

# A New Conceptual Framework to Examine Sustainability Issues in Project Environments

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**Abstract:** *In the present study, the attempt is made to investigate the sustainability in project management as the novel applied and research topic. To this end, a variety of scientific research performed in this regard were gathered. These studies were mostly focused on the investigation of sustainability in project and project management, the relation between them, and the practical implementation of the sustainability indicators. The aforementioned matters were primarily dealt in a qualitative way by using questionnaire and checklists as the main research tools. The views and findings of the most notable works reviewed in this subject area are classified into two general categories of qualitative and quantitative studies. Finally, the potential areas were identified and classified into seven general groups including: 1. Sustainability Indicators 2. Project levels 3. Case studies 4. NGOs 5. Project manager 6. project management standards and 7- Using quantitative models and mathematical tools.*

**Keywords:** *project management, sustainable, sustainability in project management, project manager and sustainable development.*

## 1. Introduction

In today's world, contrary to the past, the succeeding generations are deemed to have their own share of the world. Indeed, we are not allowed to jeopardize the life of the following generations to provide a better life for ourselves. Endangering their life has various aspects among which the surrounding environment is maybe the first one comes to the mind [1].

In fact, such a perspective towards the next generations can be extended to the concept of sustainability, that is to say, we have to follow the principles of the sustainability in performing activities. Accordingly, one of the main challenges leadership currently face in business is to integrate it into the main functions of the business. The development of sustainability has shifted from the pivotal concern of the pressure groups including organizations supporting the environment and society to the vital concern of business managers. For these managers, the central concern is to practically implement sustainability in their business. Sustainability fails to mean following the existing business practices but rather rethinking, redesigning, and redeveloping the business practices in a sustainable manner.

One of the functions of the business is project management. In the current project management methods, such a process is overshadowed by the "triple constraint", i.e. quality, cost, and time. The foregone aspects firmly emphasize the economic benefit. Even though, social and environmental aspects may, in some cases, be considered the aspects of quality, they have been hardly investigated or applied directly and independently.[2]

Therefore, the relation between sustainability and project management is assumed to be an emerging field of study about which there is limited academic research. Sustainability in project management is about integrating economic, social and environmental aspects into the management systems, formats, and project governance.

Evidence of project failure in the industry sphere suggests the necessity of further investigations of the sustainable development.[3] In other words, experience indicates that senior management in project-based organizations (PBO) may, at times, tend to follow and to include sustainability considerations in the project management; however, they may fail to know which measures and metrics they may require to this end.[4]

The study is organized as follows: section two presents a review of selected literature in the area of sustainable project management. Section three describes the existing research gap in this regard, followed by recommendation of potential areas for the future research. And finally, concluding remarks are presented in section four.

## 2. Literature of past works

Because of the novelty of the subject and its rapid growth, the majority of selected papers are belonging to the second decade of the twenty-first century. selected articles are found using the following keywords: "project management", "sustainable", "sustainability in project management", "project manager" and "integrating sustainability and project management". The aforementioned matters were primarily dealt in a qualitative way by using questionnaire and checklists as the main research tools. The chosen articles from different parts of the world investigate both theoretical and practical aspects. The views and findings of the most notable works reviewed in this subject area are classified into two general categories of qualitative and quantitative studies.

