ISSUES OF ADMINISTRATION IN TERRITORIAL SYSTEMS

DOI: 10.15838/esc/2015.5.41.9
UDC 65.011, LBC 65.290-2

Sustainable Development and Project Management: Objectives and Integration Results

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Abstract. Integration of sustainable development principles in project management is a tool to implement a values-based strategy. The main goal of this paper is to determine key issues for creating a consistent methodological basis that includes tools and techniques of project management taking into account sustainable development approaches. This paper analyses key aspects in which the conception and project management theory have interconnections. This aspect is, firstly, realization of projects initiated to reach goals in sustainable development area. And the second aspect is realization of various projects taking into consideration sustainable development approaches. The authors analyze contradictions between project management and a concept for sustainable development. The most critical contradictions deal with goals and priorities of the project, period and geography of its valuation, analysis of its impact zones. The authors define the tasks that need to be settled in order to resolve contradictions and integrate the principles of corporate social responsibility. Besides, the paper summarizes academic results in the area of integration of the concept and project management. In order to solve this problem, the authors analyze current project management standards and the integration of sustainable development principles in them. The authors

conclude that this task has not been elaborated thoroughly in current methodologies and in widespread standards such as ICB, PMBook, P2M and others. The most interesting one is PRiSM methodology, which was created for resolving integration problems. Furthermore, in making an overview of the current methodological framework, the authors present research findings on the subject. On the basis of the analysis carried out, the article defines prospective directions for further research oriented toward creating the tools and techniques of project management taking into account social and environmental aspects. These directions include the development of methodological tools (methodology of scope, resources and terms of the project) and the formation of main approaches to basic elements in project management including project resources valuation.

Key words: sustainable development, project management, social and environmental principles of management, strategy, corporate social responsibility.

Introduction

Sustainable development is one of the most important current concepts that must be implemented at all levels of management. The most important challenges that managers around the world have to deal with are as follows: achievement of well-being without compromising that of future generations; conservation of resources and preservation of the environment; support and development of social and cultural capacity within the managed territory.

Nowadays, the concept of sustainable development (CSD) in enterprise management is implemented at all levels of management: when developing the strategy and setting strategic goals, when developing the system of indicators for functions or business processes, and when implementing the tasks of operational management.

Implementation of the relevant principles and objectives in project management (PM) havs recently come to the fore. Shifting to project-oriented management approach is a general trend among industrial enterprises. PM as part of the strategy implementation cannot ignore general values and goals of a company. Given the autonomous nature of project activities' tasks, it is necessary to form a methodology that would establish clear and measurable requirements to project management in order to achieve sustainable development goals.

The aim of the research conducted in this paper is to identify the areas that require scientific study to create project management tools and techniques taking sustainable development concept into consideration. Objectives of the study are reflected in the structure of the present paper in the following logical blocks:

1) Comparison of CSD and PM theory for the purpose of finding contradictions between them.

2) Formulation of problems to be solved in order to create the tools and techniques of project management based on SD principles.

3) Analysis of existing methodologies (standards) for PM from the viewpoint of inclusion of CSD provisions and solution of the tasks.

4) Review of scientific views on solving the tasks at hand.

The intersection of theories of SD and project management can be considered from two perspectives. The first one, which can be encountered in scientific literature most frequently, is the management of SD within the framework of a project. This trend was developed significantly in foreign research in recent years. Moreover, the issue of implementing SD principles in standards of project management at the level of methodology is being discussed.

The second position is the management of SD through projects, i.e., projects are considered as the subject of SD [3]. For the purposes of the company it is important to implement the program in both perspectives. The paper examines only the first one: the integration of social, environmental and economic aspects in project management.

Despite the fact that this research area began to be developed only at the end of the 2010s, several Western scientists have been studying it. Gilbert Silvius carries out his annual review of the literature [2] devoted to the integration of SD in PM; the review for 2014 covered about 200 publications, including 16 books, 72 articles, 13 dissertations, chapters in books, white papers, essays, and other publications in this area. In the first place, among the publications on the subject, we must mention works by A. Silvius [16, 17], R. Gareis [10-13] and A. Brent. Russian scientists also showed interest in the topic in the current decade. Major works on the subject were written by V.M. An'shin [4, 5, 6], E.Yu. Pertseva [3], E.S. Manaikina [2], etc.

In general, Russian experts in the field of project management almost never use SD principles. According to a survey [5], only 10% of experts confirmed that they know the term "sustainable development" in PM context; in this case the majority of respondents (53%) were aware of CSD. The key reasons for insufficient use of CSD in project management are the low level of awareness and the absence of the relevant request from interested parties. However, upon analyzing the survey results, we can assume that there is a favorable climate and the importance of SD standards implementation in SD practice: 95% believe that the introduction of SD will help increase the value of project management for business and society, and more than 80% of respondents believe that the ability to apply the principles of SD in PM is a mandatory competence of the modern manager. Thus, it is evident that there is a lack of and the need for a transparent and applicable methodology and a set of tools for project management that takes into consideration SD principles.

