

Sustainable Model for Project Management Processes

Mahdi Aghamohammadi and Siamak Haji Yakhchali

Abstract— In recent years the global focus on issues such as sustainable development, climate changes, ethics, social responsibility and the environment is increased significantly. In order to clearly address the concept of sustainability, it is necessary to understand what Sustainable Development (SD) means.

The sustainability challenges are of a very concrete nature: how to develop and implement projects that guarantee the protection of the planet's natural resources and increasingly create wealth for more people? In this paper, we have discussed the issue of the implementation of the principles for sustainability in the project management processes, and whether we can implement this principles in the processes that the project management standards provided; or we need to design a new model of processes that can be confidently applied these principles in the projects. This article will be our starting point in this regard.

Keywords— Project Management Processes, Sustainability

I. INTRODUCTION

GROWING pressure and sensitivity related to including sustainability in all fields increases the need to research and introduce effective ways to achieve this [1]. These new paths will be both technical (new materials, more effective processes, etc.) and management-related. In this regard, policies laid down by (national, regional and local) Governments are essential to meet the sustainability challenge that society is demanding [2].

On the one hand, when the topic of sustainability is brought up, aspects relating to management (strategies, communications, aims, integration, teamwork) are frequently encountered but project management is rarely explicitly designated, maybe due to lack of knowledge, maybe due to the fact that both disciplines are still finding their feet or maybe a combination of the two. On the other hand, sustainability and environmental issues are not specifically or systematically considered in most major project management frameworks such as PMBoK, ICB, ISO 21500:2012 and Prince2 [3].

Transforming strategic sustainability objectives into specific actions for projects is a complicated process. Multi-dimensional perspectives of sustainability such as economics, social and environmental aspects, combined with a lack of structured methods and information at different hierarchical

levels, only emphasis the problem [4]. In addition, sustainability seems at first to be counter to traditional project management in which almost all aspects are superimposed on the investment's economic profitability.

There are many pending questions concerning sustainability and project management. Is any project really sustainable? How might a sustainable project be defined? Could a project be sustainable without a sustainable management? Does management of sustainable projects refer to sustainable results and sustainable management of projects refer to sustainable processes? ***How we can implement The Principles of Sustainable development in Project Management Processes?***

II. LITERATURE REVIEW

A. Sustainability

In order to clearly address the concept of sustainability, it is necessary to understand what Sustainable Development (SD) means. As the document "Our Common Future" (Brundtland Report) states, the concept of SD is the development that meets the needs of the present without compromising the needs of future generations [5]. A broader concept of SD is based on the integration of three dimensions: economic, environmental and social, constituting the sustainability known as Triple-Bottom Line (TBL), and which became widely known [6], but these ideas were also inspired, for example on authors like Sachs [7], that formulated the concept of eco-development, and on the Natural Resource Based View presented by Hart [8]. In addition to that, a lot of international events were developed for clearing the sustainability concept, as for example, "Bellagio Principles" that worked on the development of sustainability indicators to achieve progress in sustainability [9], "The future we want" that met the commitment of countries for the sustainable development [10], among others.

Similar to that, there is an increasing interest in Corporate Responsibility (CR) including corporate financial responsibility, corporate environmental responsibility and corporate social responsibility [11]. Furthermore, Baumgartner and Ebner [12] show the concept of Corporate Sustainability (CS) relating to actions related to the business environment, and it means that SD when incorporated by the organization is called CS and it contains, like sustainable development, all three pillars or dimensions: economic, ecological and social.

Looking at the three dimensions of sustainability and first at economic dimension, Shenhar and Dvir [13] argue that the

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economic dimension is considered paramount for developing businesses, but these authors say, at the same time, that the others dimensions (environmental and social) are equally important and companies need to put effort to work on projects in order to integrate variables related to the three dimensions of sustainability.

The environmental dimension has been developed in management theory since the 1990s, when the Natural Resource Based View presented by Hart [8], including pollution prevention, product stewardship, and sustainable development strategies. As suggested by Hart [8], management theory has ignored the constraints imposed by the environment and a similar statement can be applied concerning sustainability in project management. In other words, Hart [8], when said, at that time, which the environmental impacts associated with business activities also have multiplied, as for example, air and water pollution, toxic emissions, chemical spills, and industrial accidents have created regional environmental and public health crises for thousands of communities around the world.