TABLE 1: Qualitative Studies About Sustainability in Project Management

Author/Date	Study Purpose	Relevant Findings
Silivius et al (2010) [5]	to give a maturity model for the integration of sustainability in projects and project management processes.	<ul style="list-style-type: none"> <li>- providing a comprehensive overview of the concepts of sustainability and their application to project management</li> <li>- Sustainability in project management develops the system boundaries of the project and of project management</li> </ul>
Fernández-Sánchez & Rodríguez-López (2010) [6]	to identify, sort and prioritize sustainability indicators based on risk management standards	<ul style="list-style-type: none"> <li>- developing a methodology for choosing sustainability indicators by all stakeholders</li> <li>- applying the methodology in a research project in an effort to identify indicators for linear infrastructure projects in Spain</li> <li>- to make a practicable model for the assessment of sustainability</li> </ul>
Talbot & Venkataraman (2011)[7]	to suggest a structure for merging sustainability into project baselines for consulting engineering projects	<ul style="list-style-type: none"> <li>- providing determinable indicators in a project setting</li> <li>- distinguishing the sustainability sub-indicator's possessor who could be responsible for its attainment</li> <li>- applying the high level sustainability indicators to regiment the gathered stakeholder requirements into sustainability issues</li> </ul>
Craddock (2013)[8]	to create the linkages among Business Excellence Models, project sustainability, and project success	<ul style="list-style-type: none"> <li>- applying Business Excellence models in a project environment</li> <li>- preparing a framework to direct sustainability in an organization by BEMs</li> <li>- Putting upon BEMs to address project sustainability as one contributor to project success</li> </ul>
Gareis (2013)[9]	to seek how sustainability can be considered while managing the transformation of a project	<ul style="list-style-type: none"> <li>- changing project dimensions in transforming process</li> <li>- can be considering the principles of sustainable development in changes of projects</li> <li>- sustainability might cause and be a reason the transformation of a project</li> </ul>
Tharp (2013)[10]	to examine aspects of a sustainable project and feasible implementation guidelines them to integration sustainability into the project processes	<ul style="list-style-type: none"> <li>- perceiving the risk of relinquishing sustainability aspects in both short-term and long-term impacts in a project</li> <li>- investigating how to incorporate sustainability ways into project management knowledge areas</li> <li>- interpreting the basic sustainability aspects to the corporate setting and the broader society</li> </ul>

Brent&Carin (2013)[11]	to study how sustainability could be addressed in the project management, based on the resolution of four pragmatic instances	<ul style="list-style-type: none"> <li>- accentuating the risk of diminishing all sustainability aspects of a project to one common denominator that can be more unmistakable to decision-makers</li> <li>- presenting a system dynamics approach to the sustainability valuation of renewable energy Project developments</li> </ul>
Tufinio et al (2013) [12]	to assess the common scenario of sustainability implementation in projects and project management practice	<ul style="list-style-type: none"> <li>- Drivers for sustainability implementation can be from different causes</li> <li>- The sustainability roadmap is not similar for each organization.</li> </ul>
Maltzman& Shirley, (2013)[13]	to show the importance of the role of the project manager in attaining organizational sustainability in an enterprise	<ul style="list-style-type: none"> <li>- directing the paths in which the project manager can entreat the role as change representative on their projects and within their corporate</li> <li>- the emphasis on developing a new mindset, a new framework of reversion</li> </ul>
Winnall(2013)[14]	to illustrate how the alliance of social risk monitoring can essentially go forward the probability of a project's success	<ul style="list-style-type: none"> <li>- classifying and managing the social sustainability risk in the common procedure as all other risks in the project</li> <li>- stakeholders are aware of their potency to stop projects which do not satisfy their social needs</li> </ul>
Schipper, &Nedeski (2013)[15]	to perceive the major subjects with the practical application of sustainability to a real project, and to render a method for analysis	<ul style="list-style-type: none"> <li>- finding 8 contraptions which could supply to an utmost sustainable contribution</li> <li>- raising a manifest difference between the internal project viewpoint of sustainability and external viewpoint of sustainability</li> </ul>
Goedknecht (2013)[16]	to display what a project manager can play a role in the implementation of sustainability within the project and the management process	<ul style="list-style-type: none"> <li>- the sustainability degree on a project is dependent on the project manager's priorities</li> <li>- the project manager has a medium accountability for considering the holistic approach and the long-term view in sustainability project management</li> </ul>
Eid (2013)[17]	to describe and to explore the suggestion of a tri-dimensional coalition between construction, sustainable development, and project management	<ul style="list-style-type: none"> <li>- examining the relationship between sustainable development and project management through its application in a construction project</li> <li>- nominating and evaluating the eligible change of sustainable development guidelines into the project management standards</li> </ul>
Wang et al (2015) [18]	to determine vital factors for sustainable project management	<ul style="list-style-type: none"> <li>- leadership, process control and communication are the most important factor in the sustainability project management</li> <li>- team management and innovation are the least important factors</li> </ul>
Marcelino-Sádaba et al (2015) [19]	to dissect connections between sustainability and project management via a comprehensive literature review	<ul style="list-style-type: none"> <li>- defining an original conceptual framework to manage sustainable projects, based on four dimensions: products, processes, organizations and managers</li> </ul>
Martens &Carvalho (2016) [20]	to recognize major variables of sustainability in project management context and	<ul style="list-style-type: none"> <li>- providing a systematic literature review incorporating bibliometric and content analysis</li> <li>- to figure out its significance of indicators based on project managers' perspective</li> </ul>

