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Project Management for Circular Economy projects in 7 steps

Abstract: *Circular Economy is a new term for already known trend to reduce the environmental impact of the industrial activities. Shifting to a circular economy is not a straight forward process of incremental changes in the production system and that it usually calls for development of new, high risk technologies, implementation of which might be easier if performed under the guide lines of the project management. This is because the new undertakings within the concept of circular economy have all the characteristics of more general class of projects typically managed under the systems assuring the required risk mitigation. These characteristics are: lack of precedence (originality), ambitious tasks, complexity and the risk. When all these "ingredients" are there, there is clear benefit, and perhaps even an urgent need for professional project management approach.*
Management of the projects involves, among others, scheduling, budgeting and risk mitigation. For the beginners, the advanced procedures of project management might be difficult to comprehend. Thus, in this paper, the focus is on the seven basic steps, which need to be made in this respect to assure timely and strict financial implementation of the projects. The aim of the paper is to familiarize the readers with the basic tools/rules of the project management, which are crucial in the project management practice. Also, based on the Author's personal experience, these tools/rules are explained in the way, which simplifies their application.
Keywords: *Circular Economy projects, Project Management*

ZARZĄDZANIE W 7 KROKACH PROJEKTAMI DLA GOSPODARKI O OBIEGU ZAMKNIĘTYM

Streszczenie: *Circular Economy to nowy termin dla znanej już tendencji do ograniczania wpływu na środowisko działalności przemysłowej. Przejście do gospodarki o obiegu zamkniętym nie jest prostym procesem, wymaga stopniowych zmian w systemie produkcyjnym i zwykle wymaga opracowania nowych technologii, których wdrożenie może być łatwiejsze, jeśli zostanie przeprowadzone w ramach wytycznych dotyczących zarządzania projektem. Dzieje się tak, dlatego, że nowe przedsięwzięcia w ramach koncepcji gospodarki o obiegu zamkniętym mają wszystkie cechy bardziej ogólnej klasy projektów zazwyczaj zarządzanych w ramach systemów zapewniających wymagane ograniczenie ryzyka. Te cechy to: brak precedensu (oryginalność), ambitne zadania, złożoność i ryzyko. Kiedy wszystkie te „składniki" istnieją, występuje wyraźna korzyść, a być może nawet nagła potrzeba profesjonalnego podejścia do zarządzania projektami. Zarządzanie projektami obejmuje między innymi planowanie, budżetowanie i ograniczanie ryzyka. Dla początkujących, zaawansowane procedury zarządzania projektami mogą być trudne do zrozumienia. Dlatego w niniejszej pracy skupiono się na siedmiu podstawowych krokach, które należy podjąć w tym zakresie, aby zapewnić terminową i ścisłą realizację finansową projektów. Celem artykułu jest zapoznanie czytelników z podstawowymi narzędziami i zasadami zarządzania projektem, które są kluczowe w praktyce zarządzania projektami. Ponadto, w oparciu o osobiste doświadczenia Autora, te narzędzia zasady są objaśniane w taki sposób,co upraszcza ich stosowanie.*
Słowa kluczowe: *projekty z zakresu Circular Economy, zarządzanie projektami*

1. INTRODUCTION

Circular Economy is a new term for already known trend to reduce the environmental impact of the industrial activities. What is, however, new in this case is a radical approach to the problem, which not only justifies the use of "second hand" materials and products, but in

fact make it priority. This approach, stimulated by legislatures and eco-sensitive consumers, implies the need for similarly radical changes in industrial processes, among other processes of recycling. This means, that shifting to a circular economy is not a straight forward process of incremental changes in the production system and that it usually calls for development of new, high risk technologies, implementation of which might be easier if performed under the guide lines of the project management. This is because the new undertakings within the concept of circular economy have all the characteristics of more general class of projects typically managed under the systems assuring the required risk mitigation. These characteristics are: lack of precedence (originality), ambitious tasks, complexity and the risk. When all these "ingredients" are there, there is clear benefit, and perhaps even an urgent need for professional project management approach.

Unfortunately, professional management of the projects in Polish economy is seldom adopted. The pioneers in this respect are multinational companies, bringing to Poland experience accumulated in the activities abroad. As a result, more complicated projects in our country are usually delayed, more expensive than expected and frequently end up in the court of law.

Pro-ecological projects nearly by definition are complex and characterized by measurable risks. This is because these projects offer solutions designed for the specific clients, whose needs differ depending on the local resources and the changing legislature. Also, there is a formal requirement of using the best available technologies, which change systematically with the progress in science. Thus, this type of projects have been already recognized as requiring professional project management – see for example [1, 2].