Furthermore, explaining the social dimension of sustainability, it is possible to find many corporate models of sustainability (see for example www.gri.com, www3.ethos.org.br) that show a large number of variables composing the social dimension of sustainability. When the focus is project management, there are proposals that explore the relationships between project management and sustainability and most studies work on defining a process or sustainable project management methodology [14]. For example, Gareis et al. [15],[16], that developed a model to discuss relationships between sustainable development and project management. However, the integration of sustainability issues in project management is until a lack of research [17],[18],[19],[20],[16].

B. Sustainability and project management

Sustainability is a participatory process that creates and develops a vision of community that respects and makes prudent use of natural resources, seeking to ensure, as far as possible, that the present generations achieve a high degree of economic security and can attain democracy and popular participation in the control of their communities while maintaining the integrity of the ecological systems and of life [21]. As the project activities, especially complex projects involving large amount of resources and interfering with the daily life of the surrounding communities, the issue of sustainability is urgent.

A significant number of companies are adopting project management techniques [22], investing resources and efforts in the implementation of project management. There are several reference guides in the project management area, such as the Guide of the Project Management Body of Knowledge (PMBOK) given by the Project Management Institute [23], which is structured into ten areas of knowledge, yet showing no special attention to the area of sustainability. Other guides of important organizations can be highlighted, such as the

International Project Management Association [24], the Australian Institute of Project Management [25], the Association for Project Management [26], the Projects in Controlled Environments e PRINCE2 [27] and the ENAA Model Form e International Contract for Process Plant Construction [28], and also devote no special attention to the issue of sustainability.

In order to address sustainable issues into Project Management a clear understanding of the various details involved in a project and their interactions is required [14], but Sustainability (in the economic, environmental and social dimension) needs to be inserted into and worked within the project management function, and remains as a gap in the literature and in practice [3],[29],[30]. It involves the organizational processes and the organizations' management level, there by contributing to improve the results [17],[18],[19],[16].

C. Project Management Processes

Two frequently used frameworks or standards for project management processes are the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK® Guide) and the Office of Government Commerce's Projects In Controlled Environments (PRINCE2®).

The PMBOK® Guide depicts the following project management process groups or clusters (Fig.1).

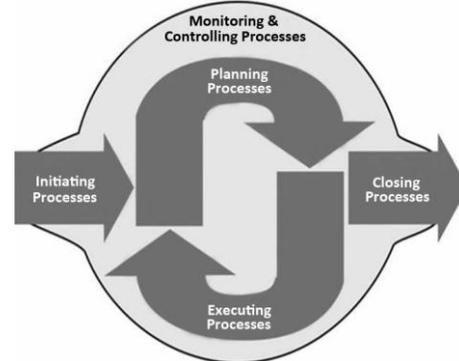


Fig.1 Project management process groups [23].

Although these process groups suggest a project life cycle, they do not necessarily represent the phasing of the project. Projects appear in many variations and 'there is no single way to define the ideal structure for a project' [23]. The project management process groups may therefore depict a full project life cycle or the nature of the project management processes in a certain stage or phase of the project.

PRINCE2® bases its identification of project management processes on the project life cycle and identifies seven project management process groups: Starting Up a Project, Initiating a Project, Directing a Project, Controlling a Stage, Managing Project Delivery, Managing Stage Boundaries and Closing a Project [27].

III. RESEARCH METHODS

The ultimate goal of the researches and studies that we are working on them and this article is the starting point is this that, we could achieve a new model of sustainable project management processes. As we have seen in the literature review, no specific research on how the practical implementation of the principles for sustainability in project management processes has taken place, and two standards of project management as well as not considering the issue of sustainability. As we observe, these two standards have focused more on the technical management of the project and none on the deliverables of each step of each process. If we want to implement a sensitive and important knowledge areas such as the principles of sustainability in the processes, we had need to have more precise control each process; And this would be possible if each process based on the various stages that are focused on deliverables.