As it is observed in Table 2, in recent years there has been a wave of studies dealing with the indicators of sustainability in project management using mathematical modeling as well as multi-objective/multi-criteria decision-making tools.

TABLE 2: Quantitative Studies About Sustainability in Project Management

Author/Date	Study Purpose	Relevant Findings
Shen et al (2007) [21]	to engender a checklist for evaluating project sustainability performance across its life cycle	<ul style="list-style-type: none"> <li>- allowing all project parties to determine the project sustainability performance in a constant and comprehensive way</li> <li>- amending the collaboration among all stakeholders to achieve adequate project sustainability performance</li> <li>- facilitating perception the primary factors impressing a project sustainability performance across its life cycle</li> </ul>
Khalili-Damghani&SSadi-Nezhad (2013) [22]	to establish a decision support system to untangle sustainable project selection problem	<ul style="list-style-type: none"> <li>- considering simultaneously the maximum precision and minimum complexity by the proposed framework</li> <li>- using decision support system in a real case of sustainable project selection.</li> </ul>
Heravi et al (2015) [23]	to determine and evaluate sustainability indicators for three	<ul style="list-style-type: none"> <li>- identifying and evaluating the main sustainability indicators through petrochemical projects life-cycle</li> </ul>

	phases petrochemical projects	<ul style="list-style-type: none"> <li>- the environmental dimension is of great importance to operation and maintenance phase</li> <li>- the most momentous dimension in the construction phase is the economic dimension</li> </ul>
Sánchez (2015) [24]	to develop a framework to avouch a true portfolio selection to gain business strategy and stakeholders demands	<ul style="list-style-type: none"> <li>- accomplishing a simultaneous analysis of eco-impacts to organizational objectives</li> <li>- evaluating sustainability for portfolio selection and project monitoring</li> <li>- formularizing the portfolio selection and project monitoring problems methodically</li> </ul>
hen et al. (2016)[25]	to assay the effects of the share repartition between public and private segments on project sustainability performance	<ul style="list-style-type: none"> <li>- getting an expected level of sustainability performance by organizing appropriate investment distributions between the two sectors in a public-private-partnership project</li> <li>- putting out a noteworthy system for defining investment distributions in a PPP-type project towards higher project sustainability performance.</li> </ul>
Siew et al (2016) [26]	to appraise project sustainability in a progressive manner via maturity levels	<ul style="list-style-type: none"> <li>- presenting sustainability maturity model relating to main project activities</li> <li>- considering uncertainty in the assessment of project sustainability maturity levels</li> </ul>
Martens et al (2016) [27]	to identify key variables of sustainability in project management, and to explore the impact of these variables on project success	<ul style="list-style-type: none"> <li>- develop a framework incorporating sustainability in project management and project success</li> <li>- giving more importance to sustainability in projects by project managers</li> </ul>

### 3. Potential for Future Research

The reviewed literature reveals a significant relation between sustainability in projects and project management. Moreover, regarding the role of project manager, scholars appears to agree that the aforementioned role is crucial in including sustainability in projects; however, the project manager is officially responsible for a number of project's aspects.

By studying the previous papers and their results, it can be concluded that the key to success in implementing sustainability is establishing a proper and strong relation between project and project management. However, sometimes other subjects could be linked to such a relation, the before-mentioned proper and strong relation between projects and projects management is the main element for establishing sustainability.

In relation to sustainability, a plethora of indicators could be studied. Table.3 lists the most important ones. But the question is that whether these indicators are the same for all projects? The response is, No, for each project, irrespective of the place where it is done, has its own requirements. As the present study is focused on three main domains of economic, social, and environmental usefulness, these indicators could be changed according to the place where the project is being conducted [28]. For instance, social indicators have extensively high importance in African countries rather than the wealthiest European countries where environmental indicators have higher significance.

