information disclosure in the real estate industry. Structural equation modeling was used for the modeling and content analysis was used to collect data on the level of voluntary carbon information disclosure, from 2013 annual reports of 126 real estate sector companies listed in the Kuala Lumpur Stock Exchange (KLSE). The model achieved a good fit, and was acceptable prediction. The results show that financial market factor has a significant predictive influence on voluntary carbon disclosure. The application of the result is that financial market factor has a significantly positive influence on companies’ willingness to make voluntary carbon disclosure in the real estate industry. The result may be limited to the real estate industry that is highly leveraged on syndicated fund.

Keywords: Climate change mitigation, Real Estate, Carbon disclosure, Market Motivations, Malaysia

1. INTRODUCTION
The risk associated with climate change is been experienced in most countries and the need to measure and manage its effect is of prime importance. There is a strong association between the emission of carbon dioxide (CO2) and other greenhouse gases (GHG) and the threat of climate change (Freedman & Jaggi, 2005). The effect of climate change is evident with the rise in surface temperature and sea levels, heavier rains with floods, hurricanes and storms, in some cases heat waves and drought (Revi, 2008). There is a quest by companies to stay competitive by improving their environmental records through energy efficiency, waste reduction, and recycling. This is to better satisfy the needs and expectation of their customers, also to adjust to the business landscape in view of climate change, gain support from society, improve media coverage or a blend of these benefits. The built environment being different or alternate to the natural environment in that it is a manmade environment at the expense of the natural environment; comprising of commercial, residential, industrial and institutional estates as well as roads, sidewalks, green spaces, and connecting transit systems (Younger, Morrow-Almeida, Vindigni, & Dannenberg, 2008). Property developers, management and investment companies are at the forefront of the quest from mitigation of the effect of climate change, and want to adopt green projects in order to appeal to the needs and expectations of customers especially those with concerns toward the environment.

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The world’s carbon emission for energy use from properties was 3% per annum in 1999 to 2004. But recent reports show that carbon emission for energy use in commercial and residential properties is estimated at 71% (Younger et al., 2008). In the US about half of the total carbon emission is from industrial, commercial and residential properties. Property development increases carbon emission in other ways, besides alternating for the natural environment; through the property use, building orientation, land location, building plan. The building influences each other and the surrounding landscape, the construction materials and building design elements of the internal and external walls, coupled with the use of energy and water supply by the occupants of the property. The consumption of electricity supply within the property affects the environment and through other interactions between the property and the environment it influences the environment negatively. Carbon emission from properties are primarily for electricity, used for lighting, cooling, heating and other uses in a building, which increases demand for energy which is derived from fossil fuel which emit carbon dioxide (Brown, Southworth, & Stovall, 2005). Real estate properties are long term structures so its emission of carbon is often for a long term. New buildings and older ones, have opportunity to integrate carbon reduction programs through energy efficiency for an eco-friendly neighborhood and environment. The cost for energy efficient project may involve high initial cost but offers long term savings and better ecosystem. The high initial cost could be an obstacle on the benefits of sustainable projects, but sustainable building development designs are cost effective and promote energy efficiency, protects the environment, and mitigate carbon emission that contributes to climate change (Younger et al., 2008). In developing economies the need to sustain economic development is weighed against the need for sustainable development. That is the reason for most countries are not willing to legislate for mandatory carbon disclosure and management which may have adverse effect on business and economic development.

There has been studies on the determinants for carbon information disclosure (Kansal, Joshi, & Batra, 2014; Luo, Lan, & Tang, 2012; Yunus, Eljido-Ten, Abhayawansa, & Vesty, 2016) with varying results. While Luo et al. (2012) argued that economic factors are deterministic, Kansal et al. (2014) claimed that among India companies social factors motivated companies decision for disclosure, but Yunus et al. (2016) held that the firm size and financial leverage are predictive factors. While Luo, Tang, and Lan (2013) found that there is a significant disparity between developed and developing countries as it concerns carbon disclosure, but most studies on the factor determinants for carbon disclosure are located in the developed countries and Amran, Periasamy, and Zulkafli (2014) in a study in Asia Pacific countries noted the need for an understanding on the determinants for voluntary carbon disclosure among the emerging economies due to the low level of disclosure noticed Therefore this study is to investigate market determinants that motivate companies in the real estate industry of a developing country.

2. LITERATURE REVIEW

Commercial sustainable property development is of a great advantage (Dixon, McNamara, & Newell, 2008) while the concept of sustainability has being around in the industry for some time, the implementation of the practice in property development, management and investment in most countries is still minimal (Sayce, Ellison, & Parnell, 2007). This is evident in the certificate for energy performance in the EU by property investors (Keeping, Dixon, & Ellison, 2007; Sturge, 2007). The property industry is observed by tenant as not making sufficient progress in relation to climate change mitigation programs (Bould, 2007). The major setback for sustainable real
estate projects is the economic justification for the cost in commercial projects (Sayce et al., 2007), without established results on the relationship between sustainability and economic returns, it will be difficult to proceed with such projects.

The determinants for sustainable commercial building has being either through statutory legislation for environmental regulation, energy efficiency and carbon emission reduction from government in most developed countries or market factors (Keeping et al., 2007; Sayce et al., 2007; Sturge, 2007). The importance of the market factor is in its influence through the market mechanism influencing stakeholders at all levels, investor, business, government, tenant and community.

The Agency theory claims that financial market pressure comes from shareholders and debt holders to whom management is directly accountable. Failure to disclosure relevant information could lead to a wider information asymmetry between management and capital providers; thereby increasing the company’s cost of capital (Cormier, Magnan, & Van Velthoven, 2005). Capital raising companies tend to provide more information on risk activities. The higher the leverage, the more pressure management would bear to disclose carbon information, it can be argued that companies that is highly leveraged tends to withhold some sensitive information, if the disclosure would increase transparency such that firm’s financial risks would be higher than anticipated, thereby undermining the firm’s negotiating position.