Professional management of pro-ecological undertakings is also subject of various courses offered by the Universities [3]. Management services to such projects are offered by a number of companies [4, 5, 6].

2. CIRCULAR ECONOMY PROJECTS

The main objective of the circular economy is to make economic systems and industrial processes more environmentally friendly and sustainable. Shifting to a circular economy is not a straight forward process and requires substantial changes in the value chain such as reduction of the resources needed, greater recycling, re-use of products, better waste, air and water management.

Circular economy projects inherently are pro-ecological and eco-innovative. They reduce the impact of industrial activities on the environment and the consumption of the natural, non-renewable resources [1]. Among others, the circular economy approach aims at refinement of the industrial processes in terms of the use of recycled materials.

3. CIRCULAR ECONOMY PROJECT LIFE PHASES

As in the case of all undertakings deserving project management approach projects, circular economy projects feature specific life phases, of which the first is phase is project definition. This phase has to be accomplished with the Customer (main beneficiary and also Sponsor) of the project. The main goal of this phase is to define the project objectives, for example separation of the plastics made of different polymers in the plant processing polymeric waste, and the boundary conditions, which might include the following:

— the use of best available technology
— robustness of the technological solution
— minimized impact on the environment

One has also to establish the data characterizing the current status of the processes/products. At that stage, the analysis and classification of the planned waste input and appraisal of the current processes has to be performed. Planning of the project should lead to the selection of a suitable technology and reengineering of current production approach.

Having well defined goals of the project as well as the technical steps to achieve project

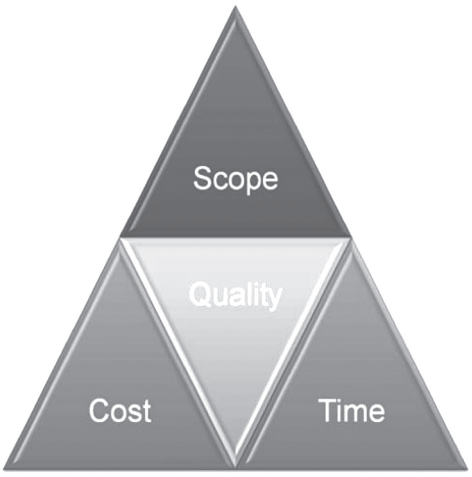

Table 1. Triple project constrains

objectives, we can now start managing such a project applying one of world-wide known project methodologies [7, 8] or any other methodology described in books [9, 10, 11].

Management of the projects is multi-tasks exercise that involves, among others, scheduling, budgeting and risk mitigation. For the beginners, the advanced procedures of project management might be difficult to comprehend. Thus, in this paper, the focus is on the seven basic steps, which need to be made in this respect. These steps alone assure timely and strict financial implementation of the projects. The aim of the paper is to familiarize the readers with the basic tools/rules of the project management, which are crucial in the project management practice. Also, based on the Author's personal experience, these tools/rules are explained in the way, which simplifies their application.

4. PROJECT MANAGEMENT BASICS

The term „project" in the context of this paper means an undertaking aiming at development of unique and original processes, product, service or knowledge. Project management consists in application of the know-how, skills, tools and techniques which all together serve the purpose of the project execution to the full satisfaction of all the parties involved.

"A project can be good, fast or cheap. Pick any two." This is an old proverb of the projects managers.

In the classical approach to project management, projects are characterized by triple constraints, which need to be considered all together. These are

- Scope (good)
- Time (fast)
- Cost (cheap)

In reality, there are also other dimensions of interest, such as satisfaction of the client, perception of the company, which may increase the number of constraints in a given project. The important point to be made here is that all the project constraints are inter-linked and none can be considered individually. There is always a trade-off effect between any two of them – time is inter-related with the cost, cost with scope etc.

5. SPECIFICS OF THE PRO-ECOLOGICAL PROJECTS

The distinctive features of the pro-ecological projects are:

- High degree of innovation (the need to use the best available technologies)
- Direct dependence on the regulations protecting the environment

- Potential co-funding with public money
- Exposure to the public scrutiny

All these aspects and the score of the other make these projects challenging, particularly in terms of the defining success criteria and measurements of the satisfaction of the parties involved [12].

