Mapping Sustainable Development onto Project Management Processes

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Abstract
In the past two decades, sustainable development has attracted increasing attention from both researchers and practitioners in different industries. For project-based organizations, an effective way to satisfy the three pillars of sustainable development (social, environmental, and economic) is to develop guidelines that incorporate sustainability into project management processes and practices. This can be best achieved by mapping sustainable development onto project management processes. This paper summarizes a study aimed at identifying and mapping sustainability practices onto the five project management process groups recognized by the Project Management Body of Knowledge (PMBOK Guide): initiating, planning, executing, monitoring and controlling, and closing. This was accomplished by conducting a comprehensive literature review and consulting with experts in the construction industry in the United Arab Emirates. Accordingly, eighty sustainability practices related to the three pillars of sustainability were identified and mapped onto the five processes recognized by the PMBOK Guide. The results of this study are of value to project managers in the construction industry who are interested in incorporating sustainability into project management practices, thus achieving the sustainable development goals of their organizations. The results may also contribute to incorporating sustainability into project management standards.

Keywords
Project management, sustainability, sustainable construction practices, sustainable management

1. Introduction
The perception of sustainable development associated with the triple fundamentals of—economic, environmental, and social—has evolved into becoming a novel prospect for projects (Labuschagne et al. 2005; Valdes-Vasquez and Klotz 2013). Although sustainability has become an eminent appeal for professionals and scholars in the province of project management (Silvius et al. 2013; Sánchez 2015; Silvius and Schipper 2015; Sarkis et al. 2012; Valdes-Vasquez and Klotz 2013; Labuschagne et al. 2005) and project management could be a mechanism to enhance the incorporation of sustainability dimensions (Bocchini et al. 2014), there is yet an inconsistency between the perception of prominence and the substantial use of sustainability in project management (SPM) practice (Martens and Carvalho 2016a). Additionally, project management, which focused upon eco-design articles contemplate an incipient theme (Brones and Carvalho 2015) and be rendered a deficiency in the eco-design literature (Brones et al. 2014). Apparently, there is an extensively accessible discipline in the areas of both sustainability and project management; nonetheless, there is a deficiency of research that associates both fields to each other. Furthermore, the literature about this research topic has emerged but still persists to be discrete (Martens and Carvalho 2016b), which could be evident and confirmed by the exclusion of basic issues of controversy concerning sustainability by the extensive governing bodies in the field of project management. Additionally, further research is needed in advancing
tools, techniques, and methodologies (Singh et al. 2012) and in addressing the absence of incorporation of sustainability in project management function routines (Cole 2005; Brones et al. 2014). Sustainability can be linked with project management in many ways. For example, one may consider not only the leading variables, i.e., the selection of variables that must be managed towards sustainability during the project life cycle, but also the success indicators such as the impact that the project has on people, planet, and money (Carvalho and Rabechini 2011). The motivation of this study is the need to bridge the sustainability in project management (Brones and Carvalho 2015), given its increasing importance in the current business environment, motivates. Silvius et al. (2012) distinguished between sustainability means for projects and project management to use the suitable approach to fit the goal. Silvius (2015b) referred to Eid’s study, which concluded that project management standards failed to address sustainability agenda. Hence, this area needs more focus to develop the standards of incorporating sustainability in project management to prepare project managers for their essential role in realizing project sustainability.

2. Research Objectives

The construction industry is a significant contributor to improving the quality of life, and the need to manage projects in ways that optimize the use of current resources without compromising future generations’ resources has become crucial. Project management standards lack the integration of sustainability practices that can lead project managers and organizations to function in more sustainable ways. A guideline should be developed to help project managers incorporate sustainability in construction projects. The objective of this research was to identify and map sustainability practices onto the five project management process groups recognized by the PMBOK Guide: initiating, planning, executing, monitoring and controlling, and closing. The remaining parts of this paper are organized as follows. A literature review on the concept of sustainability and sustainable project management is given in Section 3. Research methodology and results are summarized in Sections 4 and 5, respectively. Finally, section 6 concludes the paper by summarizing the findings, identifying limitations, and making suggestions for future research.