So we'll discuss to design a new sustainable model where from the moment of formation of the project to its final delivery, at each stage of the project, which determined that the project was not aligned with the general policies of sustainability, and in some cases goes against these policies, be prevented from entering the next stage and should be returned to the previous stage and again with the changes in methods, programs, etc. aligned them with this policies. And in some cases may be at any stage the project is that but determined that it has negative effects of severe and irreparable damages to each of the sustainability principles such as environmental sustainability or social sustainability, the project stops, even though their economic feasibility. Of course, after the initial model designed, by academics and organizations elites will be analyzed and finally we'll reach an acceptable model that theoretically and operationally viable.

IV. DISCUSSION

In this study we'll use the Elena project guideline that compared to the PMBOK and PRINCE2 provides more and better opportunities to apply and control step by step of the principles of sustainability. For this reason, in the following summarize and describe the attitude of this guideline to projects and especially project management processes.

This guideline is a structured system and reference for the governance and management of the projects has been developed by the Dr. Siamak Haji Yakhchli. Of course, he has developed separate guidelines at each management level of project-based organizations such as portfolio and program management levels, competency development and evaluation of project leaders and managers and etc. but in this study we will only focus on Elena project guideline and the guidelines that are more focus on project management processes. This guideline explained the principles, concepts, processes and tools needed to lead and manage projects as well as how to use them in projects with different characteristics.

The processes describe progress step by step during the life of the project from the beginning to the end; each process

consists of a series of sub-processes that are following certain goal during the life of the project. In this guideline there are eight processes that give a set of sub-processes required for successful leadership and management projects; each sub-process provides a list of actions needed to implement it. Respectively, it becomes clear that during the life of the project what actions should be taken.

The following figure shows the symbol processes of Elena project guideline (Fig.2):

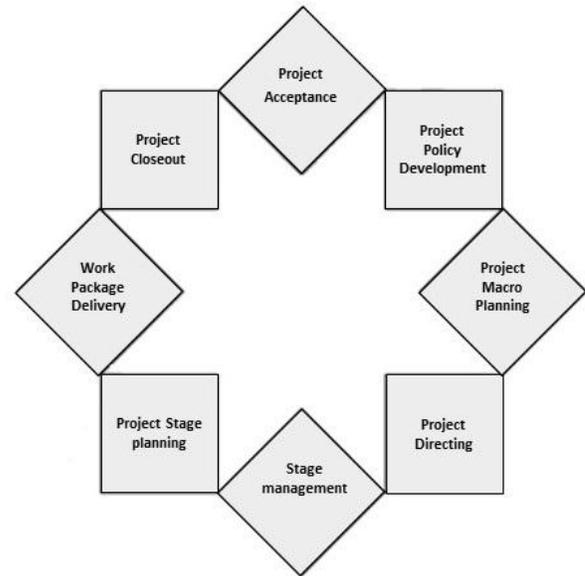


Fig.2 Elena project guideline processes[32].

Each process use from one or few concepts during the life of the project. Likewise documentation on Elena project guideline, accepted, created, updated, approved and closeout to provide a unified system for operating and managing the project.

Due to the uncertainty characteristics of the project, plan detailing all activities and consequently the estimated project time, cost and resources required from the beginning of the project is not possible, and even if these details are determined and programmed to cause many changes will be undesirable; Therefore project planning on Elena project guideline takes place on several levels, and applied step by step approach to governance and project management. Of these stages of the project to interpret the governance (or steering) stages.

Governance stages of the project is basis on the decision-making points and project planning horizon. Project planning horizon is over the period ahead that there is the possibility to create detailed plans and the decision-making points is where completely condition of the project review and decide whether to continue or stop the project; This decision-making points interpreted the gate. In other words, at the end of each stage of project steering is considered a gateway; where continuing or stopping the project and other projects important issues are decided. Gate review provides project evaluate opportunities at regular intervals and defined. Also with review the gate, ensure that key decisions will be made before implementation of detailed activities required to implement those decisions.

The project steering stages focus on project deliverables to appropriate the defined gateway for each step. In other words, the project passes the gate that certain items should be created; and with review and evaluate the deliverables are decided on the status of the project at the end of each stage. So each stage of the project steering must have clear outcomes and outputs. Therefore this stages cannot overlap with others. In other words, project steering stages only run consecutively and there is no possibility of overlap between steering stages.