Based on the general analysis of the projects aiming at reducing the environmental impact, one should indicate the importance of following factors:

- Specific Client expectations
  - Defined only in general terms
  - Variable (may change during the project implementation)
  - Frequently concentrated on the cost
  - Occasionally unrealistic
- Exposure to the legal regulations, such as EU and the national directives, emission protocols
- Aims of the project being rather general
- Cost dominating the importance of the other constraints

6. PROJECT MANAGEMENT FOR CIRCULAR ECONOMY PROJECTS IN 7 STEPS

Based on the experience accumulated over nearly 15 years of project management practice of the Author, the following 7 steps for beginners are defined. The first three, which initiate the project, are:

1. Establishing scope and goals
2. Setting up the project execution team consisting of the representatives of all the stakeholders; assignment of the duties
3. Preparation of the project execution plan

The four next, are taken in parallel, throughout the execution phase and include:

4. Risk management
5. Change management
6. Dissemination of the information (communication)
7. Knowledge generation (lessons learned)

6.1. ESTABLISHING SCOPE AND GOALS

The leader of the project has to, before initiating the project, agree with the Client main goals to be achieved. This is the Client, or using the other term the Sponsor, who decides about aims, goals and rational of the project. The aims and goals of the eco-innovative projects by definition have to take into account eco-dimension of the undertaking and parameters quantifying the impact on the environment.

Examples of the parameters quantifying the environmental impact include:

- the quantity of the raw material used,
- amount of the energy needed,
- amount of the emissions to the environment.

It is also important that in the early stage of project implementation changes of success and the risk of not achieving the assumed eco-progress are analysed.

When the decision is made with regard to the aims and goals, the next steps concern:

- Scope
- Timing with the definition of the stages and the miles stones
- List of assumptions
- Risks recognized

There are three primary constraints on projects: scope, time and cost. It is important to understand and prioritize these constraints. This not a simple task. Client often believes that all three constrains are of equal importance. In reality this is neither true nor practical approach. It is vital to establish with the Client the relative priority of these constraints, even if the process of coming to agreement might be lengthy. To some degree this is the process of understanding the reality

The process of establishing Client priorities, which is essential to project definition and execution, usually requires that an open dialog is established with the Client. Within this dialog the Client should explain what are the consequences of the failure to accomplish the project timely and what is the acceptable "quality" of the final

outcome. All parties involved should also accept that priorities might change during life cycle of the project. Thus it is essential to start analysis of main risks that might result in change of triple project constrains (scope/ quality, time and cost). Risk Analyses should be done taking into account possible mitigation actions.

6.2. DEVELOPMENT OF PROJECT TEAM

Development of project team consists of following steps:

- Identification of project stakeholders. The term project stakeholder refers to,an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project" [7]
- Definition of roles and responsibilities of each project team member
- Assignment of resources with appropriate qualifications to respective project tasks

Frequently, the project team is formed without a deeper reflection on the participants. Not recommended practice is to nominate the members based on their availability not on the input they may offer. It should be underlined, that the good practice is to select the best experts in the subject of importance to the project success.

All project stakeholders should receive regular information about the project status. The key issue is that the Project Leader knows explicit and implicit interest of all the stakeholders.

6.3. PROJECT PLANNING

Project planning involves each of the following steps:

- Task planning, which starts with the development of WBS (Work Breakdown Structure), which break up project into manageable subtasks;
- Costs estimating;
- Recognition of assumptions taken during planning activities;
- Staffing – resource assignments;
- Scheduling

Costs estimation is probably one of the most difficult tasks. The same applies to the cost efficiency and value-to-money analyses. One should consider:

- payback period,
- simple rate of return,
- break-even point,
- updated value method NPV,
- internal return rate method IRR.

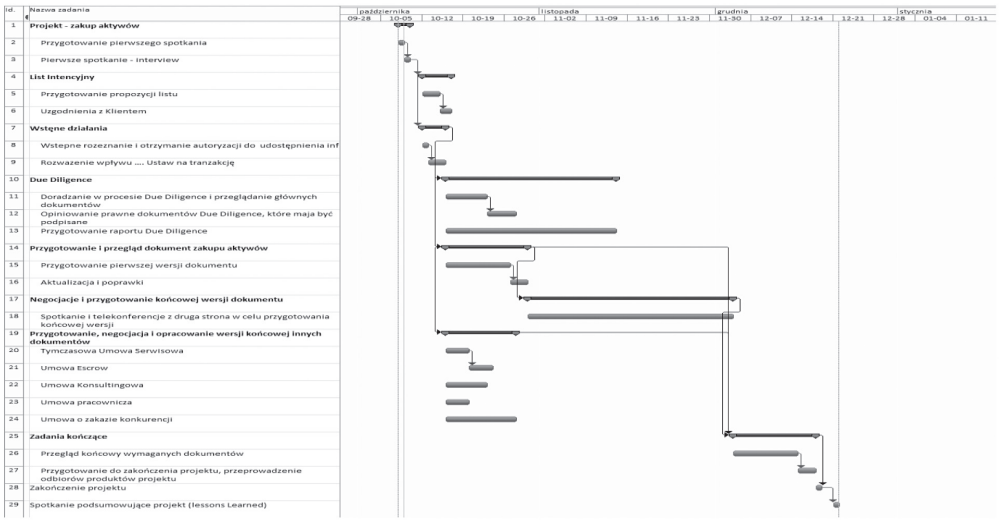

Table 2. An example of the project schedule with a critical path

Scheduling of the project requires both the general and project specific knowledge. In project management, a schedule is a listing of a project's milestones, activities and deliverables, usually with intended start and finish dates.

