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T B Venczel[1], L Berényi[2] and K Hriczó[3]

[1] MDA Hungary Autóipari Kft. 3400 Mezőkövesd, Lövői St. 35., Hungary
[2] Institute of Management Science, University of Miskolc, 3515 Miskolc-Egyetemváros
[3] Institute of Mathematics, University of Miskolc, 3515 Miskolc-Egyetemváros

tamas.venczel@modine.com; szvblaci@uni-miskolc.hu; mathk@uni-miskolc.hu;

Abstract. There is a high need – especially in industrial organizations – to launch successful products and services. Therefore, it is crucial to understand what are the key factors in project success. The motivation of the research is to examine, if there is a model that can be applied to predict future project success; preferably in the automotive engineering and manufacturing environment. The paper aims to study project success literature and understand the differences and similarities between project success and project management success. Also, highlight the importance of the application of convenient models, to define success factors and link them with success criteria. Without a proper definition of success, success factors, and success criteria, the right success model cannot be chosen; therefore, the risk for an unsuccessful launch is higher. Applying a proper success model forecasts future project success. The first section of the paper introduces project success management, afterward literature review given differentiating project success, project management success, and success models. The overview highlights the importance of proper success factors and criteria definitions supported by success factor model application to increase the likelihood of successful project implementation.

1. Introduction

Nowadays, in the industrialized world, one of the most important keywords is "success." Every project practitioner has some thoughts on the definition of success and its dependency on different factors [1]. Although there are several overlapping areas, the definitions of project success and project management success differ from each other [2-5]. Project management is planning, organization, monitoring, and control of all aspects of the project; with the motivation of all included, achieving project goals in a safe manner, within the agreed schedule, budget, and performance criteria [6].

The "iron triangle" model was the first model to describe project management success. It was proven to be only part of general project success [2]. Projects can be successful despite poor project management if they reach their higher, long term goals and vice versa. Extending the "iron triangle" model, shows that there are many opportunities to widen our perspective; as project managers are also responsible for integration, resource, scope, communication, risk management, within time, budget, and performance [7].

Although it is possible to perform projects with poor project management, the correlation between applied project management practices and project success is significant [4, 8-9].

2. Literature review

2.1. Research focus areas

There have been numerous studies on several aspects of project success. Three main research areas can be found in the field.

- research on project success [10-14], including relevant project success factors, criteria, and their relations,
- research on project management success [15-17], which can be differentiated from project success,
- building success models [18-20], which can be applied for various projects depending on their characteristics.

2.2. Project success

The aim of Spalek [21] was to research the critical success factors of projects from a project management point of view. Why do some projects succeed, and some of them fail? What could be possible key factors regarding the outcome? According to Standish Group, the majority of projects (67% in 2003) run out of budget or time significantly. Can these failures be linked to the weakness of project management, or do they have other factors? Are these individual phenomenon, or is there a systematic set of activities behind it? A study has been conducted to answer these questions.

A research poll has been done, based on the feedback of Project Managers, having at least five years of experience and having completed at least three projects. The poll was a web-based questionnaire including:

- project integration,
- project communication,
- project scope,
- project schedule,
- project budget,
- project resources,
- staff fluctuation,
- reporting and monitoring the project,
- resistance to the project,
- project context.

82 Project Managers (experts) participated in the research, where the questionnaire was divided into three parts.

Each respondent of the survey knew at least one project management method. The highest portion of them (83%) knew PMBOK®; the second was PRINCE2 (41%), the third group mostly knew methodologies developed by themselves or by their companies (32%). Project managers usually learned methods during their work (61%), but almost half of them acquired knowledge from books and professional press (43%).

Table 1. summarizes the outcome of the survey. The answers were grouped by percentage and then allocated into different categories based on their effect on project success.

However, the study of Houston [22] includes research of University of Colorado-Boulder projects where six areas have been defined as the most critical project success factors. They were not examining the meaningful difference between the factors, but listed the most impacting factors in order, as shown in Table 2.

