

01-005

TOWARDS SUSTAINABLE PROJECT MANAGEMENT. A LITERATURE REVIEW

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The objective of this paper is to identify trends in the introduction of Sustainability in Project Management (PM) practice and theory. The approach of the paper is double: on one hand it reviews the literature of Project Management, Innovation and Sustainability and displays their common grounds, in the other hand it proposes a framework of Drivers to be implemented in order to evolve from Traditional Project Management to Sustainable Project Management.

Keywords: *Sustainability; project management; Innovation in Project Management*

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Palabras clave: *Sustainability; project management; Innovation in Project Management*

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1. Introduction

Sustainability is a trending topic in scientific community, corporations, financial market and other stakeholders. Awareness is growing not only because of environmental but also economic and social problems. As a response, Corporate Social Responsibility emerged, but most of the companies see this like a cost and not like an investment issue. On the other hand, companies do see innovation as an important issue for their long-term growth. Consequently, the scientific community is responding with sustainable innovation as a holistic solution that integrates innovation, protection of the environment, and economic performance.

There is an increasing understanding of the need to develop methods, tools and techniques to integrate sustainability criteria into the management of projects (Ebbesen, J., 2013). This development implies per se an innovative process that needs to be attractive for the organizations in terms of efficiency, accomplishment of quality criteria and sustainability, without compromising the economic return..

In the current project management methodologies, the traditional constraints of time, cost (budget) and quality have been supplemented with risk, schedule and resources, but there is a disagreement as to where the sustainability issue sits in relation to them. (Ebbesen, J. et al, 2013). Social and environmental aspects may be included as aspects of the quality dimension, but they are bound to get less attention. (Silvius, G., 2012).

Initiatives have developed tools to relate sustainable principles and Project Management (Gareis, R. et al, (2009); Talbot, J. et al, (2011); Sánchez, A. (2014)), finding potentials and limits in these considerations (Gareis, R. et al, 2011; Eskerod, P. et al, 2011). Tam (2010) facilitates the understanding of Sustainability in Program Management offering key factors to align the decisions to corporate sustainability strategy. Hope, A. et al (2014) elevated the balance of environmental, social and economic to the Portfolio Management process.

Silvius (2012) related the concept of sustainability to the project lifecycle and developed a maturity model to assess the level of consideration of sustainability in projects, focusing his approach at levels of sustainability in resources, processes, business models and products/services (Silvius, G. et al, 2010; Labuschagne, C, et al, 2004).

On the other hand, Nidumolu et al. (2009) created a maturity model that describes the leverage of sustainability and, like Lin et al. (2014) and Willard, B (2005), considered innovation as one of the key forces used to increase corporate competitive advantage.

There is a consensus about the stages of sustainable innovation (Nidomolu, R. et al. 2009; Eccles, R. et al, 2013; Kiron, D. et al 2013; Hall, J. et al, 2012).

The objective of this paper is to analyze the state-of-the art of Sustainable Project Management and Sustainable Innovation fields in order to: 1) identify emerging study fields, 2) classify literature, 3) detect contradictions and similitudes among authors 4) present a model that relate Sustainable Innovation with the change from Traditional to Sustainable Project Management and 5) propose future research.

2. Methodology

Consistent with the proposed objective, a qualitative design was chosen (Creswell, 1994) to conduct a literature review of empirical, international and national research on sustainable project management and sustainable innovation. A systematic literature review was performed (Gough and Melbourne, 2002; Oakley, 2003).

2.1 Research Questions

The purpose of this research is to give answers to the following questions:

- Which aspects of traditional Project Management have evolved to Sustainable Project Management?
- What is the impact of Sustainable Innovation in that process of evolution?
- What are the findings and contributions already done in the field and what are the future research developments proposed?
- What are the implications for the practitioners?

2.2 Population, Sample and Data Collection

This study started with a bibliographic review of published material. The sources consulted include recognized journals, conference papers, books with high impact on the subject, internet sites and international standards.

A search of related research starting on 1990 to 2104 was applied. The search strategy is based on selected keywords: “Sustainable Project Management”, “Green Projects”, “Sustainable Innovation”, “Eco-innovation” and other keywords listed in Table 1. Based on this, a population of 560 articles was identified.

