

# QUALITY EVALUATION METHODOLOGY FOR RESEARCH PROJECTS

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**Abstract:** *Project management can be viewed in two different ways. First one in to ensure realization of unique, non-recurring, time and sources limited processes, which lead to advanced specified aims, and the second is to enhanced these processes. For implementation and successful project ending are major factor customers or third parts requirements. Project requirements are different for those, who implement the project and those who use the project results. Generally it can be declared, that in this case exists particular system, which can forward the project in to the place, where can meet customers and third parts requirements. In management systems exists standard, called ISO 10006:2003, which describes quality management system implementation in project management and is for everyone, who has experience with project management or for those, who need to be assure that their project includes requirements of the standard ISO 9001.*

*This paper presents the concept of the methodology, based on standard ISO 10006, used for project evaluation in processes, which should ensure successful and effective project realization.*

**Key words:** *project, control, quality, management*



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## **1. Introduction**

Nowadays in the business world it is necessary to use all possible ways for improvement and changes implementation, which could help organizations flexible response to customers' requirements and adjust their demands. It means that organizations for key solutions use tool, called project.

In the frame of the project it is possible to implement: new product or service development, event organization, proposal and development of the institution department, organizational structure reengineering etc.. From the general view each project should define clear goals, should be understandable, applicable, and actual with responding for real needs and include responsibility allocation for task fulfillment. Successful project is based on two major phases: plan and implementation. According to specification more critical is planning phase, which stays at the beginning of the project realization. Planning as a process is during project life cycle very similar, but it has differences with detail severity. Second phase – implementation starts after successful acceptance and agreement signed with stakeholders. (Bruce & Langdon, 2003). From the evaluation project quality view is phase of implementation key step, because in this phase project process are realized and also status, time and financial plan keeping is monitored. The question is: It is possible to evaluate in this phase quality of results or impacts, which project brings?

## **2. Quality Management System in Project Control**

The project quality can be viewed in different ways. The factor of who assesses the quality, and what is the evaluation based on, is always decisive. However, the bottom line is always determined by the customers' or stakeholders' requirements. The quality is differently evaluated by project builders, project contractors, and those the project outputs are designed for (Barker & Cole, 2009).

However, generally it can be stated that even in this case there is a certain system capable of managing a project so that the requirements of all abovementioned parties are met. Management systems use the ISO 10006 standard, which can be used for a large variety of projects, from small to large, from simple to complex parts of a programme or even set of projects. It is intended for people who have experience with project control, and who would like to ensure that their organization applies methods contained in the ISO 9001 standard; as well as for people who have experience with quality management and are required to cooperate with project organizations to share their knowledge and experience. With regard to the "organization" the standard distinguishes between "project organization" and "originating organization". The project organization is the one that implements the project; while the originating organization is the one that decides to implement the project. It is common that the same institution is both an originating and project organization. In project control the entire conception is based on the so called project quality plan, which identifies activities and sources needed to achieve the project goals. The project quality plan should be specified by the customer in contract terms

and conditions, however, it should be realized that this plan should not limit the object of the quality plan used in the project organization. Both QMS and quality management system in project control are based on the processes and process approach. In connection with the successful implementation of projects the ISO 10006 standard provides thirteen groups associated not only with the project implementation process itself, but also with its control processes (Tab. 1).

Standard Chapter	Title chapter
1	Scope
2	Normative references
3	Terms and definitions
4	Quality management systems in project
4.1	Project characteristics
4.2	Quality management system
5	Management responsibility
5.1	Management Commitment
5.2	<b>Strategic process</b>
6	Resource Management
6.1	<b>Resource – related processes</b>
6.2	<b>Employee – related processes</b>
7	Product realization
7.1	<b>General</b>
7.2	<b>Interdependency – related processes</b>
7.3	<b>Scope - related processes</b>
7.4	<b>Time - related processes</b>
7.5	<b>Cost - related processes</b>
7.6	<b>Communication - related processes</b>
7.7	<b>Risk - related processes</b>
7.8	<b>Purchasing - related processes</b>
8	Measurement, Analysis and improvement
8.1	<b>Improvement - related processes</b>
8.2	<b>Measurement and analysis</b>
8.3	<b>Continual Improvement</b>

Tab. 1. Chapters and processes of standard ISO 10 006

Not every process in this chapter needs to be in particular project and also in the project it is possible to find other existed processes (ISO 10006).

### 3. Current Evaluation of Research Project Quality

Projects of national and international cooperation are regularly subject to monitoring evaluations focusing on monitoring and evaluating project effectiveness, time keeping and meeting financial requirement. According to the situation and the project nature the evaluation can use e.g.:

- The percentage-of-completion method – based on the identification of the status and completion of tasks from the Gantt chart, when the percentage of the

task completion is shown for each activity. This method is simple; however its predicative value is low.

