

Measuring Project Outcomes: A Review of Success Effectiveness Variables

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Abstract

The main objective of each project is to be successful. The field of project management is directly related with project success. At least for five decades the project evaluation was determined by meeting three criteria (time, cost, quality). Many researchers suggest that success can't be accessed only through the three criteria, since project success is more complex. Do the owner, developer, contractor, user, general public see the project with the same dimensions of success? The success criteria vary from project to project since we have different types with different people. In project assessment we may need a multidimensional approach due to project complexity differences that will also take under consideration the project effectiveness variables. The paper reviews the appropriate management models that include key elements of measuring project success and project effectiveness that can both be outcomes in a project.

Keywords: complexity, project management, project success, effectiveness, project success model

Introduction

There is no single uniform measure for project success. As referred the term of success covers a broad area and is not easy to be defined (Morteza & Kamyar, 2009). We don't definitely know if the dimensions of success differ between different project types and what dimensions should we add for more complex projects. When a project deemed successful is based on specific success factors. Those factors might not be the success factors in another one. Morteza & Kamyar, (2009) also mentioned that what appears to be accepted in one project may have the opposite effects in another project. By a short historical review the last five decades we can see that project success is specified by meeting the time, cost and quality criteria.

In the 1960's the measures of project success it was just on a finishing and operational basis. Most of the earlier studies (1980s) which were concerned, being determined on a basis of time, cost and quality.

A Review of Project Success - Effectiveness Dimensions

Project effectiveness is usually referred as project success in most of the Project Management literature. Project success has attracted the attention of many researchers over the past years. As defined from Wikipedia, the free encyclopedia, success is "a level of social status, achievement of an objective, the opposite of failure". There is no uniform measure to what constitutes project success or project effectiveness.

Cohen and Bailey (1997) introduced an approach that includes various outcomes that are important in organizational settings. The effectiveness dimensions may include: (1) performance effectiveness, (2) member attitudes, and (3) behavioral outcomes.

Shenhar, Levy, & Dvir (1997) arrived to the conclusion that project success should be assessed along at least the four dimensions of project efficiency, impact on the customer, direct and business success, and preparing for the future.

Poli, Cosic & Lalic (2010) has researched whether certain combinations of project structure/type projects lead to project success. They base their research on Shenhar, Levy, & Dvir (1997) project success dimensions and measures.

Gemunden, Salomo & Krieger (2005) define project success along the dimension of triple constraints (time, budget, quality), the internal success dimension (technical success, competency gains, meeting target cost of new product) and external success dimension (financial success, meeting the market shares, image gain, and meeting the regulatory requirements of the new product).

Poli, Cosic & Lalic (2010) define that one of the key elements for project managers to achieve the project success is to choose the project structure which will be appropriate for their project and not one matrix for each project.

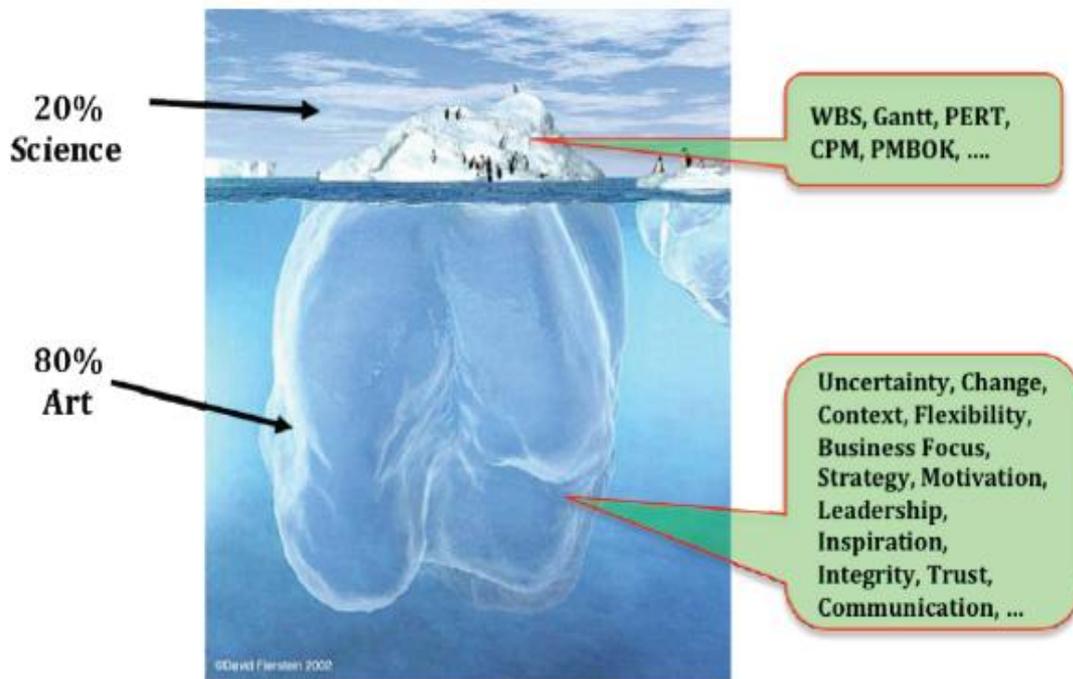
In Prabhakar's (2008) literature review of the project success term, one can distinguish the work of Baccarini (1999) in differentiating success factors that facilitate success from success criteria that evaluate it, and are composed of two components, ie: 1) Project management success (time, quality, stakeholder satisfaction) and 2) Product success (meeting strategic organizational objectives - goal, satisfaction of user needs - purpose, satisfy stakeholders related to product - customers/users), and in highlighting the following characteristics of project success: 1) PM success is subordinate to Product success, and 2) PM success influences Product success, and 3) PM success is affected by time.

