



## Sustainable procurement in the Canadian construction industry: current practices, drivers and opportunities



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### ARTICLE INFO

#### Article history:

Received 4 February 2014

Received in revised form

25 June 2015

Accepted 2 July 2015

Available online 11 July 2015

#### Keywords:

Canada

Construction industry

Construction procurement

Sustainable procurement

### ABSTRACT

Procurement is a key process in construction project management. The current construction procurement practices have been widely criticized for disregarding sustainability in the project life cycle. At present, there is a gap of knowledge on status-quo of sustainable procurement in Canada. Therefore, the objective of this study is to review sustainable procurement practices in the Canadian construction industry. A multi method research design was used in this study by combining both qualitative and quantitative research methods. Three research tools were used in the study; namely questionnaire surveys, review of documents, and semi-structured interviews. Data triangulation was used to combine the results of all three research tools. The study showed that sustainable procurement initiatives have rarely been used in the Canadian construction industry. Limited sustainability initiatives are used in the project procurement, while environmental sustainability criteria are given the prominence. Furthermore a significant deficiency is observed in bid evaluation involving triple bottom line of sustainability. A majority of construction industry respondents agreed that sustainable procurement is a long due necessity and highlighted government regulations as the main driver for sustainable procurement. This study may be the first step to promote the use of sustainable procurement in the Canadian construction sector.

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### 1. Introduction

The construction industry is a vital sector in the Canadian economy (Statistics Canada, 2009), which accounts for 6% of the gross domestic product (GDP) (Industry Canada, 2012). Construction activities have a significant impact on all the three pillars of sustainability; i.e. social, environmental, and economic (Sev, 2009; Jones et al., 2006; Spence and Mulligan, 1995; Tam et al., 2004). According to the Industry Canada (2011), built environment consumes 50% of extracted natural resources and 33% of total energy use in Canada. In addition, buildings produce 25% of the landfill waste, 10% of airborne particles, and 35% of greenhouse gas emissions. Construction industry employed 1.2 million workers in 2010

which is a 7.1% of the total workforce in the economy (Human Resources and Skills Development Canada, 2013).

The annual global construction expenditure is expected to increase by 67%, from \$7.2 trillion in 2011 to \$12 trillion by 2020 (Betts et al., 2011). The same report states that total spending for the decade will be \$97.7 trillion. By 2020 the global construction industry will account for 13.2% of global GDP (Betts et al., 2011). Canada, along with Australia, will lead construction growth among developed countries mainly supported by their natural resources (Betts et al., 2011). From 2000 to 2010 construction GDP in Canada increased by 42.7%, whereas GDP for all industries increased by 20.2% (Statistics Canada, 2012). Bratt et al. (2013) stated that public procurement has a significant potential to drive sustainability agenda of a country because of its volume. Similarly, construction procurement too can be a main driver to promote the national sustainability agenda.

Procurement is an integral process of any construction project which includes all activities related to providing goods, services and consultancy necessary to accomplish the project objectives (Martins, 2009; Sears et al., 2008). Several authors had discussed the potential of procurement to influence sustainability

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performance of a construction project (Adetunji et al., 2003; Häkkinen and Belloni, 2011; Preuss, 2009). Construction procurement is a multi-dimensional process combining a vivid range of aspects such as contract strategy, conditions of contract, performance, culture, sustainability, economics, political environment, learning, leadership, satisfaction, self-esteem, and motivation (Rowlinson and McDermott, 1999). According to Robinson (2004), Sebastian (2011) and McMichael et al. (2003), a combination of multiple disciplines is required to achieve sustainable development. Therefore, procurement would be a potential multi-dimensional mechanism to improve the sustainability performance of a construction project.

Promoting the sustainable development through procurement, should overcome number of flaws identified in the traditional procurement processes. Several scholars have pointed out that selection of the lowest bid, not the best value alternative, is a major weakness of traditional procurement methods (Hampton, 1994; Walker and Hampson, 2008; Hall, 2010). In addition, use of traditional construction procurement methods causes environmental degradation, eventually resulting in impaired quality of life for supporting communities. The above issues eventually can result in indirect costs for the project owners for rectification of the damage (Walker and Hampson, 2008).