3. Literature Review

3.1 The Concept of Sustainability

The term sustainable development was first coined among activists and political leaders as a reaction to the increase in resources used as a result of industrialization (Meadows et al., 1972). Along with there is an indication that if the world population and world economy continue to grow at their current speed, as well as the continuing growth of pollution, food production, industrialization, and population of the world, it would eventually lead to the critical reduction of the world’s resources. Similarly, according to Brundtland (1985), the definition of sustainable development can be stated as development that meets the needs of the present without compromising the ability of future generations to meet their own, with the concept of interlinking aspects of economy, environment, and social well-being in the picture. Therefore, sustainability is about integrating the triple bottom line economic, environmental, and social which might influence each other in multiple ways despite regional differences in emphasis on each pillar. In the same manner, Silvius and Schipper (2016) concluded that sustainability is also about integrating short-term and long-term aspects for the full lifespan of the matter at hand. By looking closely at sustainability pillars, the economic perspective indicates that it should consume income rather than the capital and tends to prefer short-term effects because of discount rates. However, the social and environmental perspectives both indicate that long-term resource degradation might occur because the impact may not be visible in the short term. Sustainability implies that the source and sink functions of the environment should not be degraded and the natural capital remains intact. This can be achieved by ensuring that the rate of renewing natural resources is higher than their depletion rate, and furthermore, it must not to exceed the environment’s maximum capacity to assimilate waste.

3.2 Sustainable Project Management

The concept of sustainability has been recently implemented in project management knowledge, although to some extent, sustainability and project management are in contrast. Considering the nature of projects as temporary organizations, the standards for project management fail to seriously address the sustainability agenda. Hence, this
conclusion may not be surprising. Projects and sustainable development are probably not natural friends (Silvius 2015a).

Bocchini et al. (2014) considered project management as a method to positively affect the integration of sustainability dimensions in projects. Sustainability is a model that simultaneously addresses today’s needs and the impacts on future generations by bringing together three dimensions: ecology, economy, and society. Its significance arose in political strategies; goals of nations, cities, and communities; and companies’ business strategies within the past 25 years. A long-term sustainable development can be achieved only if the idea of sustainability is implemented at different levels, from national guidelines to the practical application on-site. The different levels should exchange information and knowledge to ensure an efficient progression.

Fernández-Sánchez and López (2010) presented that one of the biggest problems when measuring sustainability is identifying sustainability indicators and selecting an indicator set. For these reasons, they have proposed to establish a methodological process to identify and select sustainability indicators by considering them as opportunities (positive risks) of the project and to strike a balance between the effects within the project life cycle, as well as to obtain social, economic, and environmental benefits. They also proposed a methodology that constitutes a first approach toward standardization for identifying and selecting sustainability indicators in construction projects. Furthermore, they obtained information by consulting different stakeholders to achieve a certain consensus to find the common goal of sustainability.

Based upon the interpretation of sustainable development deduced from the World Commission on Environment and Economic Development, a comprehensive perception of sustainable development is founded from the incorporation of the three scopes (economic, environmental, and social) pertaining sustainability, frequently known as the “triple bottom line” (Elkington 1998). Furthermore, the increased number of companies implementing project management techniques confirms that project management has attained predominant significance among companies pursuing efficient, agile, and effective responses in their business and project development procedures (Kerzner 2001). Corporations commenced in adopting projects affiliated with the rules of institutes and associations and their respective project management bodies of knowledge, including A Guide to the Project Management Body of Knowledge (PMBOK Guide)—Fifth Edition (Project Management Institute 2013); the International Project Management Association Competence Baseline (ICB) (IPMA 2013); and the APM Body of Knowledge (APM 2013) of the Association for Project Management. Nonetheless, these governing bodies do not pay any attention to the sustainability field, and this eventually leads to increments in the daily practice of organizations and professionals in the project area. Carvalho and Rabechini Jr. (2011) claim that sustainability encompasses the tension between the diverse groups of stakeholders. Multiple researchers also suggest that there is an enhanced opportunity and necessity to comprehend topics associated with integrating sustainability aspects into organizational processes, precisely at the managerial level (Singh et al. 2012; Labuschagne et al. 2005; Carvalho and Rabechini Jr. 2011; Silvius et al. 2013; Silvius and Schipper, 2015; Martens and Carvalho, 2016a). Accordingly, these researchers dispute that the concept of triple bottom line sustainability requires to be implemented and integrated into the project management function, thus leading to alleviated and enhanced results. Additionally, Thamhain (2014) indicates that sustainability will persist to be a predominant dispute, particularly in large projects. The literature on sustainability in project management is yet developing, and there persists to be an insufficiency that demonstrates within the heterogeneous terminology approved by researchers from different research groups of different epistemological fields (Brones and Carvalho 2015; Martens and Carvalho 2016b; Brones et al. 2014).