3. RESEARCH METHODOLOGY

Structural equation modeling (SEM) involves a mix of the confirmatory factor analysis and path models. It describes the measurement and structural models; evaluating the confirmation of hypothetical model and the interpretation of the final model (Chen, Zhang, Liu, & Mo, 2011). SEM permits the calculation of interrelated dependence and multiple relations, with the capacity to show unobserved models in these interactions and measurement error (Hair, 2010; Hair, Black, Babin, Anderson, & Tatham, 2009). The SEM is used in the study due to it can be used to develop a model and it robust multivariate results.

3.1 Sample selection

The data for the studies were drawn from the 2013 annual reports of property sector companies listed in Kuala Lumpur Stock Exchange (KLSE). The data was collected through content analysis on the level of disclosure; and financial ratios were used as constructs for the independent variables. Three industry-types selected within the sector were Property companies, Real Estate Investment companies, and the Construction companies. A total of 126 annual reports were selected, comprising sixteen (16) property investment companies, seventy six (76) property companies and thirty-four (34) construction companies. To measure the theoretical model the data was analyzed using Square-Structural Equation Modeling (SEM) instrument which is a more robust analysis tool than the regression model used in similar studies. Validity and reliability measures were applied. With the aim of theory development, SEM assesses the path relationships (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014).

3.2 Measures

The use of content analysis for the measurement of carbon disclosure in annual reports was adopted in Clarkson, Li, Richardson, and Vasvari (2008), (Freedman and Jaggi (2011)), and
Dwyer et al. (2009). Financial ratios were used to measure each factor: social factor, institutional factor, economic factor, and financial market factor.

4. RESULTS

Measurement and structural models were employed, with the reliability and validity test applied to check before the structural model was examined. The analysis employed maximum likelihood for the estimate method as it provides a dependable approach to parameter assessment for a multiplicity of estimate state (Suki, 2014).

4.1 Structural model

Table 1: Model Fit Results

|               | $\chi^2$ | df | $\chi^2$/df | GFI   | AGFI   | RMSEA | CFI   | TLI   |
|---------------|----------|----|-------------|-------|--------|-------|-------|-------|
| Recommended   |          |    |             | >0.90 | >0.90  | <0.08 | >0.90 | >0.90 |
| Model values  | 33.114   | 24 | 1.3798      | 0.9474 | 0.9014 | 0.0551| 0.9881| 0.9822|

The structural model in the SEM was performed and evaluated. A variety of indices were used to assess the model’s overall fit (Table 1). The results indicate that the $\chi^2$ of the model was 33.114 with 24 degree of freedom. The parsimonious fit category of the Chi Square/Degrees of Freedom ($\chi^2$/df = 1.3798) was achieved, while the standard is to be less than 3; for the incremental fit category the Comparative Fit Index (CFI) of 0.9881 was achieved which requires a minimum requirement that is greater than 0.90. The Adjusted Goodness of Fit Index (AGFI) of 0.9014 was achieved against the threshold of greater than 0.90; for absolute fit, the Root Mean Square of Error Approximation (RMSEA) of 0.0551 with a target of less than 0.08, the Goodness of Fit Index (GFI) required a standard of greater than 0.900, and 0.9474 was achieved indicating a satisfactory model fit (Bentler, 1990; Byrne, 2001). Therefore the hypothesized model is of good fit, hence acceptable. So the results of the model are adequate and can be used for further prediction.

Table 2: Regression Weights

| Path                 | Estimate | S.E   | C.R    | P      |
|----------------------|----------|-------|--------|--------|
| Financial Market     |          |       |        |        |
| Factor → Voluntary   | .1864    | .8472 | 2.0336 | .0420  |
| Economic Factor      |          |       |        |        |
| Factor → Voluntary   | .1493    | 11.6758 | 1.6241 | .1044  |

*p < 0.05

5. DISCUSSION/CONCLUSION

The results show that the probability of getting a critical ratio as large as 2.0336 in absolute value is 0.0420. This means, the regression weight for financial-market factor in the prediction of Voluntary Carbon disclosure is significantly different from zero at the 0.05 level (two-tailed), hence has significant positive direct effect. While the probability of getting a critical ratio as large as 1.6241 in absolute value is 0.1044 for the economic factor. The implication of this result
is that, the regression weight of Economic factors in the prediction of voluntary carbon disclosure in the real estate industry is not significantly different from zero at the 0.05 level, so no significant direct effect.

This means between the two markets factors modeled against voluntary carbon information disclosure financial market factor has a significant effect while the economic factor does not have, this result negates the finding in (Luo et al., 2012). Furthermore it means the variables within the financial market factor can be controlled to motivate market driven voluntary carbon information disclosure in the real estate industry, this agrees with (Yunus et al., 2016), towards low carbon economy and corporate climate change mitigation participation.

The implication of the results is that policy incentives can be developed around the financial market factor constructs to motivate companies’ willingness to make voluntary carbon disclosure toward climate change mitigation.

This means that investors, capital market operators and regulator with the financial and banks can motivate climate change mitigation in the real estate sector by making mitigation requirements conditions for mortgage financing and for long term and bridging loan terms. This application is due to the significant positive direct effect between financial market factor and voluntary disclosure. This means as pressure increases from the financial market creditors for the real estate sector there will be a corresponding increase in voluntary carbon information disclosure, which involves measurement, monitoring and management of emission, this implications agrees with the postulations of agency theory.

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