Table 1. Influence on the project success, Spalek [21]

Success factor	*Influence on project success (%)*
Formally establishing the Project Manager	93%
Project Manager Competencies	88%
High authority of the Project Manager	85%
The project goal set in a clear and measurable way	90%
Formally establishing a Project Team	86%
Top Management support for the project	84%

Table 2. Influence on the project success, Houston [22]

No.	*Success factor*
1	Communication
2	Project Management Practices and Performance
3	Relationship Management
4	Quality of Project Team Resources
5	Collaboration
6	Change Management

2.3. Project management success

Different project management models have emerged through history, investigating the effectiveness of project management. Mladen and Mariela [23] tried to differentiate between Project Success and Project Management success. Their article deals with Project Management Success through construction projects, and it is divided into four different sections:

- definition of Project Management success
- breakdown structure of project management success criterias
- success factors through European Union co-financed, water projects
- recommendations for future development.

Based on the study of Radujkovic and Sjekavica [24] success factors can be grouped into three different categories as shown in Figure 1. [23].

- the elements of project management competency, including behavioral, technical, and contextual competencies of project manager and project team members,
- organizational culture, structure, competence, atmosphere,
- project management methodologies, software, tools, techniques, risk assessment tools, and communication support tools.

Theoretically, if an organization has a competent and well-coordinated project manager, project team, adequate organization culture, structure, competence and atmosphere, and appropriate usage of project management tools are given; then there is a high likelihood of project management success, which leads to project success.

