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Embedding "green" in project-based organizations: the way ahead in the construction industry?

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ABSTRACT

Academic studies on building industry have much to contribute to the mission of sustainable development and yet there has been a lack of proactive engagement with environmentalism in the project-based organizations (PBOs). The embedding of "green" in project-based organization is made particularly problematic due to the increasing conflict between organization-wide change initiatives and emerging cost occurred during daily operation. An independent environmental representative is introduced to develop a new mode of PBOs to help environmental paradigm shift in the construction industry. The paper is a contribution towards an environmental understanding of the project management process.

1. Introduction

The built environment contributes greatly to global energy use and greenhouse gas emissions. The method by which construction process is implemented and managed, and the way it contributes to human being's daily life has major impacts on the environment. Construction activities bring about air, noise and waste pollution. The extraction of fossil fuels and minerals in the process of developing a construction project can change the ecological characteristics of land plots. The deforestation and reclamation of land for developing new construction projects can change living environment and as a result, natural species and plants cannot survive. For example, in 1989, there were 200–400 Chinese White Dolphins in Hong Kong waters. However, it was reported that the reclamation of land for the new airport in Chek Lap Kok indicated that the numbers have reduced to 40–100 (Williams, 1994).

Further, the removal of trees and rivers for construction purposes contribute significantly to global pollution problems like global warming and habitat destruction. Existing studies (for example, Shen et al., 2000; Hendrickson and Horvath, 2000; Zhang et al., 2012) have well discussed various pollution concerns from on-site construction activity including the generation of excessive noise, dust, chemical particles, odor, toxic gas and solid wastes. For example, it is reported that 14 million tonnages of waste are put into landfill in Australia each year. Of these, 44% is attributed to the construction industry (McDonald, 1996). Construction projects also consume large amounts of energy, water, materials and land, thus contributing to the exhaustion of natural resources and excessive energy consumption (Poon, 2000; Shen et al., 2000; Zhang et al., 2012). Best (2001) notes that building sector accounts for around one-third of the delivered energy used in most countries. Energy consumption continues throughout project life cycle (Jiang et al., 2013). Significant amount of energy is embodied in various manufactured building materials and components. On-site construction activities consume the energy for tools, lighting, hoists, cranes, mixers and other facilities. During the post-construction period, energy is consumed for lighting, heating and the operation of various mechanical and electric appliances.

Construction activities also present higher possibilities of unsafe working environment compared to other industry. The Hong Kong Construction Industry Review Committee (CIRC, 2001) reports 47 deaths and 14,000 site accidents within the Hong Kong construction industry during 1999. This represents 39% of all industrial accidents. Safety equipment and insurance policies are normally

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inadequately established. Health problems and sites accidents are evidence that the industry engages unfriendly environmental practices.

To minimize environmental harm, the construction industry has included "green" as one of the project management objectives. A growing number of project based organizations have started identifying sustainability issues as a key factor for company success. A framework was developed to assess corporate social responsibility performance relevant to construction enterprise, which will promote the sustainable development of construction industry (Zhao et al., 2012) The integration of environmental, economic and social dimensions into corporate behaviors has been one valuable strategy for construction companies to determine their long term performance.CIB (1999) proposed a new paradigm that integrates resource, emissions and biodiversity into a global context including socio-cultural issues, economic constraints and environmental quality as shown in Fig. 1.

Other new measures such as governmental policies, incentives for construction firms to adopt 'green' features and environmental management systems (EMS) including ISO 14000 have been introduced to implement environmental management. Individual countries have also adopted domestic environmental assessment schemes including the Building Research Establishment Environmental Performance Assessment (BREEAM) (Baldwin et al., 1998) in the UK, the Building Environmental Performance Assessment Criteria (BEPAC) (Cole et al., 1993) in Canada, the Green Building Challenge (GBC assessment framework) (Cole and Larsson, 1999) in the US, and the Hong Kong Building Environment Assessment Method (HK-BEAM) (CETC, 1996) in Hong Kong.

Nevertheless, it seems that the applications of these measures are of limited effectiveness. For example, Ofori et al.'s (2000) survey on the Singaporean construction professionals suggests that the construction industry was not ready for the implementation of an EMS and those Singaporean construction professionals adopt a "wait and see" attitude towards taking up ISO 14000. This was echoed by more than two thirds of the respondents in the survey. The studies by Lam et al. (2011) show that few Hong Kong construction firms adopt ISO 14000 standard. In the US, Curkovic and Sroufe (2011) notes that American companies are hesitant towards ISO 14000 standard as they fear that the information gathered during the certification process may reveal a company's previous environmental violations. Further, Franchetti (2011) argues that the US is highly skeptical of ISO 14000 as these standards are a product of a private, non-governmental organization. Boiral (2007) found that the Canadian organizations in his sample did not adopt ISO 14000 to reduce their environmental impacts or improve their environmental management. It was developed without the direct input of environmentalists, workers and other members of society.

Whilst the factors contributing to the limited effectiveness of implementing environmental management vary, the ineffective function ofmanagement practice of PBOs is considered as one of the major factors (Zhang et al., 2011; Zuo et al., 2012). It appears that the development of project management objectives (environmental management) has not been accompanied by the development of project management organization. In other words, the existing mode of PBOs seems unable to meet the demand presented by the development of project management objectives. Therefore, this paper aims to investigate the barriers and challenges in implementing 'green' in construction PBOs and how 'greening' PBOs mode can be developed so that the effective implementation of 'greened' project aims can be achieved.

2. Existing measures for implementing "green" management in construction activities and the limitations

The Chartered Institute of Building (CIB, 1989,) report identifies four areas of improvement for environmental management in construction activities:

- efficient use of energy and natural resources
- carefully selecting environmentally friendly building materials and the control of toxic chemicals and dangerous wastes
- pollution control, clean technologies, recycling and waste management
- environmental education via intensive training

In line with these principles, various measures for protecting the environment have been developed in previous research studies. These measures can be broadly grouped into three areas: governmental regulations; economic measures and Environmental Management systems (EMS).

2.1. Governmental regulations

The environmental impact of construction activities has been gaining increasing attention globally. This has triggered governmental alarm, thus, governments worldwide have implemented

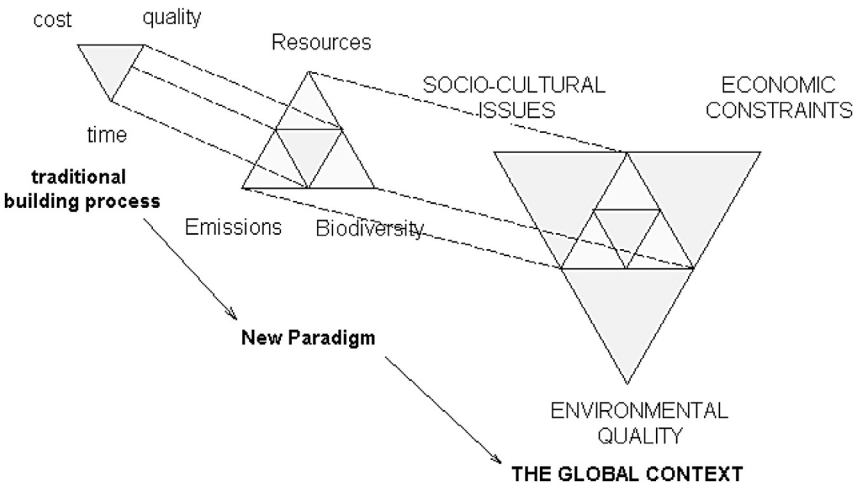

Fig. 1. The new paradigm in a global context (CIB, 1999).