With regard to provided descriptions about the Elena project guideline and insights that this guideline have to the project processes and procedures, we reach to the conclusion that in order to implement the principles of sustainable development in project management processes, formulated the process model referred to in this guideline with the sustainability policies and achieve to an Elena sustainable process model. For this purpose, we will develop a sustainability management plan in the early stages of project by all inputs and tools of areas of Project Management standard (PMBOK), and will provide a sustainability check list based on international standards and reliable world sources (such as [31]). Then we will design a new model that in which to implement these sustainability policies and principles and control them.

And finally to reach a sustainable model that where in each of the control gates, each of the stages of the project will be assessed with sustainability check list and other needs and specific expectations of its; and at any stage it is judged that the project goes against the fundamental sustainability principles, it will correct, and if necessary, will be prevented from continuing the project.

V. CONCLUSION

In this paper we have shown that projects and sustainability are interrelated. Sustainable development needs us to do things differently; needs change and needs projects to deliver this change. We have also shown that project management standards have not focused as well as principles and policies of sustainable development on projects; In addition, it is difficult to have implemented principles for sustainability in the proposed processes by these standards. For this reason, we need a new approaches to processes that can be implemented these policies and principles in any of the processes, with a focus on deliverables and step by step progression.

Therefore, we will use the Elena project guideline that the processes are based on defined deliverables; So that we can be more precise and better control and monitor of the implementation of sustainability principles in the processes and projects.

REFERENCES

- [1] Abidin, N.Z., Pasquire, C.L., "Revolutionize value management: a mode towards sustainability". *Int. J. Proj. Manag.* vol. 25, pp. 275-282, 2007. <https://doi.org/10.1016/j.ijproman.2006.10.005>
- [2] Brandoni, C., Polonara, F., "The role of municipal energy planning in the regional energy-planning process". *Energy*, vol. 48, pp.323-338, 2012. <https://doi.org/10.1016/j.energy.2012.06.061>
- [3] Brones, F.A., Carvalho, M.M., Zancul, E.S., "Ecodesign in project management: a missing link for the integration of sustainability in product development", *J. Clean. Prod.* Vol. 80(1), pp. 106-118, 2014. <https://doi.org/10.1016/j.jclepro.2014.05.088>
- [4] Ugwu, O.O., Kumaraswamy, M.M., Wong, A., Ng, S.T., "Sustainability appraisal in infrastructure projects (SUSAIP)". Part 2. A case study in bridge design. *Autom. Constr.*, vol. 15, pp. 229-238, 2006. <https://doi.org/10.1016/j.autcon.2005.05.005>
- [5] WCED. World Commission on Environment and Development, "Our Common Future". Oxford University Press, Oxford, England, 1987.
- [6] Elkington, J., "Cannibals with Forks: the Triple-Bottom Line of 21st Century Business". New Society Publishers, Canad_a, 1998.
- [7] Sachs, I., "Estrat_egias de transi_ç_ao para o s_eculo", XXI: desenvolvimento e meio ambiente. Studio Nobel e Fundaç_ao de Desenvolvimento Administrativo, S_ao Paulo, 1993.
- [8] Hart, S.L., "A natural-resource-based view of the firm". *Acad. Manag. Rev.* vol. 20 (4), pp.986-1014, 1995.
- [9] Hardi, P., Zdan, T., "Assessing Sustainable Development: Principles in Practice". International Institute for Sustainable Development, Canada, 1997.
- [10] Brasil, Rio 20. Retrieved from: http://www.rio20.gov.br/sobre_a_rio_mais_20 (accessed 27.03.16.), 2016.
- [11] WBCSD. The World Business Council for Sustainable Development, "Corporate Social Responsibility: Meeting Changing Expectations". Retrieved from: <http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id%482&nosearchcontextkey%4true> (accessed 11.08.13.), 2006.
- [12] Rupert j. Baumgartner, Daniela Ebner, "Corporate sustainability strategies: sustainability profiles and maturity levels". *Journal of Sustainable Development*, vol. 18, pp.76-89, 2010. <https://doi.org/10.1002/sd.447>
- [13] Shenhar, A., Dvir, D., "Reinventing Project Management: the Diamond Approach to Successful Growth and Innovation". Harvard Business School Press, 2007.
- [14] Marisa, Sanchez, "Integrating sustainability issues into project management". *Journal of Cleaner Production*, vol. 96, pp. 319-330, 2015 <https://doi.org/10.1016/j.jclepro.2013.12.087>
- [15] Gareis, R., Huemann, M., Martinuzzi, A., "Relating sustainable development and project management". In: IRNOP IX, Berlin, pp. 1e25. Retrieved from: <http://pt.scribd.com/doc/106456206/Gareis-Irnop-2009> (accessed 11.01.13.), 2009.
- [16] Silvius, A.J.G., Schipper, R., Nedeski, S., "Sustainability in project management: reality bites". *PM World J.* vol. 2 (2), pp. 1-14, 2013.
- [17] Singh, R.K., Murty, H.R., Gupta, S.K., Dikshit, A.K., "An overview of sustainability assessment methodologies". *Ecol. Indic.* vol, 15 (1), pp.281-299, 2012. <https://doi.org/10.1016/j.ecolind.2011.01.007>
- [18] Labuschagne, C., Brent, A.C., Van Erck, R.P.G., "Assessing the sustainability performances of industries". *J. Clean. Prod.* vol. 13 (4), pp. 373-385, 2005. <https://doi.org/10.1016/j.jclepro.2003.10.007>
- [19] Carvalho, M.M., Rabechini Jr., R., "Fundamentos em Gest_ao de Projetos: Construindo compet^encias para gerenciar projetos: teoria e casos", 3^a ed. Atlas, S_ao Paulo. 422 pp, 2011.
- [20] Martens, M.L., "Sustainability in Project Management and its Relation with Project Success: Proposition of a Conceptual and Empirical Model". Thesis (Doctorate). Polytechnic School of the University of S_ao Paulo, S_ao Paulo, Brazil, 284 pp, 2015.
- [21] Thomas N. Gladwin, James J. Kennelly, Tara-Shelomith Krause, "Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research", *Academy of Management*, vol. 20, pp. 874-907, 1995.
- [22] Berrsaneti, F.T., Carvalho, M.M., "Identification of variables that impact project success in Brazilian companies". *Int. J. Proj. Manag.* vol. 33 (3), pp. 638-649, 2015. <https://doi.org/10.1016/j.ijproman.2014.07.002>
- [23] PMI. Project Management Institute, "A Guide to the Project Management Body of Knowledge", (PMBOK® Guide). Published by, fifth ed. Project Management Institute, Inc., Pennsylvania, USA, 2013.