Table 1: Process of the methodology research

Unit of analysis	Relevant books and articles published on the linkages between Sustainable Project Management and Sustainable Innovation where these are the main substance of the work and which are frequently cited in the literature. Textbooks, unpublished working papers, conference presentations and communications were excluded.	
Type of analysis	Qualitative	
Period of analysis	1990-2014	
Search engines	Scopus, ISI Web of knowledge, Science Direct, Google Scholar, EBSCO, Recolecta, ProQuest	
Keywords used in searches	Sustainable Project Management Green Projects, Sustainable projects, Sustainability, environmental management, environmental sustainability, Sustainable Project Management, environmental management practices, sustainable innovation project management,	Sustainable Innovation Eco-design, Eco-innovation, green innovation, Design for environment, sustainable innovation, environmental innovation, greening of industry, green building

Main journals evaluated Journal of Cleaner Production (JCP), Journal of Engineering and Technology Management (JET-M), Journal of Construction Engineering and Management (JCEM), PM World Journal (PMWJ), Green Business Process Management (BPMJ), International Journal of Managing Projects in Business (IJMPB), Business Strategy and the Environment (BSE), Ecological Economics (ISEE), Project Perspectives, International Journal of Project Management (IJPM), Journal of project, program & Portfolio Management (PPPM),

Total number of articles evaluated 30

The first relevant articles about Sustainable Project Management started to appear in 1990. During the period of 1990–2000, a pattern with a low number of publications may be observed.

Figure 1. Sustainable Project Management publications organized by year of publication. Source: Scopus

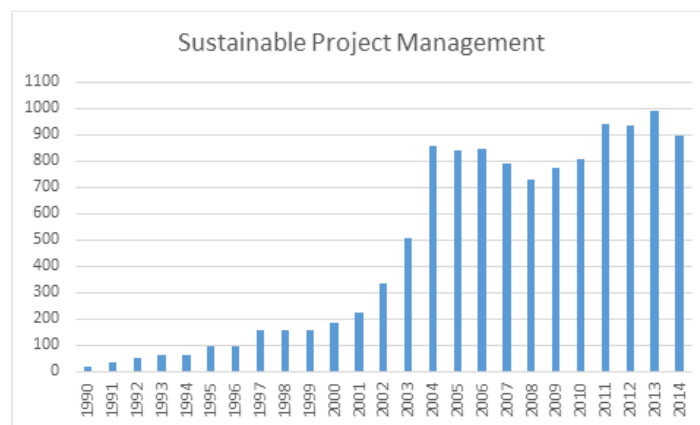
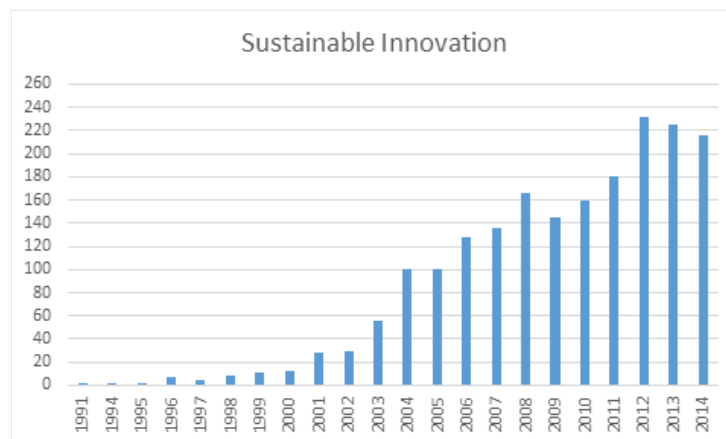


Figure 2. Sustainable Innovation publications organized by year of publication. Source: Scopus



In order to get a more accurate results list the search was limited to the time period from 2000 to 2014. For the next filtering stage, all the members of the research team read the abstract of the papers, focusing in two criteria: does the paper analyze Sustainable Development and Project Management? Does the paper analyze Sustainable Innovation issues?

The number of papers decreases considerably, as not all the papers that include the keywords defined in the searching stage was oriented to one of the topics defined in the criteria. Using this procedure a population of 30 papers was established.