From the literature review we can easily see a concentration specific success dimensions. The following table shows that the efficiency project management variables (cost, time, quality), have been over-researched. New variables start to appear mostly from the model research work that still need to be validated further in different types of projects, different organizational and cultural settings. Research is limited in the human dimensions (creativity, satisfaction, social connectivity, knowledge).

Table 1: Project success dimensions

Dimensions	Author(s)
Cost, time, quality, efficiency, performance, technical success	Atkinson (1999); Chan and Chan (2004); Shenhar, Levy, & Dvir (1997); Dweiri (2006); Pocock et al., (1996); Pinto and Pinto, (1991); Belout, (1998); De Wit, (1988); Lim and Mohamed, (1999); Lim and Mohamed, (1999); Baccarini (1999), Chua, Kog & Loh (1999); Gemunden, Salomo & Krieger (2005); Blindenbach-Driessen (2006); Al-Tmeemy et al. (2010)
Safety, Operation, Utility	Chan and Chan (2004)
Satisfaction	Chan and Chan (2004); Patanakul and Milosevic (2009)
Resource productivity, Organizational learning, time-to-market, Personal growth	Patanakul and Milosevic (2009)
Impact on the customer, Direct and business success, Preparing for the future	Shenhar, Levy, & Dvir (1997)
Competency gains, Financial success, Meeting the market shares, Image gain, Meeting the regulatory requirements of the new product	Gemunden, Salomo & Krieger (2005)
Participants' satisfaction	Pocock et al., (1996)
Satisfaction of interpersonal relations with project team members	Pinto and Pinto, (1991)
Stakeholders' satisfaction	Belout, (1998); De Wit, (1988); Lim & Mohamed, (1999); Baccarini (1999)
Client satisfaction	Lim and Mohamed, (1999)
Project management process	Baccarini (1999)
knowledge	Blindenbach-Driessen (2006)
Team creativity	Leenders et al. (2003)
New ideas, methods, approaches, inventions or applications	Kratzer et al (2005)
Research publications and patents	Mote (2005)

The science of project management knows 20% using tools and the other 80% require further research. Shenhar (2012) used an iceberg (figure 1) in order to show the lack of investigation and a lot of research needs to be carried out especially in the unknown variables that are related to the bottom of the iceberg.