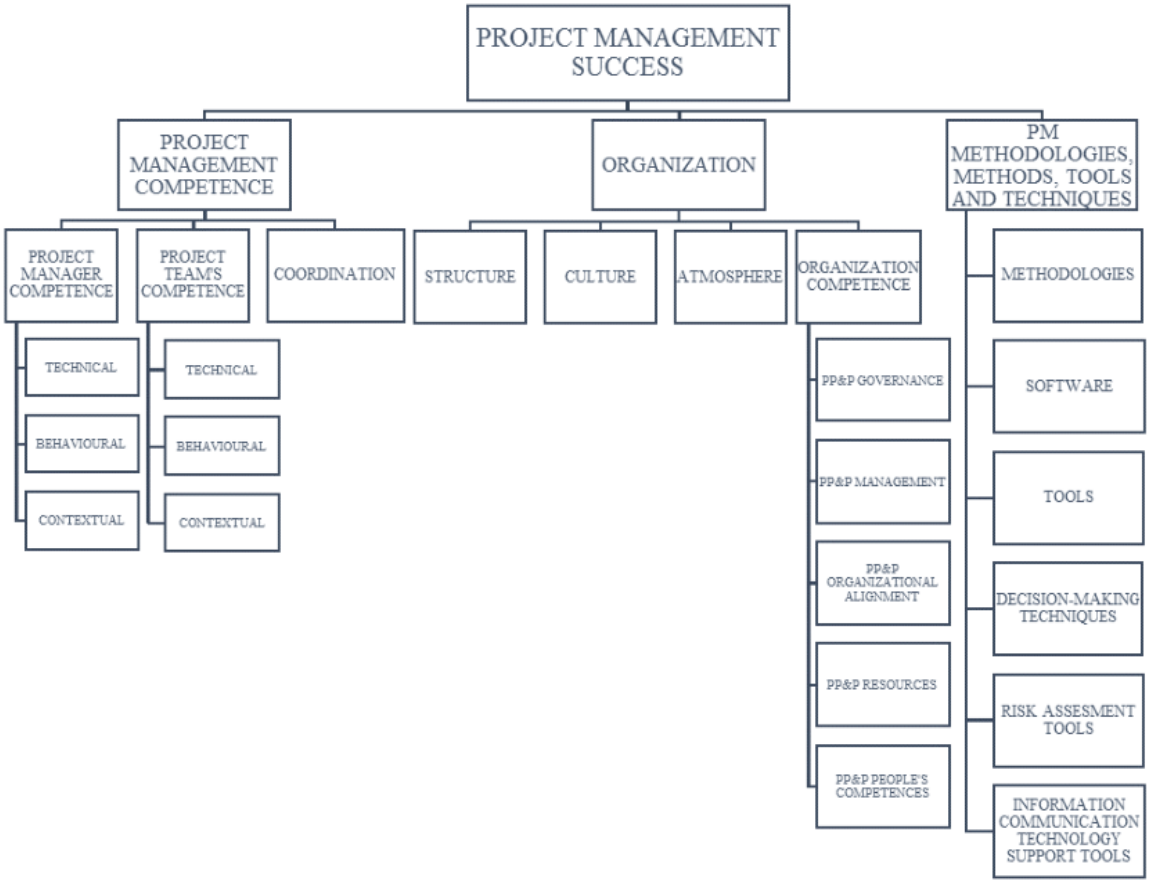

Figure 1. Project management success factors [23]

Mladen and Mariela [23] benchmarked the theory above on three different projects with different characteristics. They reviewed these projects considering all factors related to success and predicted the expected project success, based on project management success potential. There are future development possibilities of the study, as there is no link between the prediction of project management success and outcome of the projects; but the categorization of projects into the elements can support to map the weaknesses of an organization's project management. Therefore, improvement actions can be defined and performed.

Another aspect is to combine general *Success Management* with Project Management. Takagi & Varajão [25] aimed to insert success management within the project management procedure. Several project management methodologies are known, but none of them takes success management explicitly as part of the overall methodology. For example, PM^2 identifies factors and success criteria, but does not include monitoring and controlling of these. Success management also needs to be quite flexible and able to adapt to a quickly changing environment. As an example, it can happen in the beginning phase of a project, that budget has an overall priority and defines success. Still, over time, timing becomes more important due to possible market opportunities. This means that flexibility is required in project success management, especially in an agile environment.

