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An empirical study on the relationship between sustainability performance and business competitiveness of international construction contractors

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ABSTRACT

With expectations for resource efficiency and climate change adaptation in the construction industry, there is an increasing need for contractors to implement sustainable practices. Such action will burden contractors with additional costs that will lower their economic performance. There are few research studies on how sustainability relates to a firm's competitiveness. This paper represents an empirical study of the relationship between sustainability performance and business competitiveness of international construction contractors. An inverse U-shape relationship between contractors' sustainability performance and their international revenue, and a U-shape relationship between contractors' sustainability performance and their international revenue growth was discovered. The findings can help international contractors have a better understanding of the relationship between sustainability performance and business competitiveness, evaluate their current position in the relationship, optimize their resource allocation on sustainable development and integrate sustainability into their strategic planning. Therefore, contractors with high sustainability performance can expect higher international revenue growth, and sustainability performance is likely to become an opportunity for competitive advantage in the international construction market.

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1. Introduction

Sustainable construction was originally defined as the creation and responsible maintenance of a healthy built environment based on resource efficient and ecological principles (Kibert, 1994). The negative impact of the construction industry on resources, living and working environments has been recognized for decades (e.g. Bourdeau, 1999; Shen and Zhang, 2002; Tan et al., 2011). Contractors play an important role in promoting sustainable development by assuming responsibility to minimize their negative impact on the environment and society. However, the question is "Does it pay to be sustainable?" There are different views on investment in sustainability. Some argue that it would be a burden for them because they have to pay additional costs to implement sustainable practices. Some consider that sustainability would enhance companies' shareholders value, or at the very least, protect their highly valuable reputations (SCTG, 2002).

Porter and van der Linde (1995) proposed a relationship between sustainability and competitiveness. It was noted (p. 120): *"Proper designed environmental standards can trigger innovations that lower the total cost of a product or improve its value. Such innovations allow companies to use a range of inputs more productively – from raw materials to energy to labor – thus offsetting the costs of improving environmental impact and ending the stalemate. Ultimately, this enhanced resource productivity makes companies more competitive, not less."*

Wagner et al. (2001) conducted a comprehensive review of literature on the relationship between sustainability performance and business competitiveness. The literature was classified into three categories (by methodology used), including event studies, portfolio studies and multiple regression studies. The results indicated that there was no unique relationship prevailing in these

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studies due to different industrial regulation, market structure, factors for measuring sustainable and economic performance, and time period used for analysis. In another study, Wagner and Schaltegger (2003) proposed a phenomenological relationship between sustainability performance and economic success – the inverted-U-shape relationship. Does this relationship exist between sustainability performance and business competitiveness?

According to Robinson et al. (2006) the implementation of sustainable construction practices can lead to competitive advantages such as cost saving from waste reduction plans, improved human development and better labour practices by reducing the risks often associated with dirty and dangerous construction sites, and revenue gains from improved image, loyalty, improved market access and increase in repeat businesses. Adetunji et al. (2003) conducted a questionnaire survey in the UK construction industry and found that sustainability strategy and effective reporting to stakeholders can help enhance contractors' reputation and business competitiveness. Sustainable construction is therefore regarded highly important for the long-term viability of contractors. Fergusson and Langford (2006) developed a framework exploring the relationships between environmental strategic development, competitive advantage and business performance improvement.

Increased environmental competencies provide the opportunities for companies to gain competitive advantage that lead to improved business performance. Tan et al. (2011) reviewed sustainable development in construction and proposed a framework to help contactors improve their competitiveness by implementing sustainable construction practices. To continue the study, the relationship between sustainability performance and contractors' competitiveness will be tested in this paper based on an empirical study. This paper aims to answer the questions: "Does this inverted-U-shape relationship exist in the construction industry?" and "How is this relationship important for international contractors?".