Comparison of CSD and PM theory for the purpose of identifying the tasks of integration

Project management experts [8] note the following contradictions in incorporating the principles of CSD in PM *(tab. 1)*.

Objectives in the area of integration of CSD in project management

Having analyzed the contradictions and existing methodologies, the authors formulate the following problems that, when solved, will help create tools and methods for integration:

1. Extension and clarification of project's performance indicators.

Change in the project's objectives and reassessment of its success criteria in two aspects. On the one hand, it is necessary to increase the period of evaluation of project's indicators and include long-term indicators of

Table 1. Main contradictions between CSD and PM

Aspect	Sustainable development	Project management
Goal-setting period	Long-term orientation of goals	Short-term orientation of goals
Interested parties	In the interests of present and future generations, this implies constant dialogue with a wide range of stakeholders for decision-making	In the interests of the customer and stakeholders (interested parties or stakeholders include: project sponsor, customers, users, agents, suppliers and contractors, business partners, organizational groups within the company, functional heads, etc. [1])
Orientation of tasks	Focus on product life cycle	Focus on the results/product
Basic values/ priorities	People, Planet, Profit. The concept of the triple criterion [15], according to which the business is built on "three pillars of sustainable development": people, planet and profit.	Scope, Time, Budget. The formula of the triple constraint that describes three aspects of project management that should be balanced: the scope of the project, its cost and time*.
Consequences for initiator and participants	Creates barriers to the adoption of initiated projects; increases the complexity of the activity; brings benefits in the long term.	Creates barriers to the adoption of initiated projects; reduces the complexity of the activity; brings benefits upon completion of the project.
Geographic landmarks of management	Aims to achieve local, regional, national and global effects.	Focuses on the effect within the territory of the project.
* The classic formula consists of three components. Currently, the formula includes the fourth component – "quality".		

project's efficiency. Another aspect is aimed at including additional indicators to evaluate the project effectiveness, including environmental and social factors.

2. Incorporation of SD in the stages and knowledge areas of project management.

It is necessary to develop a methodology for setting objectives and monitoring their execution at various phases of the project life cycle, as well as in various fields of knowledge related to the project.

3. Determination of the relationship between the life cycle of the product, project, and resources for setting out the objectives of SD.

Due to the fact that from the viewpoint of sustainable development a company is responsible for the entire cycle of its activity that includes the quality and sustainability of its products and assets, it is necessary to find a solution to the issue of revaluation of the project life cycle.

4. Regulation and organization of work with interested parties.

At various stages of project management it is necessary to attract stakeholders from various areas of project influence, organization of additional methods for development and decision-making (for example, the Foresight or Delphi methods).

5. Clarification and expansion of requirements for project manager and additional roles in project management.

On the one hand, it is obvious that the importance of behavioral competencies (values, ethics) of a project manager and key participants is increasing. On the other hand, it is necessary to set out specific targets in the sphere of SD for project team members.

6. Development of a methodology for prioritization of project tasks, including the tasks of SD, in accordance with the triple constraints of the project scenario development.

In the management of project constraints the importance of project's resources may increase (in the framework of the tasks to increase energy efficiency, to use renewable materials and energy sources, to implement human development).

7. Definition of requirements for reporting materials at all stages of the project.

8. Development of a system for assessing the impact of the project on regional, national and global level.

In the implementation of sustainable development goals it is necessary to track their effectiveness at the regional, national and global level, not only in the form of budgetary efficiency of the project for the region, but also other non-financial indicators.

Inclusion of SD principles in existing standards pack

Project management today is based on the PMBok standards of the International Project Management Association (IPMA) and the Project Management Institute (PMI). A more complete list and a comparative characteristic are shown in *table 2*.

Current standards of PM do not cover or cover only partially the issues concerning the inclusion of additional indicators of project success related to their long-term efficiency, environmental and social impact, and also the recommendations for the assessment of regional and country effects. Besides, current guidelines do not consider the issue of organizing the target-setting for SD,

Table 2. Methodologies and standards applied in PM in the world

Name of PM methodology	Type (standard/certification)	Organization, country	Inclusion of CSD principles
ICB	Certification system	International Project Management Association, IMPA (Switzerland)	At the level of competence of project manager. An international group of experts was created to develop a list of sustainability aspects for inclusion in the next version of the standard [2].
PMBok	Body of knowledge. American national standard (PMP, CAPM, etc.)	Project Management Institute, PMI (international organization, located in the USA)	A number of sustainability indicators are included in the processes of initiation and planning.
P2M	Standard. Guidebook	Project Management Association of Japan (Japan)	The project as the creation of the value of the end product, which is determined by social and corporate ethics, and also by sustainable growth that contributes to the care of the environment [5].
PRINCE2	Methodology. British standard on PM in the social sphere	AXELOS Limited (UK)	Describes the processes and stages of work on the project, excluding the criteria upon which management decisions are made.
PRiSM	Methodology. GPM standard	Green Project Management (GPM Global) (headquarters in the USA)	Principles of green management are most important in decision-making.

implementation of these targets, monitoring and submission of reports. Positive aspects include a well-elaborated issue concerning the relations with stakeholders, the presence of a separate methodology for incorporating green management principles.

