



International Conference on Sustainable Design, Engineering and Construction

"Factors affecting social sustainability in highway projects in Missouri"

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Abstract

Sustainability focuses on the interaction between a given project and the social, environmental, and the economic dimensions of the system enclosing it. The majority of the studies conducted focused mostly on the environmental aspects of sustainability rather than the economic ones, while very few studies discussed the social dimension. Social sustainability promotes the concepts of respect, awareness, diversity, vitality, and responsibility toward the workforce and the society by keeping them healthy and safe from harm during the different phases of a project. Highway projects are one of the most critical infrastructure projects in the construction industry. This is due to their high budgets, frequent occurrences, and the inevitable disturbance they cause to the existing communities and environment. As such, a comprehensive study was conducted to analyze the performance of highway projects with respect to the social dimension of sustainability. Due to limitation of space, the paper presents only some aspects of this study. In this study, ten major core factors were identified as principle contributors to social sustainability, and recommended for implementation at different stages of highway projects. This paper discusses these factors in details.

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Peer-review under responsibility of the organizing committee of ICSDEC 2016

Keywords: "Social Sustainability; Highway Project; Construction"

1. Introduction

The main concept of sustainability focuses on the interaction between a given project and the social, environmental, and the economic dimensions of the system enclosing it [1, 2]. It is evident that there is a relationship

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between promoting the concept of sustainability in one of its dimension and its propagation to the other areas of sustainability. For example, practicing green construction (environmental sustainability), will result in savings in the operation cost on the long run (economic sustainability), and will enforce healthy work environment for the workforce (social sustainability) [3, 4, 5]. In construction, sustainable development of a construction project incorporates the major principles of sustainability with respect to the society, environment, and the economic conditions through the various stages of a construction project [6, 7, 8, 9, 10, 11, 12, 13]. The three dimensions of sustainability are usually referred to as the triple bottom line, as shown in Fig. 1(a) [14].

To be socially sustainable, the systems and processes proposed for executing a project should be contributing to the objectives of creating healthy, livable, equitable, diverse, vital, and sustainability-aware workforces and communities [2, 4]. Clear guidelines for social sustainability practice in construction projects should be stipulated and enforced. Such guidelines should dictate - besides the ethical and safe practice of construction - the accountability of day-to-day operations to respecting, caring, and improving the quality of living for the workforces as well as within the communities impacted by the project [15].

Many studies have been conducted to address different aspects of sustainability in various industrial sectors. The majority of these studies focused on a single aspect of sustainability rather than incorporating all the three dimensions in one comprehensive model. Some studies mainly revolved around addressing some of the social aspects as in [16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27], the environmental aspects as in [28, 29, 30, 31, 32, 33, 34, 35, 36, 37], and the economic aspects as in [38, 39, 40, 41, 42].

Most studies that addressed the sustainable development of construction projects focused more on the environmental aspects rather than the social and economic ones. In general, the environmental dimension of sustainability has been given more priority and usually considered before the economic and social aspects in construction projects [4, 43]. This is for reasons related to organizations having to obey environmental regulations and meet law requirements [2]. For example, considering the state and federal laws for minimizing wetlands or historical site degradation, the highway department will have to design and build a highway with the objective of reducing environmental impacts around such wetlands. This can result in additional cost (tax dollars), and may cause disturbance to communities to which the highway will be rerouted by diverting the traffic to or from them. This is clearly evident in Missouri Department of Transportation (MODOT) regulations; for any project, environmental studies are required for suspected wetlands and unusual features of an area including historical sites threatened or endangered species [4], while the Socio-economic impacts are the last on the list.

2. "Problem and research objectives"

Highway projects are unique type of construction due to their special nature. The construction of a highway is a costly project that requires careful planning and significant amount of time and resources to complete. For instance, the interstate highway system is the most expensive project in the history of U.S. Despite the complexity of these projects, the disturbance they cause to their surrounding environment and communities, and their obvious impact on the economy, highway projects are very frequent either through the construction of new roads or the periodic maintenance of existing ones. In literature, very limited number of studies focused on the sustainability of highway projects; and very few of these studies addressed the social dimension in highway projects, as in [44, 45, 46]

The priorities of most entities working on a highway project are getting the project done on time, within budget, and respecting the regulations. Although there are clear federal and state laws and regulations for protecting the environment and public money, this is not the case for social sustainability.

The problem of the lack of consideration and non-practice of social sustainability at different stages of the highway projects can be rooted to two main causes. First is the lack of awareness of the importance of social sustainability, and the difficulty of identifying the factors that define it. The second cause is the initial cost associated with implementing social sustainability as well as the lack of clear evidence of the claimed benefits since the majority of them are intangible and very hard to quantify [1, 2, 4]. As such, there is a need for more studies that promote and facilitate the implementation and practice of social sustainability in highway project.

The main objective of this study is to define, identify, and assess the importance and likelihood of considering the social sustainability dimension in highway projects in Missouri. Ten major factors were identified as principle contributors to social sustainability. For each factor, a set of performance measures were further identified to

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