- The SSD method (structure – status – deviation) – this method focuses on assigning values -2, -1,0,+1,+2 to individual activities depending on their current status. Compared to the plan, the negative values represent the project delay, while positive ones show its advancing. On the basis of this method the project team can very easily get an idea of the project plan keeping. Through the summarization of individual values by the check date, the overall value can be determined and compared with the value obtained during the previous check.
- The earned value method EVM (Earned Value Method) – the aim of this method is to assess the amount of effort dedicated to the project in the moment of control to assess the project time shift in terms of spent costs. This method is based on the set of defined time and financial indicators.
- The milestones method MTA (Milestones Trend Analysis) – this method is based on the setting of a larger amount of milestones, which are placed at points in a project, where major events are likely to be completed. When using the milestone method, the preparation of the report must be planned for the control day; and the control day itself must be planned, too.
- Or other various budget methods supported by specific software applications, e.g. MS Project, which is used as a project management support tool (Dolezal, J. et al., 2009).

Individual methods use different strategies depending on the object of their investigation. However, project outputs depend on the quality of individual activities or processes, which take place during the project implementation process.

The project evaluation is based on the so called integrated control and management system, which comprises three core attributes: time, costs and quality. While the time and cost attributes can be factually assessed, it is relatively difficult to evaluate the project quality (Fig. 1).

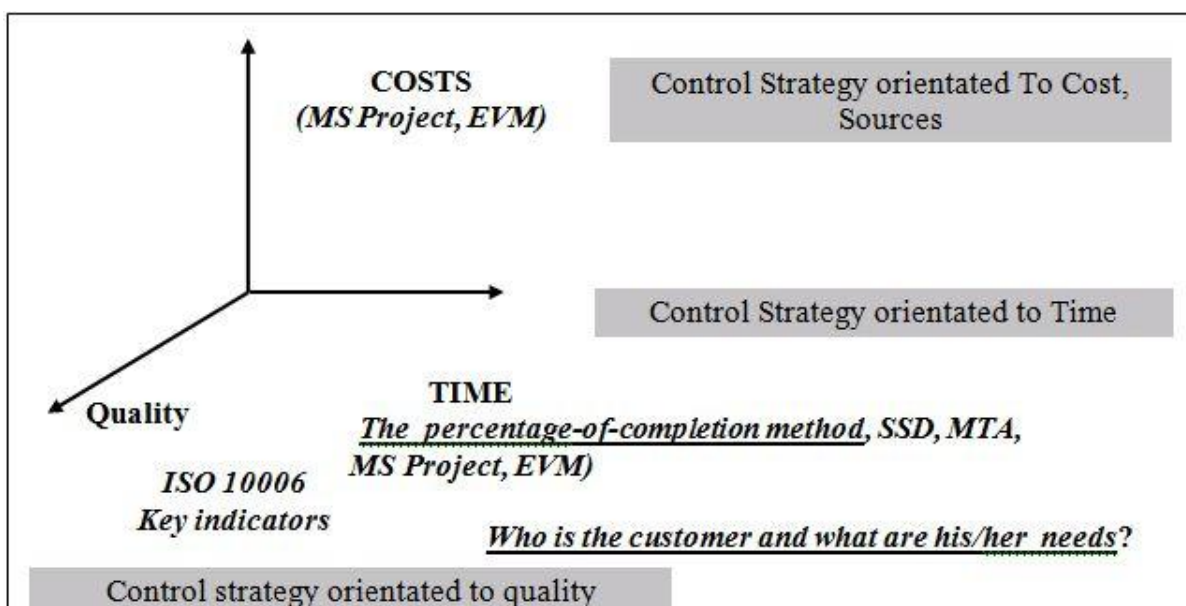


Fig. 1. Integrated Project Control

Currently no methodology capable of providing an overall evaluation of the project quality, especially in case of research, exists, as the project results may be specific and their evaluation may be subjective (\*\*\*)).

#### **4. Proposal for Research Project Evaluation**

As mentioned above, the project results, outputs and impacts can be monitored from three different perspectives, namely time, costs and quality. The evaluation of costs and time can be based on the aforementioned methodologies; however it is very difficult to assess project quality as the evaluation may often be influenced by subjective opinions. The issues of evaluation control and reporting is crucial for the project success. A certain role in the evaluation process is played by regular monitoring reports supplemented by indicators or documents, which confirm the implementation of activities and actions. However, reports do not include information on the quality of project control processes. Due to this fact it may be reasonable to design and implement a methodology based on the ISO 10006 standard requirements, which deals with the quality management system in project control. This methodology also includes a set of EVM method indicators, which are used to assess the project state both from the time and financial perspective. The basic characteristics of the new methodology would be as follows:

- the methodology would be usable and assessable both in the phase of planning and in the phase of implementation,
- the core element would be represented by the ISO 10006 requirements assigned to 13 sections of the standard and 37 processes (Tab 2):

This methodology would be based on the use of the so called check-list of the evaluation of the project control process; while the financial, time as well as quality state of the project would be detected through the regular monitoring. The check-list would be supplemented by specific character questions, which would reflect the qualities of the selected research project (e.g. Can applied research be implemented on the basis of the project findings and results?). The suggested methodology would also include the creation of an Excel programme, which would generate interconnections between individual phases (plan/ implementation) in accordance with the PDCA cycle of the continuous improvement.