Review of scientific views on the objectives of integration of CSD in project management

Researchers to date have presented their developments on aspects in which contradictions arise between CSD and PM. The research findings on the problems that have to be solved in order to remove contradictions are given below.

Task 1. Extension and clarification of project's performance indicators

Elaboration of sustainable development criteria and indicators is one of the main tasks that have to be solved by researchers. For the purpose of selecting the projects for a portfolio, Russian scientists in their paper [4] propose to apply the quantitative comparison of projects according to the amount of their prospective contribution to bridging the gap between the target level and the actual level of company sustainability using the method of scoring.

Scoring is used at the stage of selection of projects in the portfolio and includes the evaluation of classical factors that reflect project's investment attractiveness and economic, environmental and sociological characteristics of the project. The latter are represented in the form of indicators such as the share of procurement from local suppliers, the use of recycled materials, the proportion of returned products, the improvement of socio-economic level of development of the territory, the creation of new jobs, the level of training costs and others. After the indicators are evaluated, the outcome level of the project is assessed taking into account the weights and scores of each aspect; at that, the target (standard) values are compared.

Task 2. Incorporation of SD in the stages and knowledge areas of project management.

The second task determines what stages, phases, areas of knowledge within the project require the implementation of components related to SD.

In general, the existing project management methodologies propose to split the planned works into stages: initiation, planning, execution, monitoring, completion. It is clear that the main setting of goals, and target indicators of the project is carried out on the initial stages of project's implementation. Achievement of indicators must be monitored; it means it is necessary to regulate the monitoring of implementation of the tasks in the field of SD. The question remains open as to the steps that should be performed on the main stages of project's implementation so that the targets in the field of SD were not ignored.

British researchers conducted a survey [9] in order to obtain expert opinions on the subject. Some of the questions were devoted to the definition of the place of SD in different aspects of PM. Thus, the questions were raised about what stages should take into account the principles of SD, the components of processes (based on the list of components contained in PMBok), and the areas of the knowledge of project management.

As for the aspect of inclusion of SD principles in specific stages of the project, the majority of respondents believe that the stage of project initiation should elaborate the content of the project, the planning stage should modify its objectives, the implementation stage should work out the main processes of the project. According to the respondents, integration of SD principles is not significant at the stages of monitoring and completion.

The results of the second section of the survey aimed at identifying the most important components for the integration of SD in PM are presented in *table 3*.

To determine the third question, the answers to the second question were presented in the context of knowledge areas of project management. The following areas: management of project implementation, content management, resource management, quality management, risk management are most significant from the viewpoint of integration of SD principles. Thus, the respondents and the author of the research survey came to the conclusion that the sooner SD principles are implemented in the project, the more value this will have later. A change in the process of initiation and project planning that leads to its greater sustainability will change all subsequent processes.

Russian scientists in their article [4] believe that the introduction of CSD principles in PM should cover all stages of PM including initiation, planning, execution, monitoring and completion. It is proposed to incorporate these principles at the stages of the project with the help of Sustainable Stage-Gate Process developed by Robert Cooper [7], within the framework of the Process each project is divided into phases (stages) with clearly defined results, at the end of each stage the project must pass through a checkpoint (gate) – a formal meeting to assess the situation and make decisions on the transition to the next stage. By the end of each stage, the project must meet the target values that include sustainable development indicators. Otherwise, the participants of the meeting make a decision to suspend the project or return it to the beginning of the respective stage.

Table 3. Components of PM that require adaptation to the tasks of SD

Stage of project management	Components
Initiation	Initiation
Planning	Development of project plan Development of structural plan Description of tasks Resource planning Quality planning Risk management plan Description of risks
Execution	Execution of project plan Quality insurance Team formation and development
Monitoring	Integrated monitoring of changes
Completion	-

Task 3. Determination of the relationship between the life cycle of the product, project, and resources for setting out the objectives of SD

Due to the fact that producer's responsibility applies not only to the indicators of project's life cycle, but also to the sustainability of the product, the resources that the project uses and the assets that are used and generated, it is necessary to revise the duration of project's life cycle. In particular, it is proposed [13] to use an approach that takes into consideration the accounting of the full life cycle, in which along with the implementation of the project an asset is created within its life cycle, i.e., one cycle generates another one within itself. At the stage when the assets are put into operation, a product emerges and its life cycle starts. The work [17] proposes approaches to improving economic sustainability of the assets used in the project and the products produced from them. Additional research task is to form the approaches to environmental and social responsibility in relation to the assets included in project's life cycle, and also the development of techniques that improve sustainability of the resources used and the products produced in the project from the viewpoint of environment, economy and social impact.