**TABLE 3: Main Indicators of Sustainability in Project Management**

Economic Indicator	return on investment, business agility
Environmental Indicator	transport, energy, waste, water, material
Social Indicator	Human rights, society and customers, labor practices and decent work, ethical behavior

Due to the reasons mentioned above, further use of case studies may help us in this regard. Put it another way, the more the considered case studies, the better the conclusions in sustainability area; consequently, all indicators and their impacts could be well scrutinized. However, as this is an emerging topic, more time is required to see the impacts of such indicators.

According to what mentioned in literature review section, potential areas for future research could be presented in seven general groups.

1. Corporate Social Responsibility (CSR) requirements: In addition to the indicators mentioned in previous papers, there are other options, whether to add further indicators or to combine ones mentioned in the literature. Furthermore, some indicators could be considered with more details. Establishing green jobs

(i.e. environmentally friendly jobs) through implementing projects, is one of the indicators having received less attention in the previous studies.

2. Project levels: In a number of studies, this very subject has been examined in a special level of the project. For example, in some projects, the main emphasis has been focused on starting a project; while others have separately examined this matter in different phases of the project from design to implementation or even failure. Seamless examination of this matter at different levels of the project and determination of the relative significance of these levels from the facet of sustainability are the other potential areas for further research.
3. Case studies: As the previous studies indicated, diverse case studies may lead to different results. New studies could be provided by investigating this matter, particularly in mega projects including infrastructure projects and oil and gas projects of the country, as well as localizing the sustainability indicators.
4. Project manager: It is an open secret that project manager could enact a crucial role in project management. Therefore, the project manager could be particularly considered the main focus to investigate the sustainability in projects and project management. Project managers would have to accept more responsibility for the sustainable future. Determining the effects of capabilities, points of view, skills, and different levels of managers' knowledge as well as the effectiveness level of each factor in various case studies, is another novel area in the sustainability project management.
5. NGOs: Sustainability generally constitutes three main aspects; while projects continuously deal with the economic indicators, when sustainability is concerned, the environment and society receive the most emphasis. As it is known to all, NGOs rarely take into account the economic indicator; thus focusing on them may reveal the impacts of social and environmental indicators on the success of the business as well as the way economic indicators affect the other ones.
6. Project management standards: Each project could be evaluated by various standards. However, most of the articles have used PMBOK guide and standards. The standards used for project management, consider sustainability either partial or implicit.[29] In fact, one of the criticisms presented in the recently published PMBOK guide (v.5) for the project management knowledge is that the relation between sustainable development and project management has failed to be properly investigated. One of the rational reasons for such a shortcoming is a lack of sufficiently developed understanding of the impact of sustainability on the project management principles, concepts, and processes. Other project management standards such as APM, PRINCE2, ICB and ISO 10006 could also be considered from the perspective of sustainability. Establishing and improving standards by taking into account the concepts of sustainability could definitely provide a great help to develop and implement these concepts in the projects.
7. Quantitative models and mathematical tools: As it was found in literature review section, most studies in this area are qualitative. In recent years, using mathematic models and tools, as well as multi-objective/multi-criteria decision-making models as the novel tools have drawn the attention of researchers.



Fig. 1: Potential Areas in Sustainability Project Management for Future Research

#### 4. Conclusion remarks

The present study aimed at presenting an overview of the views and findings of the relation between sustainability and project management. Studies developed in recent years were considered in two qualitative and quantitative groups. Afterwards, the potential areas were identified and classified into seven general groups.

In short, there are two main directions for future researches. Firstly, they could investigate the new concepts in this relation, integrate different subjects, and use more comprehensive standards in this regard. Secondly, they could quantify these indicators by using new models and look at the matter more realistically by using multiple-criteria evaluation models.

In this study, the attempt was made firstly to enlighten students and academic researchers as to the studied issue and to inspire them to carry out further studies on projects sustainability, and secondly to improve the knowledge and intuition of industrial and academic advisors, project sponsors, project managers, and project team to well understand the implementation of sustainability in the projects and incorporation of sustainability practices in the project management as well.

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