For this methodology also limitation exists, especially in the projects, which are orientated to research and development, where the results can lead to the mistaken theory. Despite, this methodology will be used and verify at 7<sup>th</sup> Framework Program, called iNTEGRISK, which is related to New Emerging Risks. The project has already started, so it is possible to find out how much of planed work is done. This information is clearly important, if the project manager as well as team members want to improved project management steps and avoid mistakes.

Chapters of ISO 10006	Processes
<b><i>Strategic process</i></b>	<b><i>Strategic process</i></b>
<i>Resource – related processes</i>	Resource planning Resource control
<i>Employeeel – related processes</i>	Establishment of the project organizational structure Allocation of personnel Team development
<i>Interdependency – related processes</i>	Project initiation and project management plan development Iteration management Change management Process and project closure
<i>Scope - related processes</i>	Concept development Scope development and control Definition of activities Control of activities
<i>Time - related processes</i>	Planning of activity dependencies Estimation of Duration Schedule development Schedule Control
<i>Cost - related processes</i>	Cost estimation Budgeting Cost control
<i>Communication - related processes</i>	Communication planning Information management Communication control
<i>Risk - related processes</i>	Risk identification Risk assessment Risk treatment Risk control
<i>Purchasing - related processes</i>	Purchasing planning control Documentation of purchasing requirements Supplier evaluation Contracting Contract control
<i>Measurement, Analysis and improvement</i>	Improvement – related processes
<i>Measurement and analysis</i>	Measurement and Analysis
<i>Continual Improvement</i>	Continual improvement by the originating organization Continual improvement by the project organization

Tab. 2. Standard chapters of ISO 10006 and its processes

#### 4.1 Application of the Methodology to a Selected Project

The example of the suggested methodology is shown in the following table, which illustrates the questions and indicators using a particular example of “**Employee related process**”. The selected project is associated with the 7<sup>th</sup> Framework Programme, which is oriented on the identification and management of newly emerging risks. This particular project is in the implementation stage, thus it can be used as a model example for the quality evaluation of project management processes (Tab. 3).

Phase: Implementation									
Nr. Question / Indicator	Chapter	Process	Question./ Title of Indicator	Status (Y/N, Nr.)	Notice	Corrective Action	Preventive Action	Deadline	Respon.
<b>Q1</b>	<b>Employee – related process</b>	Establishment of the project organizational structure	Is project organizational structure setting – up?	<b>Y</b>					
<b>Q2</b>			Are allocated responsibilities and competences?	<b>Y</b>					
<b>Q3</b>		Allocation of personnel	Is organizational structure adjusted to projects requirements?	<b>N</b>	Financial Administrator is missing	To hire person responsible for financial activities	N/A	2 weeks from notice	Project Manager
<b>I1</b>			(Average Nr. of project members for Task /Summary Nr. Of All project members) x 100 (%)	<b>60%</b>	Under 40% corrective action needs to be apply				
<b>I2</b>			Team development	Nr. of education courses during project implementation	<b>2</b>	Less than 1, corrective action needs to be apply			

Tab. 3. Checklist for Quality Evaluation

The advantage of the checklist approach is that individual processes, and consequently the state of the entire project can be transparently examined. A special role in the check-list is held by the indicators, which can be used in the regular evaluation process to point out stagnation, decrease or improvement of the project management processes. These indicators represent the core element of the EVM method, which focuses on the project evaluation from the time and financial perspective.

So far none of the methodologies has generated the interconnection between the project quality management system and the existing indicator-focused evaluation method. Therefore, the main aim of this methodology is to find the way how to objectively assess the project quality on the basis of management processes in each of its phase. The check-list provides individual questions and indicators in accordance with their scope of activity, while it must be borne in mind that not all questions and indicators have to be used in all projects. The check-list scope is not limited, and

other emerging questions and indicators can be added to the check-list during the project implementation. The evaluation frequency is not strictly specified; it is up to a project manager to decide how often the evaluation is carried out. The advantage provided by this methodology is that it can be used before the project implementation, i.e. during the planning phase. By means of this evaluation the project quality can be assessed not only at the end, after the project completion, on the basis of project results and impacts, but also during the entire implementation process or even in its initial phase before the project approval process. Thus the identification of weaknesses and drawback in processes would prevent the rise of deviations, which could possibly have a direct impact on the project success (or failure).

## 5. Conclusion

In the project management, the project evaluation is carried out predominantly in the form of monitoring reports. These reports are used for the objective evaluation of the time, financial as well as factual course of the project. An important step is to identify discrepancies and take decisions and measures to avoid deviations from the set plan. Organizations often have a list of recommended items and instructions how to carry out this evaluation. The evaluation form depends on the project type, country and scope. There is a great deal of methods to assess project results; however it is not a common practice to use methods for the evaluation of project processes. When using the methodology based on the requirements of the project quality management system, it could be possible to focus on the project management processes not only in the phase of its implementation but also during its initial planning. Continuous monitoring and evaluation would thus provide permanent improvement and quality assurance expected by customers and all stakeholders that will use the project outputs.

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