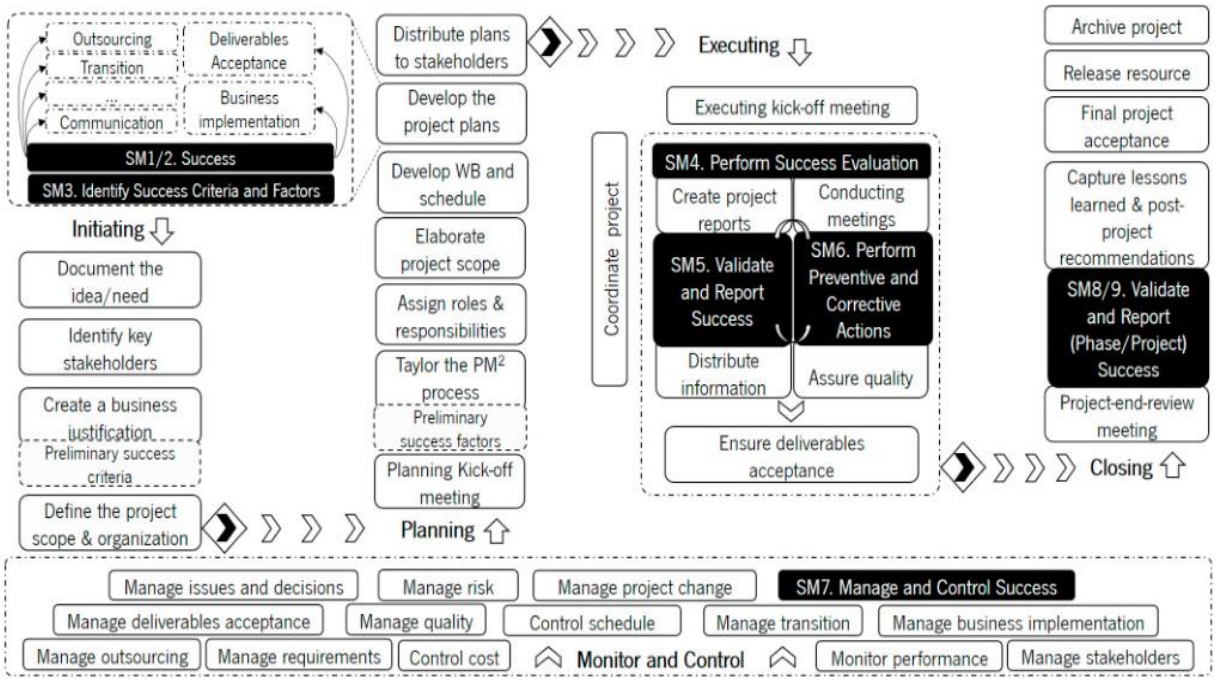

Figure 2. Integration of the success management process in the PM² methodology [25]

Takagi and Varajão [25] tried to implement success management into an existing project management methodology, PM². They propose placing nine additional components to the current method, starting with identifying success criteria and factors, followed by execution and evaluation, and closing with validation and report. As a result (represented in Figure 2.), project success management is implemented into the general methodology, reducing ineffective project management risk.

2.4. Success models

The challenge is implementing the success criteria and factors into the organization in a structured way, based on different maturity, complexity, and other characteristics. This is the reason for the demand for developing project success models that can define appropriate success factors and criteria, based on the individual, organizational needs.

The Project Excellence Model® provides a theory and practice-based methodology, to link success criteria with success factors, by including result areas (Project success criteria) and organizational areas (Critical success factors).

Result areas are based on the "iron triangle" of quality, time, and scope but extended with other criteria. The research shows it is hardly possible to generate one overall recipe for success criteria, as it varies from project to project [26]. So, rather than specify exact criteria, the model creates clusters of success criteria, to provide a higher level of flexibility for organizations as shown in Table 3. [27].

Studies have shown that project managers aiming to define, monitor, and control success, may lead to a higher level of project success.

These studies have shown other factors need to be considered for project success, besides the "iron triangle" [28-30]. Later these studies led to the definition of organizational areas (critical success factors) as shown in Table 4. [27]. With the combination of factors and criteria, the Project Excellence Model® was elaborated.

Table 3. Result areas of the Project Excellence Model [27]

No.	Result area	Explanation
1	Project Results (Budget, Schedule, Quality)	The original iron triangle of project goals. Almost all projects will have specific scheduling, budget and quality constraints
2	Appreciation by the client	The client initiates the project to fulfil specific need. What aspects and factors does the client value in judging the success of the project
3	Appreciation by project personnel	The workers of the project will be concerned with reaching their personal goals as well as a good working atmosphere
4	Appreciation by users	Users are concerned with their overall influence in the project and the functionality of the end product
5	Appreciation by contracting partners	Contracting partners try to make a profit at the project. They are also concerned with getting new orders and learning possibilities
6	Appreciation by stakeholders	Those parties that are not directly involved in the project but have a large influence. For example environmental groups, citizens and government agencies. These parties manage their specific interest.

Table 4. Organizational areas of the Project Excellence Model [27]

No.	Result area	Explanation
1	Leadership and Team	Represents the way the project manager runs the project and how tasks and responsibilities are divided. Leadership style of and co-operation in the project team greatly influence the working habits within the project organization.
2	Policy and Strategy	What are the project goals and how are they accomplished. Combining the interest of stakeholders into an end-product.
3	Stakeholder management	How does the project interact with various stakeholders? The co-operation of the project organization with external parties determines the place of the project in its environment.
4	Resources	Resources have to be utilized in an effective and efficient manner in order to achieve maximum benefit to the stakeholders involved.
5	Contracting	Each project organization establishes contractual relationships. The choices of contracts and partners evolve around the tasks at hand and the competencies of contracting parties.
6	Project management	How does operational control of the project take place? The traditional aspects of sound project control play a key role in this process.