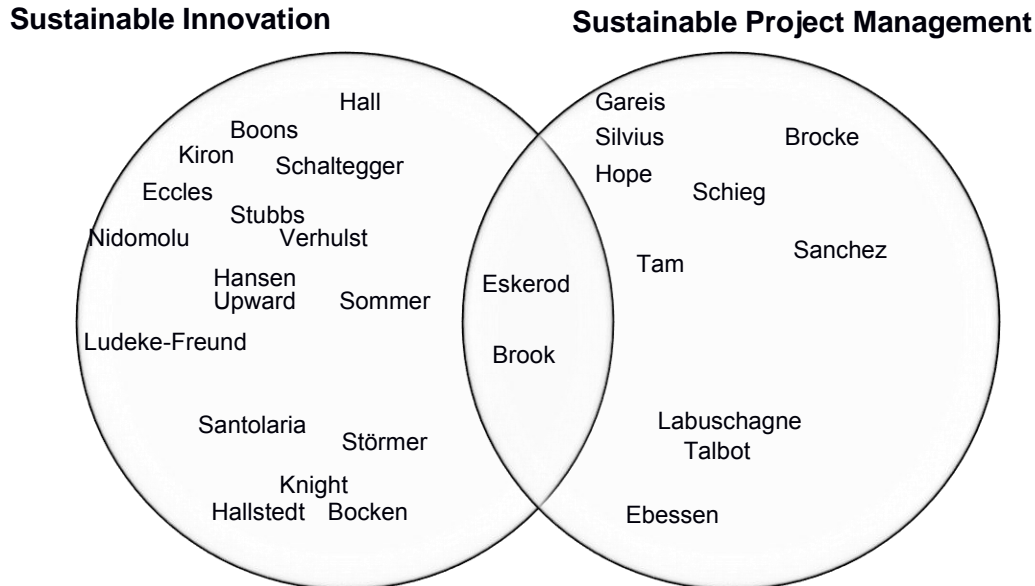
Each article was reviewed identifying specific information for the ulterior analysis. Consequently two kinds of data were identified: factual and descriptive (Eby et al. 2000). Factual data includes year of publication, source, and area of application. Descriptive data includes relevant information about the declared or implicit results: Findings, Contributions, Future research proposed by the authors, and Implications for practitioners. (Figure 4). Highlights from all articles were also pointed out.

2.3 Factual Data

Scientific Community

In the following diagram, there is a graphical representation of the identified authors.

Figure 3: Scientific community organized by topic. Source: Authors



2.4 Results of descriptive data

The evolution of the Sustainable Project Management and Sustainable Innovation concepts

Gareis, R. et al (2009), Silvius, G. et al (2012) and Ebessen, J. et al (2013) have described the way that sustainability has been integrated in the discipline of Project Management. In

spite of Sustainability having an agreed standard definition (Brundtland, G.H. 1987), this is not the case of the statement for Sustainable Project Management. Ebessen, J. et al (2013) in their research, indicate that Sustainability Project Management among practitioners is not clear. However, the majority sees this concept as the future tool in order to stay in business.

The first reference of Sustainable Project Management definition is suggested by Schieg, M. (2009) who includes the dimension of “people” in Project Management as a systematic combination of the interest in the project with the interest in public well-being. Silvius, G. et al (2010) go one step forward integrating the “environmental” aspect in the management and delivery of projects.

Tam, G. (2010) links his definition with the APM Body of Knowledge’s Project Management definition. He includes two key components that reflect the attributes of sustainability in project management: a) promoting positive impacts and minimizing negative impacts on economic sustainability; environmental sustainability; and social sustainability within the project development process; and b) the recognition that such project benefits contribute to a sustainable society. Tam extends this impact to Program Management.

Two years later Silvius, G. et al (2012) develop a concept suggesting a change with consideration to Silvius’ own six principles of sustainability in projects, their results and their effects. On the other hand, Gareis, R. et al (2012) focus in confronting six sustainability characteristics with processes and methods.

In overall, there is a strong agreement with the need to include Sustainability aspects into Project Management processes. Indeed, all the definitions - except one - that are listed below have included the three dimensions of sustainability (social, environmental and economic) in the management.

It is remarkable that authors define Sustainable Innovation in terms not only of products, processes and services, but also in the whole business model, as a holistic approach of the change that organizations are making.