Good project schedules are essential to:

- tracking the progress of the project by comparing actuals with the plan
- determining the impact of potential changes on the project
- determining when resources are to be provided for the project
- defining project Milestones and keep track on them
- defining a critical path.

The Critical Path is the longest sequence of activities in a project plan which must be completed on time for the project to completed on due date. If an activity on the critical path is delayed, then the entire project will be delayed.

Exemplary schedules with the critical path is given in Table 2

A good practice is to develop project schedule together with project team members to develop their feeling of co-ownership of this document. One should also note, that there is no such thing as a perfect project schedule or more generally Project Plan that remains unchanged during project life. However, all project changes should be done in a formal way by using Change Management Procedure.

6.4. RISK MANAGEMENT

Project Risk is defined as uncertain event or condition that, if it occurs, has positive or negative effect on at least one of the project objectives. Project risks have specific causes and, if happened –effects.

Risk management activities can be described as a process of planning, identifying, analysing, evaluating and controlling project risks in order to deliver project to Client expectations. Risk Management processes are described in details in each Project Management methodology, but for the purpose of this paper, the following simplified Project Risk Management steps are given:

1. Create prioritized list of risks
2. Develop alternative mitigation actions
3. Analyse all mitigation actions and choose one that is preferable
4. Update project schedule and project plan with all task arrising from chosen mitigation actions

It is important to keep in mind that all decisions should be consulted with appropriate project team members. It is worth to notice also that risks can be linked and also mitigation action taken for one risks could influence other risks (by e.g. increasing probability of risk occurrence) or might even create a new risk.

Considering alternative mitigation actions, one should take into account:

- project goals
- linked risks
- project team capability to perform certain mitigation actions
- project constrains

One of the most important element in risk management process is assignment of project owner – the person responsible for mitigating project risks. It should be noted at this point, that there are some risks, which are not controlled by the PM. In particular, PM must accept the risk of new environmental regulations, merging of the companies, resignation of a project team member.

6.5. CHANGE MANAGEMENT

„The only constant is change – adapt or die!"

Project Change is any deviation from the project baseline. For the purpose of this paper we could take simplified definition of baseline as agreed project schedule with resources assigned to tasks. Project change might influence triple project constrains:

- Time - schedule
- Scope (requirements)
- Costs

It is of vital importance that any change in project should be treated in a formal way. Each Project Management methodology describes in details steps that should be taken and files to be generated to document the change process [7, 8]

Why we should formally manage changes? There are some good reasons for that. Managing changes with defined procedures assures that:

1. The only changes made are the ones truly needed
2. The consequences of each change are fully recognized
3. The changes made are well communicated to all the stakeholders

6.6. COMMUNICATION PLAN

Efficient communication procedures need to be defined in the context of to whom and what information must be forwarded. During the project implementation stage, the project progress must be communicated to all the stakeholders. It is also of vital importance that the communication is efficient and adequate, disregarding whether or not the messages are welcome or not.

A good practice is to exchange information regularly, say every week. It requires some effort, which pays back fast and can be reduced with the use of modern communication techniques (video conferencing etc.).

6.7. LESSONS LEARNED

Once the project is accomplished, a good practice is to organize a meeting summarizing the experience gained. Project Management Institute (PMI) Project Management Body of Knowledge (PMBOK) defines lessons learned as the learning gained from the process of performing the project.

The lessons learned should address, among others:

- Good and so good aspects of the project implementation
- Areas of possible improvements
- The views of the Clients (stakeholders)

The purpose of documenting lessons learned is to share and use knowledge derived from experience to:

- Promote the recurrence of desirable outcomes
- Preclude the recurrence of undesirable outcomes

7. SUMMARY

There is a clear message in this paper – there are good reasons to use the proposed 7 steps defining the rules of project management approach to the undertakings characterized by a fair degree of novelty (innovation).

The adoption of these rules pays back! Even ambitious projects of the Circular Economy become easier predictable. The costs shall be kept under control. Satisfaction of the Client shall be higher and the communication efficient. Finally, there will be team spirit assured, which shall mobiliz all the parties involved.

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