2. Literature review on linkages between sustainability and competitiveness

The relationship between sustainability and business competitiveness has been studied by many researchers (e.g. Porter and van der Linde, 1995; Wagner et al., 2001; Tan et al., 2011). In particular, Hart and Ahuja (1996) conducted an empirical examination of the relationship between emissions reduction and firm performance using a sample of S&P 500 firms and the results showed that emissions reduction enhances firm performance after one to two years of initiation, and firms with high emissions gain the most. King and Lenox (2001) found evidence of an association between firm environmental and financial performance by analyzing 652 manufacturing firms in the U.S., but the direction of the relationship was uncertain. Wagner et al. (2001) conducted a comprehensive review on the relationship between firm environmental and economic performance and found that the relationship between these two dimensions was variable. Many factors affect the variability of the relationship, such as the market structure, regulation, performance measures, data used, and time-period for analysis. Wagner and Schaltegger (2003) summarized two major reasons for the variability: methodological reasons (such as the lack of statistical data, its low quality, or incomplete environmental and sustainability data) and theoretical reasons (such as the influence of corporate sustainable strategies having relatively less impact on the economic or financial success of firms than other factors).

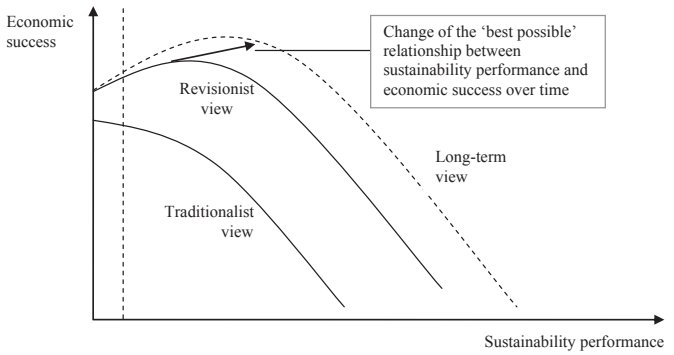

Fig. 1. Phenomenological relationship between sustainability performance and economic success.
(Source: Wagner and Schaltegger, 2003)

Wagner and Schaltegger (2003) also proposed a phenomenological relationship based on the model by Schaltegger and Synnestvedt (2002), as shown in Fig. 1. The 'traditionalist' view argues that the environmental protection activities would reduce economic success because the environmental regulations are used to correct the negative behaviour of companies that would consequently burden companies with additional costs. In contrast to this view, the 'revisionist' view argues that the sustainable practice would benefit a company's economic success because the improved sustainable performance is a potential source of competitive advantage that would lead to more efficient processes, productivity improvement, lower costs of compliance and new market opportunities (Porter, 1991; Porter and van der Linde, 1995; Sinclair-Desgagné, 1999). However, these benefits decrease after a peak point due to increasing investment on sustainability. From a longer-term perspective, frontiers in sustainable development would perform much better than their competitors because the ability of innovation and developing new technologies and production approaches for sustainable development would be more important for sustaining competitiveness than traditional competitive advantage factors (Porter and van der Linde, 1995).

In the context of the construction industry, environmental related issues have been widely examined by researchers, including green procurement (Varnäs et al., 2009), environmental management systems (Park and Ahn, 2012; Zutshi and Creed, 2014), life cycle assessment (Tsai et al., 2011, 2014), and green building (Tsai et al., 2013; Son and Kim, 2014). However, little research has been done on examining the relationship between sustainability performance and business competitiveness. Existing research supports the argument that sustainable strategies improve contractors' competencies in environmental and social management, and consequently lead to business success (Trufil and Hunter, 2006; Fergusson and Langford, 2006; Tan et al., 2011).

3. Research methods

Various research methods have been used for examining the relationship between sustainability performance and business competitiveness. These methods were grouped by Wagner et al. (2001) into three categories: namely event studies, portfolio studies and regression studies. In this study, correlation analysis and regression analysis are used to test the relationship between the two dimensions within a construction industry context. The correlation analysis is used to test whether there is any significant relationship between these two dimensions. The regression analysis is used for estimation to see whether the inverse U-shape curve applies.

For the correlation analysis, six hypotheses are proposed as follows:

- Hypothesis 1: There is no significant correlation between sustainability performance in time period t and contractors' economic performance (International Revenue) in time period t.

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