Kibert (2012) and Kashyap et al. (2003) defined sustainable construction as creating and operating a healthy built environment which is based on resource efficiency and ecological design. Sustainable procurement is a promising initiative to promote sustainable construction. Several incentives have been established in Canada at the federal, provincial, and municipal levels to promote sustainable construction practices (Miller et al., 2008). In order to implement sustainable procurement it is important to assess the current status of the use of triple bottom line of sustainability (i.e. social environmental and economic factors) in procurement process. A comprehensive literature review has revealed that no recent industry-wide information is currently available for incorporating sustainability criteria into construction procurement in Canada.

The objective of this paper is to identify status quo of sustainable procurement in the Canadian construction industry. In addition, this study assessed industry perceptions on implementing sustainable procurement practices in Canada. This investigation leads to an understanding on what and how sustainable procurement attributes can be adapted into the construction industry practice. Furthermore, this study analyzed the ability of current procurement practices to achieve sustainability in construction.

## 2. Literature review

World summit on sustainable development in Johannesburg was a major milestone for sustainable procurement. One of the final recommendations of the summit was to take sustainable development considerations into public procurement decision making process (United Nations, 2002). Sustainable Procurement Task Force (2006) of the United Kingdom defined sustainable procurement as:

“A process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment.”

Perera et al. (2007) stated sustainable procurement should consider the environmental, social, and economic consequences of design; manufacture and production methods; non-renewable material use; logistics; recycling options; use; operation; maintenance; reuse; suppliers' capabilities; and service delivery and disposal.

The subject sustainable procurement in the construction industry has been an unpopular topic in the literature. A key word search for “sustainable procurement” in Compendex engineering village returned 18 journal articles from 1864 to 2015 that were related to architecture, engineering and construction industry (AEC). The lack of published literature can be because the concept of sustainable procurement has been an emergent concept during the recent past.

Several authors studied the criteria used for sustainable procurement and green procurement in the construction industry. Sourani (2008) identified 43 sustainable procurement initiatives in a countrywide survey in the United Kingdom. Akadiri (2012) identified 24 assessment criteria to be used by architects and building designers in the selection of sustainable building materials. Their study ranked aesthetics, maintainability and energy saving and thermal insulation as the top 3 criteria. Xia et al. (2014) studied how project owners in the United States define the sustainability requirements for construction projects by reviewing 49 requests for proposals (RFP) documents. This study revealed that owners predominantly communicate sustainability requirements by using leadership in energy and environmental design (LEED).

Majority of prior scholarly publications related to sustainable construction procurement have been centered on environmental criteria. Proving this observation, studies by Sarkis et al. (2012) and Gopalakrishnan et al. (2012) showed that social criteria are the least attended sustainability criteria in procurement. Furthermore, Essa and Fortune (2008) conducted an industry wide survey on factors considered for pre-construction evaluation practices for sustainable housing projects in the UK. They identified environmental factors are the main factors considered while there is a lack of knowledge on how to consider social sustainability factors.

Recently there have been a several promising developments with regards to sustainable procurement. Varnäs et al. (2009) conducted studies on green procurement and developed a conceptual framework for improving environmental performance of the construction industry. Sarkis et al. (2012) developed a decision model and a framework for contractor selection using triple bottom lines of sustainability. Chen et al. (2008) developed a knowledge-framed analytic network process to select the most suitable tender for sustainable construction. Tarantini et al. (2011) developed a life cycle approach for green procurement of building elements. Electronic procurement is a growing trend at present. Walker and Brammer (2012) studied electronic procurement (e procurement) and its relationship with sustainable procurement. They concluded that even though e procurement helps with supplier's environmental, labor, health and safety aspects, it reduces the buying opportunities for small and medium firms. Fitch et al. (2015) compared project delivery methods multiple-criteria decision and financial risk analyses to select the most economically sustainable delivery method for public utilities.

Carter and Fortune (2007) stated that there is a lack of structured frameworks to assist the project teams in delivering sustainable construction projects. Faith-Ell et al. (2006) concluded that practical implementation of environmental criteria is a daunting task mainly due to lack of information and inability to supervise after the contract award. Mosgaard et al. (2013) emphasized the need for more simple universal tools such as Eco labels in promoting sustainable procurement. Moreover, Hwang and Ng (2013) emphasized the importance of strengthening the knowledge areas related to green project management.

Implementing sustainable procurement in the construction industry is hindered by a number of factors, such as lack of funding, lack of awareness, and lack of research and development (Sourani and Sohail, 2011; Walker and Hampson, 2008). Ruparathna and Hewage (2015) studied challenges and benefits of implementing

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