- [24] IPMA. International Project Management Association, Retrieved from: [http:// ipma.ch/resources/ipma-publications/ipma-competence-baseline/](http://ipma.ch/resources/ipma-publications/ipma-competence-baseline/) (accessed 11.08.16.), 2016.
- [25] AIPM. Australian Institute of Project Management, Retrieved from: [http:// www.aipm.com.au/](http://www.aipm.com.au/) (accessed 15.09.16.), 2016.
- [26] APM. Association for Project Management, Retrieved from: [http://www.apm.org.uk /BOK6](http://www.apm.org.uk/BOK6) (accessed 15.09.16.), 2016.
- [27] PRINCE2, PRINCE2® e Projects in Controlled Environments. Retrieved from: <http://www.prince-officialsite.com/home/home.aspx> (accessed 11.08.16.), 2016.
- [28] ENAA. Engineering Advancement Association of Japan, Retrieved from: [http:// www.ena.or.jp/EN/activities/model.html](http://www.ena.or.jp/EN/activities/model.html) (accessed 15.05.16.), 2016.
- [29] Mauro Luiz Martens, Marly M. Carvalho, “The challenge of introducing sustainability into project management function”. *Journal of Cleaner Production*, vol. 117, pp. 29-40, 2016.
<https://doi.org/10.1016/j.jclepro.2015.12.039>
- [30] Sara Marcelino-Sadaba, Luis Felipe Gonzalez-Jaen, Amaya Perez-Ezcurdia, “Using project management as a way to sustainability. From a comprehensive review to a framework definition”. *Journal of Cleaner Production*, vol. 99, pp. 1-16, 2015.
<https://doi.org/10.1016/j.jclepro.2015.03.020>
- [31] The Global P5 Standard for Sustainability in Project Management, “The P5 Standard Vresion 1.5”, United Kingdom, 2016.
- [32] Siamak, Haji, Yakhchali, University of Tehran, Iran, “Elena Project Guidline”, OBOUR Press, Tehran, Iran, 2014.