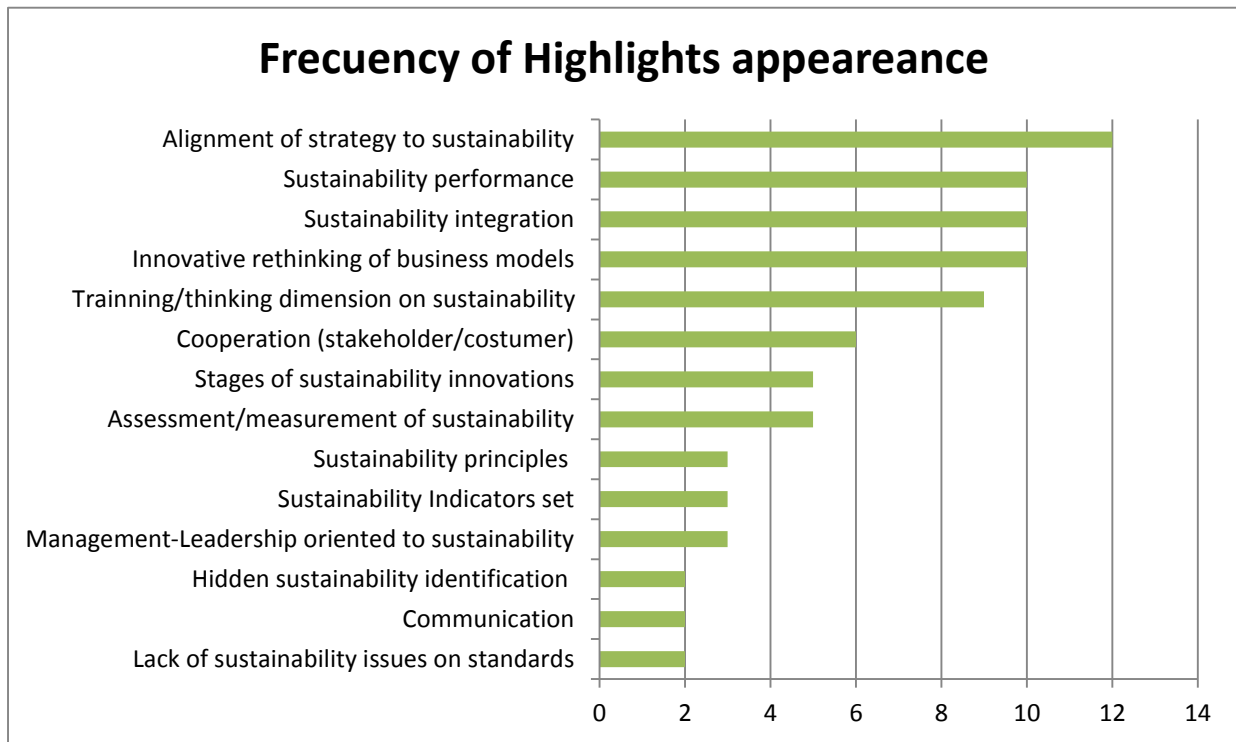
Table 2: Contribution by reviewed authors

Authors	Sustainable Innovation
Ludeke-Freund, F. (2009)	A business model for sustainability is the blueprint of a company’s business logic which internalizes the business case for sustainability.
Schaltegger, S. et al. (2012)	Business model for sustainability can be defined as supporting voluntary, or mainly voluntary, activities which solve or moderate social and/or environmental problems. By doing so it creates positive business effects which can be measured or at least argued for. A business model for sustainability is actively managed in order to create customer and social value by integrating social, environmental, and business activities.
Sommer, (2012)	A. A business model that represents a significant improvement (discontinuous leap) in overall environmental performance relating to its entire value chain system vis-à-vis that of conventional business model.
Boons, F. et al	Sustainable Innovation is a process where sustainability considerations

