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The Impacts of Environmental Practice Characteristics on Its Implementation in Construction Project

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Abstract

The study of the implementation of environmental practice in the construction industry has, over the years, resulted in a significant number of published articles. Still, the impact of environmental practice on construction projects has been poorly understood. This paper aims to address this gap. Data were gathered from a survey of 210 firms in the Malaysian construction industry. These data were analysed by using the partial least squares technique. The findings indicate that relative advantage and compatibility have a significant effect on environmental practice implementation in construction projects. The relationship between complexity and environmental practice implementation is not supported. This study extends the knowledge of the determinants of environmental practice implementation in construction projects. The findings of the study will help managers of construction firms in selecting the appropriate environmental practices for implementation in projects.

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Keywords: Environmental Practice; Construction Project; Construction Industy; Malaysia

1. Introduction

Construction-related projects are among the foremost sources of pollution in the environment. Zhaojian and Yi [1] explained that construction-related projects are responsible for 45.5% of the [world's] total energy consumption. The construction industry is a major carbon dioxide-producing industry [2]. The Energy Information Administration [3] explained that the energy consumption of buildings accounts for approximately 29% of the energy the world

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consumed in 2007. Zolfagharian et al. [4] reported that Malaysian construction activities have a 67.5%, 21.0%, and 11.5% effect on the ecosystem, natural resources, and the public, respectively. The considerable environmental effects of construction-related projects have generated a stern warning and governments worldwide have implemented a variety of regulations and have provided financial incentives [5].

Apart from regulation pressures and financial incentives, clients are becoming more demanding, critical, sophisticated, and value-driven in their choices [6]. These challenges suggest that construction products can no longer be limited to their basic and fundamental principles. As a result, influential individuals in this industry have realised the importance of protecting the environment through implementing environmental practices [7]. Therefore, environmental practices in the construction industry have received increased attention in recent years among practitioners and researchers.

Despite the expansion of research in the environmental implementation in the construction industry, its determinants in construction projects remain poorly understood. To address this gap, the present study investigated the impacts of environmental practice characteristics on their implementation in construction projects. Theoretically, the findings contribute to knowledge in the construction field by establishing the relationships between environmental practice characteristics and its implementation. By identifying these relationships, the findings are useful for aiding policymakers and construction firms' managers to implement environmental practices in the construction sector.

2. Model Conceptualization and Hypothesis Development

Environmental practice in construction projects refers to practices throughout project implementation that are friendly to the environment or cause little harm on the environment [8, 9]. Examples of environmental practices are reduction, reuse, and recycling of resource consumption during the design, planning, and implementation phases of a project [10, 11]. Environmental practices also include key values related to environmental practices are deeply ingrained in the projects and major project phases such as project planning, design, and construction are aligned around environmental practices [12]. Environmental practices in construction projects necessitate technological change in the production process (e.g., optimize utilization of materials, minimize on-site energy use, and waste reduction) [13].

Many characteristics of environmental practice can influence its implementation. In this study, three characteristics - namely relative advantage, complexity, and compatibility of environmental practice -- were investigated (Figure 1).

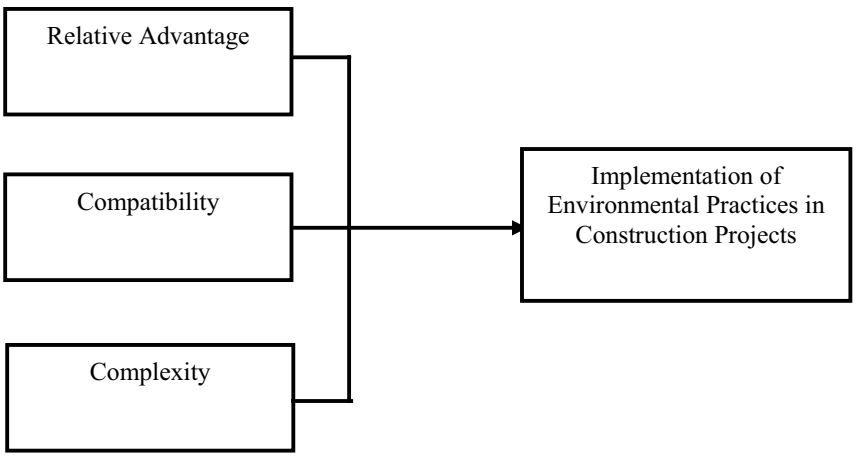

Figure 1 Proposed Research Framework