Source: Shenhar (2012) http://projectmanagement-academy.com/spl/downloads/articles/What_is_SPL_Shenhar.pdf

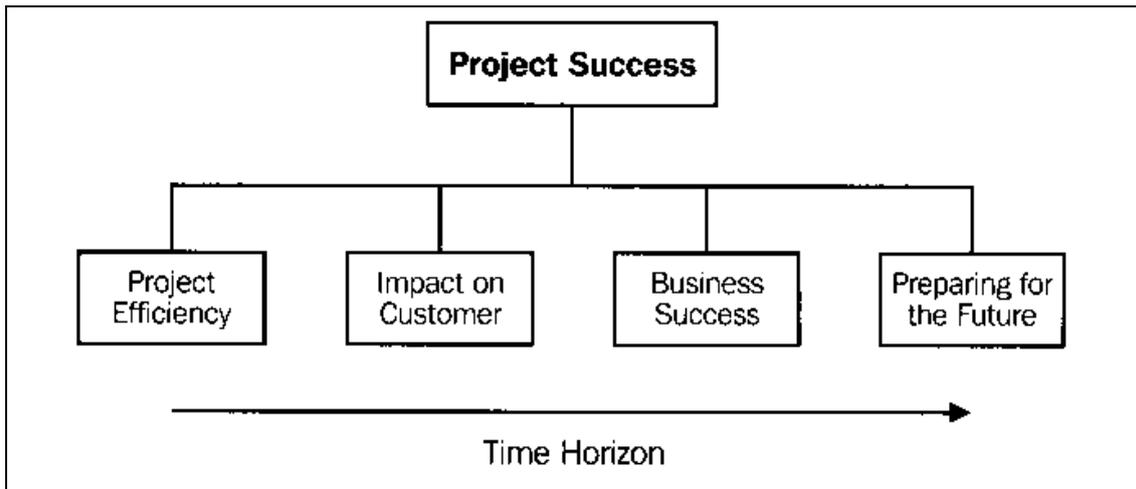
Figure 1: The art & science of project management

Success Criteria

There are several success criteria that have been studied in order to state the issue of project success the previous decades. Chan et al. (2002) have addressed that the time, cost, and quality criteria are used years to assess the success of construction projects. According to Atkinson (1999) these three criteria form "the iron triangle". It is considered very crucial for project success the strategic project management (Rodrigues and Bowers, 1996).

It is known that researchers (Pocock et al., 1996) are begun moving to new success measures (like participants' satisfaction) and moving forward from the traditional model of measuring success. For Shenhar et al. (1997) these three criteria are not homogenous dimension. Alarcon et al. (1998) also claimed for these three criteria (time, cost, quality) that are not suitable for ongoing improvement.

In the previous decades there were several researchers that had been studying and trying to introduce project success models. Shenhar et al. (1997) in an attempt to move on a multidimensional and escape from the traditional way in assessing project success introduced four discrete dimensions and incorporated them within time frame (short-term goal, medium-term goal, long-term goal and very long-term goal).



Source: Based on Shenhar et al. (1997)

Figure 2: The four dimensions of project success

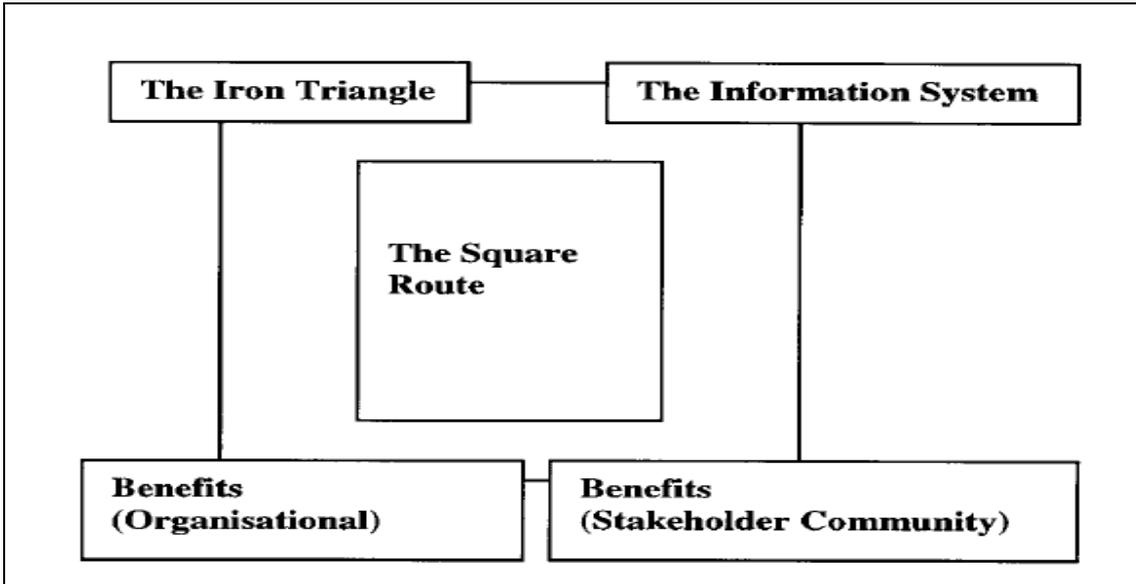
In the above Figure 2, Shenhar (1997) illustrated the four dimensions (project efficiency, impact on the customer, business & direct success and preparing for the future) and how project success assessment is changing within time frame. For the first dimension (project efficiency), the assessment can be done within three key success factors (meeting time, completing budget and met other requirements goals). The second dimension concerns the impact on customer requirements and can be measured medium-term frame when the project has been executed (meeting functional performance, meeting technical specifications & standards, favorable impact on customer, customer's gain, fulfilling customer's needs, solving customer's problem, customer is using product, customer expresses satisfaction). The third dimension (business and direct success) can be applied in the long-term when the project gains commercial recognition, market share and profits. The last dimension (preparing for the future) can be measured after very long-term.