- (2013) (environmental, social, and financial) are integrated into company systems from idea generation through to research and development (R&D) and commercialization. This applies to products, services and technologies, as well as to new business and organizational models”.
- Boons, F. et al (2013) Sustainable business models provide the conceptual link between sustainable innovation and economic performance at higher system levels/The concept of a business model captures the fact that for a firm to be successful, it needs to combine several elements into a coherent mix. At a minimum, these elements include (i) the value proposition, (ii) the configuration of value creation, which includes the way in which the firm links to suppliers and customers, and (iii) the revenue model, that is, how costs and benefits are divided over economic actors in the system
- Eccles, R. et al, (2013) Business model and innovation. This dimension addresses the impact of environmental and social factors on innovation and business models. It addresses the integration of environmental and social factors in the value creation process of companies, including resource efficiency and other innovation in the production process, as well as product innovation and looking at efficiency and responsibility in the design, use-phase, and disposal of products. It also includes management of environmental and social impacts on tangible and financial assets – either a company’s own or those it manages as the fiduciary for others.
- Kiron, D et al (2013) Business-model innovation looks beyond product, service or technology advances. This dimension of innovation explicitly addresses the fundamental choices a company makes about what it is offering to whom — its value proposition — and how it leverages its value chain, cost models and organization to deliver that value
- Bocken, N.M.P. et al (2014) Business model innovations for sustainability are defined as: Innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organization and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions.
- Tam, G. (2014) Green Innovation is the improvement of products or processes to enhance the performance of environmental management to satisfy the requirements of environmental protection.
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One of the working objectives of this research project was the identification of Highlighted topics from the selected papers. The frequency of their appearance has been represented in the following graphic.

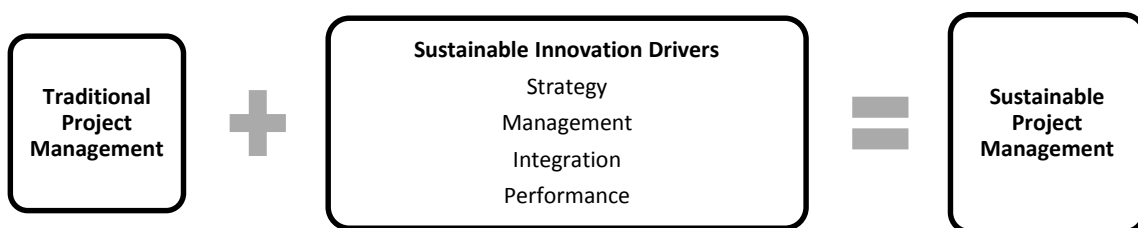
Figure 4: Frequency of Highlights appearance



3. Discussion

After analyzing the literature, the authors of this paper suggest that the Sustainable Innovation Drivers (aggregated in four domains: strategy, management, integration and performance measurement) can contribute to the shift of paradigm proposed by Silvius (2012).

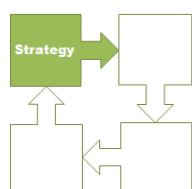
Figure 5: From Traditional to Sustainable Project Management



3.1 Sustainable innovation drivers

The idea is that the implementation of the Sustainable Innovation Drivers promotes the change from Traditional Project Management to Sustainable Project Management. This is analyzed in the next four subsections, one for each group of sustainable innovation drivers. These will be mapped to the expected influence on the Knowledge Areas and Processes of the PMBoK.

Strategy Drivers



- Sustainability strategy
- Commitment alignment

- *Strategic sustainability perspective*
- *Innovative rethinking of business models*
- *Cooperation (stakeholder/costumer)*

The objective is to maximize the triple bottom line through Sustainable Innovation.

Figure 6: Traditional alignment of the Iron Triangle with the PPP

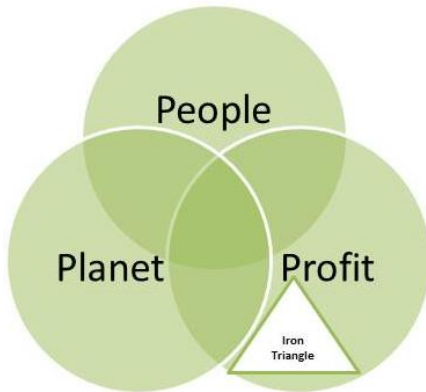
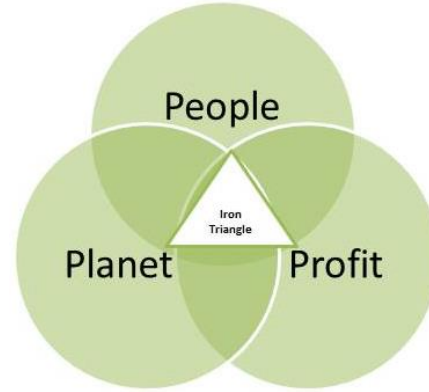


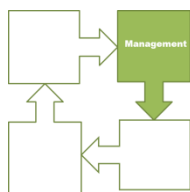
Figure 7: Sustainable alignment of the Iron Triangle with the PPP



In order to implement Sustainable Innovation it is relevant to analyze the portfolio management processes, as it is at this point where the decisions on investment on resources are taken. Hidden sustainability of the company and its economic impact needs to be identified. As a last step, these innovations have to be communicated; this requires a good management of stakeholders.