4. Methodology

Figure 1 illustrates the steps used in mapping sustainable practices onto project management processes. As shown in Figure 1, the sustainability indicators were determined from the literature, then their relevant practices were identified and mapped by an expert panel onto the five management process groups recognized by the PMBOK Guide: initiating, planning, executing, monitoring and controlling, and closing. The expert panel formed for this study consisted of five practicing/practitioner project managers employed in different organizations in the United Arab Emirates construction industry. A key selection criterion for the practitioner members of the expert panel was their demonstrated level of professional construction management experience, which was considered approximate to the status of a professional engineer.
4.1 Sustainability Indicators

From the literature, as shown in table 1 below, fifteen academic publications were included to study about indicators of each sustainability pillar. Also, it shows the percentage of how many times each indicator is repeated to choose the most common influential indicators.
Sources: (Berzosa et al. 2017), (Fernández-Sánchez and Rodríguez-López 2010), (Silviu 2015a), (Yu et al. 2018), (Fiksel 1999), (Sarkis et al. 2012), (Shen et al. 2010), (Xing et al. 2009), (Nation 2007), (Labuschagne et al. 2005), (Mulder and Brent 2006), (International Organization for Standardization 2014), (14001, 2004), (GRI Standards 2016)

4.2 Sustainable Practices in Construction Project Management

The sustainability practices in construction projects were specified by professional expert project managers in the construction field. After specifying the practices of each indicator in each pillar, they were asked to locate in which process of the five-project management process each practice can be used as shown in table 2.
5. Results

Based on the literature review, more than 35 indicators corresponding to the three pillars of sustainability were identified, as shown in Table 1. For practical purposes, we decided to include the identified indicators in 50% or more of the reviewed studies. According to the percentages shown in Table 1, the indicators corresponding to the environmental pillar are natural resources, energy, water, and biodiversity. The indicators corresponding to the economic pillar are financial performance and financial benefits of good practice. The indicators corresponding to the social pillar are labor practices, relationship with the local community, engagement of stakeholders, society, and products and services. The identified relevant practices and their mappings to the five management process groups are given in Table 2. As shown in this table, 80 practices have been identified, and each of them is mapped onto one or more of the process groups. This table also shows that almost all practices could be mapped to planning and execution processes.

6. Conclusion

The motivation behind this study was to contribute to sustainable development in the construction industry through identifying and mapping 80 practices related to the three pillars of sustainability onto the five processes recognized by the PMBOK Guide. This was achieved through the literature review and in consultation with experts in the construction industry in the United Arab Emirates. This research is intended to shed light on the importance of integrating sustainability into project management processes in construction projects. It also gives project managers a tentative guideline on where to incorporate sustainable practices in project management processes, hence contributing to the sustainable development goals of their organizations. The results may also contribute to incorporating sustainability into project management standards. However, since they were obtained based on experts’ opinions in the construction industry of the United Arab Emirates, it is difficult to indicate to what extent the results reported in this study are applicable to the construction industries in other counties. This could be investigated in future studies. Another possible future study direction would be to investigate to what extent the practices identified in this study are implemented in the construction industry in either the United Arab Emirates or other countries.

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References


**Biographies**

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