Atkinson (1999) divided the project in three stages:

- The delivery stage "doing things right".
- The post delivery stage "getting it right".
- The post delivery stage "getting them right".

The first stage (the delivery stage) measures the process criteria (cost, time, quality, efficiency) and focused on doing things right. The second stage (the post delivery stage) measure the system criteria (from project manager, top management, customer client, team member) that concern benefit to stakeholders which are involved with the project. The third stage (the post delivery stage) measures the benefits criteria.

According to some writers that had been evolved with the progress of project management success, Atkinson (1999) developed the following figure (The Square Route) in order to understand the success criteria.



Source: Based on Atkinson (1999)

Figure 3: The Square Route

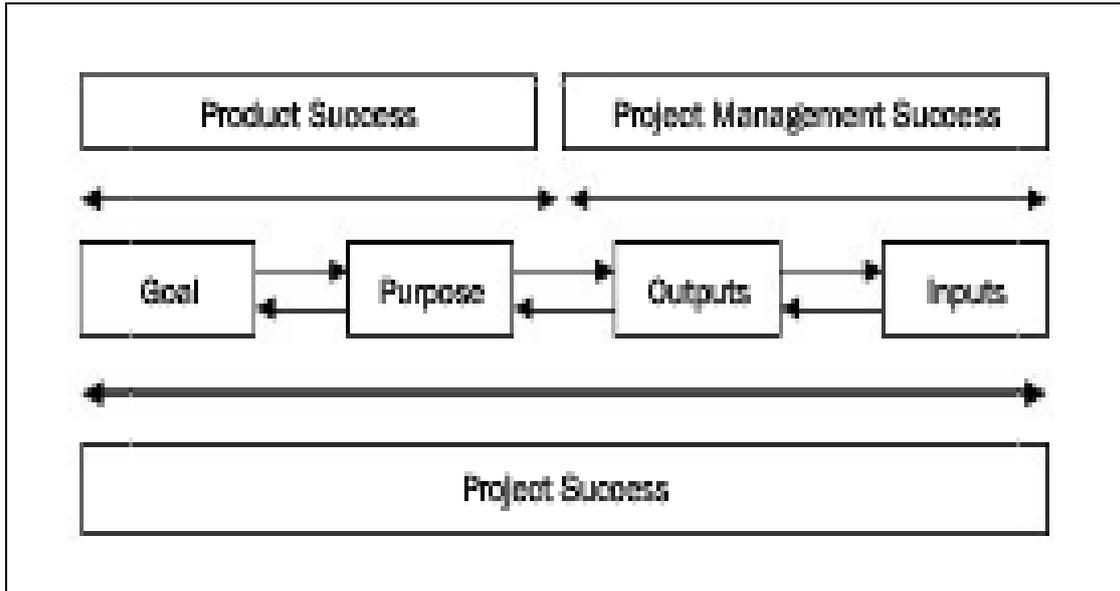
In order to understand the four success criteria of the Square route figure, Atkinson (1999) offered the following table with the analysis of the four success criteria.