The Strategy Driver will influence the Planning Phase of the PMBoK, concretely the Scope, Time, Cost, Quality, Human Resources, Communication, Risk and Stakeholder Management Knowledge Areas. Strategy Drivers affect most of the PMBoK areas.

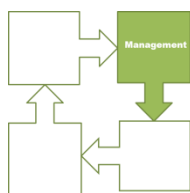
Management Drivers



- *Management of program/project related to sustainability*
- *Communication*
- *Training*
- *Thinking dimension on sustainability*
- *Leadership necessary to implement sustainability*

Management Drivers will influence the Human Resources, Communication and Stakeholders Management Knowledge Areas. Regarding the processes, these drivers will affect the Executing Process Group of the PMBoK.

Integration Drivers

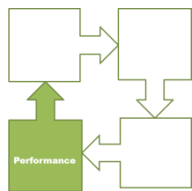


- *Sustainability principles*
- *Sustainability integration*
- *Stages of sustainability innovations*

To reach sustainable maturity it is recommended to innovate step-by-step starting from the legal requirements, the supply chain, products/services and processes, and finally the business model. Applying Sustainable Innovation from the initiating phase of the project, the integration of sustainability aspects will impact the scope and objectives of the project.

The influence of the Integration Driver will be reflected directly in the Project Integration Management Knowledge area of the PMBoK. In the case of the PMBoK processes these drivers will affect all of them: Initiating, Planning, Executing, Monitoring and Controlling, and Closing.

Performance drivers



- *Assessment/measurement of sustainability*
- *Sustainability Indicators set*
- *Sustainability performance*

It is necessary to measure the sustainability performance to identify the organization's sustainability level in order to define the possible improvements. The goal is to transform the Bottom Line to a Triple Bottom Line; this means, not just to measure the economic performance but also including the social and environmental performance, through innovation.

Sustainability is a concept that does not have standard and universal indicators sets. The tendency is to use integrated reporting; this means, to include social and environmental information. By applying transparency accountability, the stakeholders will realize how Sustainable Innovation will influence positively Sustainability indicators.

These drivers will impact the Scope, Time, Cost, Quality, Communication, Stakeholders Management of the Areas of Knowledge of the PMBoK. The processes affected will be Planning, Monitoring and Controlling, and Closing Process.

4. Conclusions

The objective of this paper is to identify the impact of Sustainable Innovation in the change process from Traditional Project Management to Sustainable Project Management. After a systematic research, 30 papers were selected in two fields of study: Sustainable Project Management and Sustainable Innovation. Trends, theories, gaps, frameworks and common concepts were identified and classified. From the articles analyzed, key factors related to Sustainable Innovation were highlighted and grouped by domain. Based on this four Sustainable Innovation Drivers were identified: 1) Strategy, 2) Management, 3) Integration and 4) Performance.

It can be concluded that the Sustainable Innovation has to be integrated since the initial phase of the project. Only when including the sustainability dimensions in the Strategy of the organization sustainable scope and objectives can be reached. This implies a change in the Management Processes based on an innovative communication process including all the stakeholders and leadership. All the project's stages must be

measured using sustainability indicators which take into account the social, environmental and economic aspects.

Probably the common outcome from the literature review was that Sustainable Innovation aspects are not being consistently considered in the evolution from Traditional Project Management to Sustainable Project Management.

Future research

- To define a common framework of indicators that can be used to measure the sustainability performance in the processes of Project Management.
- Integration of sustainability issues in the Project Management standards.
- Developed strategies/tools to integrate sustainability in the organization and Project Management processes.
- The relationship between Sustainable Project Management and Sustainable Business Innovation models.

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