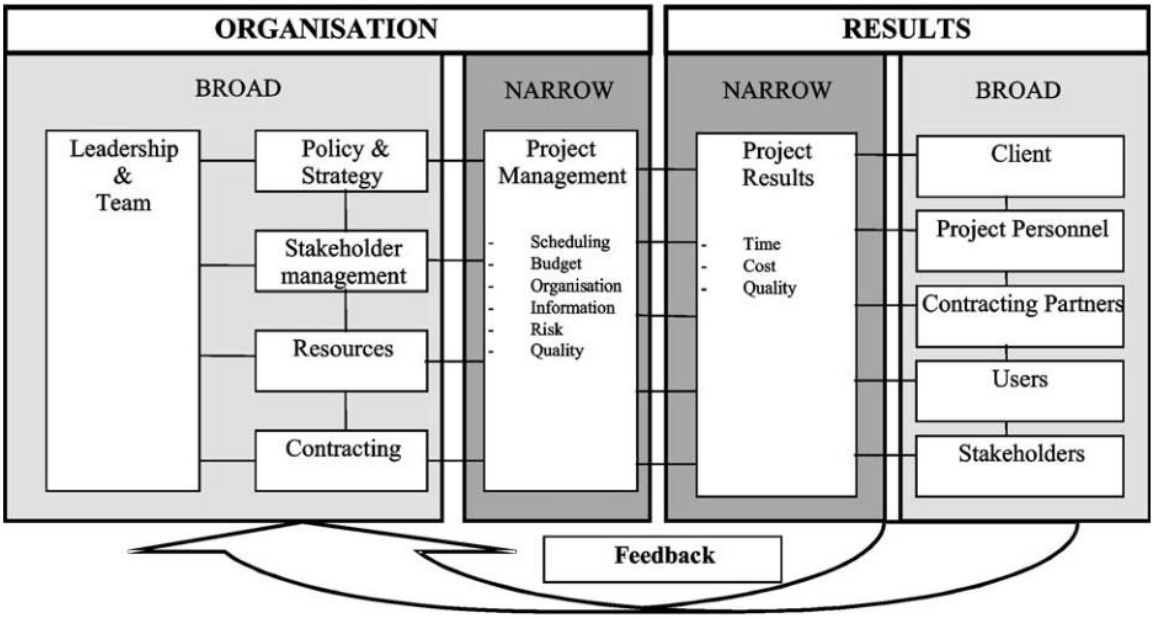

Figure 3. The Project Excellence Model [28]

By creating the Project Excellence Model® (Figure 3) there is an opportunity to connect project success factors with project success criteria. Project goals and external factors can vary; therefore, five project types were developed with different, scalable, decision criteria:

- I. Product orientation
- II. Tool orientation
- III. System orientation
- IV. Strategy orientation
- V. Total Project Management

The Project Excellence model is intended to use as the project starts, when stakeholders decide on project goals. These goals should be categorized into the six result areas of the model. Afterward, the organization should choose from the applicable five project types and define the critical success factors. After launching the project, the model can contribute to monitor and control the level of success. It helps to explain actions for improving project success.

3. Summary

Considering the overlapping areas of *Project Success* and *Project Management Success,* there is no exact definition of separating them or even if separation is required. As shown by the examples, explanations can be interpreted on a wide range. Nevertheless, research suggests; managing success as part of projects, to drive the project and organizational success. It is also highly recommended to choose an applicable method, to define and manage success factors and criteria. Otherwise, project goals could be defined incorrectly. As there is no clear proof and study on the outcome of conscious project success management, further research could be applied to a set of projects, to monitor the outcome with different boundary conditions. Based on the research results and success models, there are papers studying the correlation between pre-defined factors and criteria chosen by expert judgment. Still, the literature review could not find direct studies, that choose and apply a success model and compare the outcome of projects, based on the selected model, with a retrospective to the used model. Further investigation of the area is recommended for: Defining a success model or framework, that can be applied for various projects - especially for new product implementation, in automotive engineering launches [31-32] - can also predict future project success and provide a system to measure the model's efficiency and, therefore, the project success.

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