Iron Triangle	The information system	Benefits (organisation)	Benefits (stakeholder community)
Cost	Maintainability	Improved efficiency	Satisfied users
Quality	Reliability	Improved effectiveness	Social and
Time	Validity	Increased profits	Environmental impact
	Information-quality use	Strategic goals	Personal development
		Organisational-learning	Professional learning, contractors profits
			Capital suppliers, content project team, economic impact to surrounding community.
		Reduced waste	

Source: Based on Atkinson (1999)

Figure 4: Square Route to understanding success criteria

Baccarini (1999) has applied the logical framework method (LFM) in order to define the project success. The logical framework method assists to reflect a hierarchy of project objectives (goal, purpose, outputs, and inputs). In figure 5 Baccarini (1999) proposed that project success composed from two components. The first one is product success and the second is project management success. The first component (product success) deals with goal and purpose while the second one (project management success) deals with outputs and inputs.



Source: Based on Baccharini (1999)

Figure 5: Link between logical framework methods (LFM) and project success

Blindenbach-Driesen (2006) has made an important distinction between project success and project management success. According to Blindenbach-Driesen (2006) the following proposed model consisted of two constructs (project success and market success) as referenced in Al-Teemy et al. (2006). The first construct is project success and related on how the project management is applied while the second construct is related with the market success effectiveness.

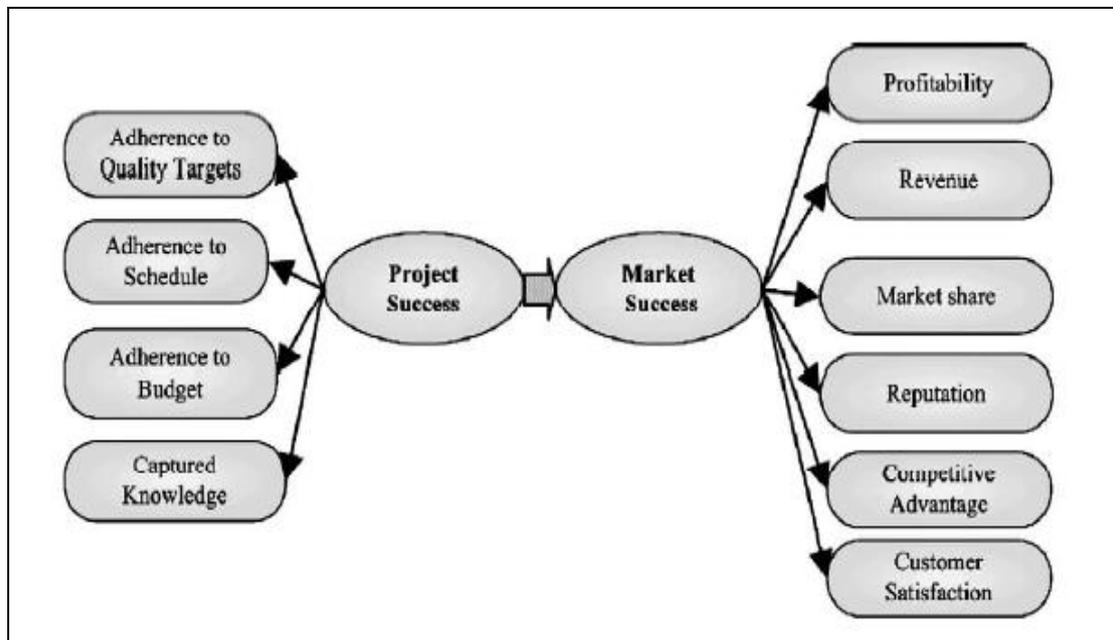


Figure 6: Theoretical performance model adapted from Al-Teemy et al. (2006)

Al-Tmeemy et al. (2010) have introduced a framework for the evaluation of project success having as ultimate aim the success of the short and long-term goals of the companies for building projects. The research aimed to add information from 13 success criteria (Cost (C), Time (T), Quality (Q), Safety (S), Achieving Scope (AS), Customer Satisfaction (CS), Technical Specifications (TS), Functional Requirements (FR), Market Share (MS), Competitive Advantage (CA), Reputation (R), Revenue and Profits (RP) and Benefit to Stakeholder (BS). From the added information of the research revealed the following categorization in three components that the criteria divided:

- Project Management Success (Cost (C), Quality (Q), Time T));
- Product Success (Customer Satisfaction (CS), Technical Specifications (TS), Functional Requirements (FR));
- Market Success (Revenue and Profits (RP), Competitive Advantage (CA), Market Share (MS), Reputation (R)).