4. Regulation and organization of work with interested parties.

The majority of studies propose to involve stakeholders at different stages of work on the project. For example, in the study [10] the participation of stakeholders helps outline the structural project plan, schedule, resource plan and budget, conduct risk analysis, and ensure the objectivity of project assumptions and the transparency of reporting. The incorporation of CSD principles in PM when identifying the risks involves the grouping of economic, environmental and social risks, as well as local, regional and global risks, this will help determine what minimization measures should be undertaken.

5. Clarification and expansion of requirements for project manager and additional roles in project management.

The work [10] examines the role of project manager in the integration of SD principles in PM. When the respective values are included in various aspects of the project, it is necessary to understand the boundaries of the project and its environment in accordance with the timing, content and amount of human resources involved in the project. Project manager is responsible for a reasonable exclusion of those aspects which are no longer part of the area of influence of the project.

Besides, a key element of organizational design is the identification of roles responsible for project's sustainability. It is possible to fulfill CSD principles only when SD tasks are integrated directly into specific project roles. Also the project can include a special role that is responsible for SD, similarly to that of a quality expert assigned to the project.

6. Development of a methodology for prioritization of project tasks, including the tasks of SD, in accordance with the triple constraints of the project scenario development.

When the additional criteria of project's success that are not related to economic efficiency are included, it is necessary to

understand the degree of their importance in decision-making. Given the triple constraint in project management, the task of finding the balance between scope, time and cost is crucial when making decisions. At that, it is obvious that SD tasks increase the importance of the resource aspect of the project, i.e., they affect its value to a greater extent. The measures included in the content of the project within SD objectives can either increase or reduce the cost of the project; they can have similar impact on project's timeline. Thus, the isolated setting of target indicators of project's SD is inexpedient. A model is required that provides for a comprehensive development of target indicators in accordance with project limitations and the significance of these limitations.

7. Definition of requirements for reporting materials at all stages of the project.

An additional research objective is to define the requirements for reporting materials at all stages of the project. When developing the original package of project documents including structural, resource plan, risk analysis, assessment of environmental and social impacts, it is necessary to provide a clear regulation of the requirements for the inclusion of SD tasks. At the stage of project implementation it is necessary to control the tasks at each stage of the project. The final reporting on the project must also have a clear correlation with the sections of project's business plan in terms of criteria and indicators that were set out.

8. Development of a system for assessing the impact of the project on regional, national and global level.

The most universal research task is to track the impact of the project on the level of regional, national and global sustainability. The solution of SD problems is clearly linked to the Millennium Development Goals (until 2015) and Sustainable Development Goals after 2015 that were set out at the 68th session of the UN General Assembly in 2014. Obviously, the solution of large infrastructure projects has a direct impact on sustainable development of regions and the entire country. Less complex projects implemented within an industrial enterprise also influence the achievement of the overall level of SD on the territory of presence. Assessing the impact of such projects on the achievement of company's strategic tasks in the field of SD will help their effectiveness in implementing the regional SD strategy. Development of a system for accounting and monitoring the relevant relations is one of the most promising global challenges.

Conclusion

Thus, researchers face a number of open tasks for the integration of SD principles in project management. The article reveals the main contradictions between CSD and PM, and on the basis of these contradictions the authors formulate the tasks to resolve these contradictions and establish a methodological basis of project management, aimed at mainstreaming company's sustainability objectives. Having analyzed the inclusion of SD provisions in the existing PM methodologies, we can make a conclusion about their insufficient elaboration in the field under consideration.

The analysis and generalization of scientific approaches on the research tasks shows that at present the following tasks are least studied and require urgent scientific consideration:

– the task of extending the time frame and geography in the target indicators of project efficiency, as well as creating the possibility of tracking the impact of the project on the existing indicators of regional, national and global sustainability,

– formation of approaches to environmental and social responsibility in relation to the assets included in the life cycle of the project, and the development of techniques that will improve the sustainability of the resources used and the products produced in the framework of the project from the viewpoint of environment, economy and social impact,

– development of a methodology for prioritization of project tasks, resources and timelines, including SD tasks, in accordance with the triple constraint in the development of project scenario,

– definition of requirements for reporting materials at all stages of the project.

When these tasks have been solved, it will be possible to realize the value-oriented business strategy to the fullest extent and to improve the general level of region's socio-economic well-being without producing a negative impact on the environment and on the lives of future generations.

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