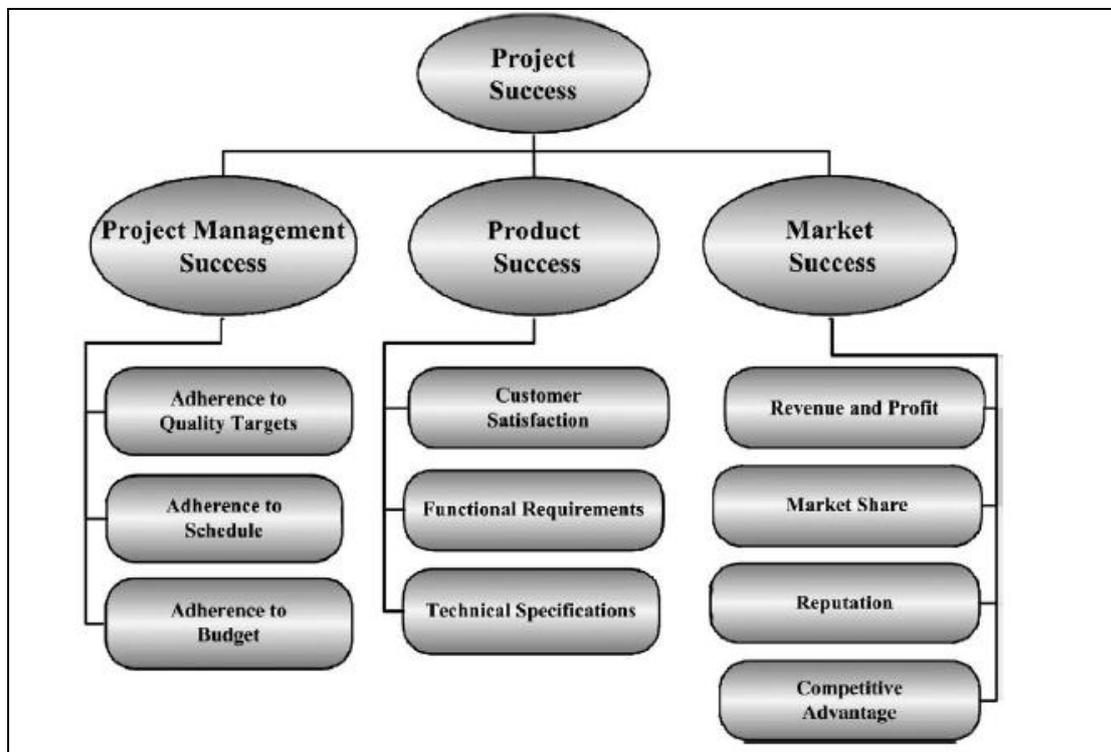


Figure 7: Success criteria for building projects adapted from Al-Teemy et al. (2006)

The majority of the above mentioned models have failed to align the success criteria with the company's success in the long-term. The Project Excellence Model (figure 8) is the most promising direction in achieving project goals.

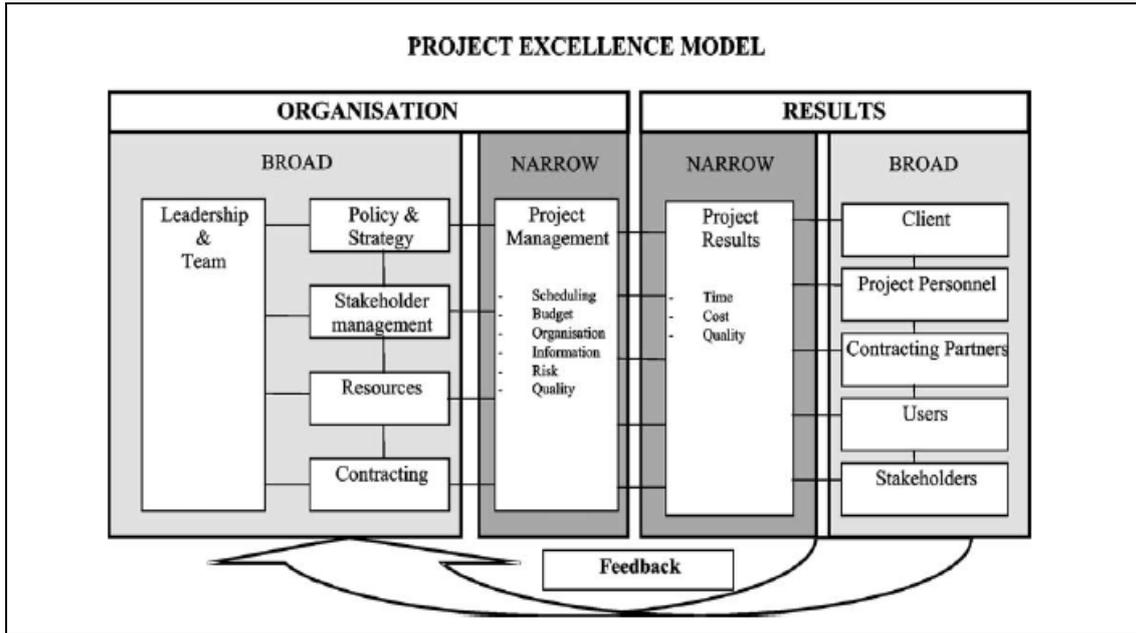


Figure 8: The project Excellence Model adapted from Westerveld (2006)

The Project Excellence Model consists of 12 areas (six areas cover project success criteria and six organizational areas cover critical success factors) that play a key role in managing a project and is based on the EFQM (European Foundation of Quality Management) model. Five different project types are used in order to describe the project. The project goals and the external factors of the project must fit, for the success of the choices which have been made on the organizational areas.

Models and dimensions of success

It is clear that the term success is not being understood the same way by all researchers and practitioners. It is also clear that the CSF (critical success factors) methodology developed by Rochart (1979) was used as a strategic tool for the identification the dimensions of project success from the practitioners.

In Belassi & Tukel (1996) we can trace a review of all the studies and the relevant CSFs by that time that proves the strength of the used methodology in time.

Abdullah et al (2010) in a comprehensive up-to-date literature review of the subject area suggest that the definition used by Baccarini (1999), in achieving project's goals and objectives, is the most acceptable one for the term. They provide a list of project models and project dimensions for success as following:

Models of success

Project Excellence Model (Westerveld, 2003)

Project Management Assessment Model (PMPA) model to assess quality

Management, (Bryde, 2003)

The concept of KPI framework of success criteria was introduced. The objective measures used mathematical formulae to calculate the value of project success. Subjective measures the stake holder's opinions and judgments Chan and Chan (2004; cited by Lam et al., 2007)

Project Success Index (PSI) used to benchmark the performance of the design and build (D and B) project. Cost, time, quality and functionality are the principal success criteria for D and B project Lam et al. (2007)

Project Management Consultant (PMC) model with 12 underlying PMC success factor and 5 important criteria in assessing PMC performance Nitithamyong and Tan (2007)

Dimensions of success

(a) The period during project execution, (b) upon completion of project, (c) after project is delivered to clients and (d) assessment after 1-2 years, continued by 3-5 years after completion of project (Shenhar et al. , 1997, cited in Chan and Chan, 2004)

Efficiency on the implementation process measured by the performance of the project team (schedule, budget, meeting technical goals and working relationship) (Pinto and Mantel, 1990)

Confirm the important of management (success) dimensions with time, cost and quality impact developments project (Diallo and Thuillier, 2005)

Four distinct points were identified as the major dimension for project success: "(a)Project Efficiency; (b) Impact on the customer; (c) Direct business and organisational success; (d) Preparing for the future." (Shenhar et al, 2002:699)

Conclusions

In the previous decades the project success was connected with three variables: cost, time and quality. New variables start to appear mostly from the model research work that still need to be validated further in different organizational and cultural settings. Research is limited in the human dimensions (creativity, satisfaction, social connectivity, Knowledge).Shenhar et al. (1997); Atkinson (1999); Baccarini (1999); Blindenbach-Driessen, EndeD. (2006); Al-Teemy et al. (2006) attempted to make important improvements for the measuring of project success and moved away from the traditional way. Although there has been a significant effort to improve the traditional way of measuring project success criteria there is still a growing need for a management model to cover the insufficient areas of the iceberg. The Project Management Excellence Model was developed to cover to a have a better look in the unknown areas of the iceberg but there is a lot of work on what needs to be measured.

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