Generic Project Success and Project Management Success Criteria and Factors: Literature Review and Survey

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Abstract

This paper covers a thorough literature review on "Project Success" and "The Generic Project Success Criteria and Factors". In recent times, it has become a common belief that project success is defined by meeting the time, cost and quality requirements of organizations. However, there are some important project success criteria (PSCs) and factors (PSFs) which often get neglected when it comes to evaluating a project. The results of a survey, conducted by the researchers, show that to the contrary of what is mentioned in the literature, "Top Management Support" turned out to be the most important measure of project success. "Time" and "Quality" and their process, on the other hand, were not considered as critical success criteria. In fact, a controversial discovery is that some so called project success factors could potentially be considered as criteria for evaluating projects. This paper suggests the necessity of further investigations on the discrepancy between theoretical project success criteria and factors and those considered important in industry. In fact, the paper's authors believe that this controversy occurs because projects' stakeholders have different definitions of project success. Moreover, the survey presents a balance between the numbers of respondents who believe that project success is deemed project management success and the respondents, who consider that this is not necessarily true.

Keywords: Project Success, Project Success Criteria, Project Success Factors, Project Failure

1. Introduction

1.1. Success

There are a wide range of definitions of the term "Success". Success is perceived differently by different stakeholders. It plays out in various ways across states, communities, and population subgroups since there is a large diversity of people with different ideas. In fact, the definition of success is so broad that its meaning differs from one specific branch of science to another. Thus, success is not easily defined or determined. As suggested by Meredith & Mantel [1], what appears to be a failure in one project might be a success factor in another one.

1.2. History of Project Success Research

The search for critical success factors has been taking place for more than four decades, focusing on diverse alternatives. The first studies on project success factors, which are now the basis for defining project success factors, were demonstrated by a number of researchers ([2], [3], [4], [5], [6], [7] and [8]).

1.3. A Successful Project

Similarly to what has been mentioned before, there is a remarkable difference in the perception of the meaning of "success" in the minds of people who evaluate project performance. Project managers, system analysts, sponsors and users all have a specific definition of "project success". Some researchers such as Dvir et al. [9] believe that a project is deemed successful when it meets budget and schedule constraints even though it may not have met factors such as customer needs or achieved a quality commercialization process of the final product.

1.4. Project Success Classifications

Some researchers have recently created some categorizations for project success factors, giving them different terminologies as follows.

1.5. Project Success Criteria Versus Project Success Factors

Baccarini [10] classified project success-related factors into two groups: "Project Success Criteria" (PSCs) and "Project Success Factors" (PSFs). He demonstrated that it is of importance to differentiate between these two groups. More specifically, he stated that success criteria are used to measure success whilst success factors facilitate the achievement of success. This statement has been confirmed by some other researchers and it is has been strongly emphasized by Turner [11].

1.6. Project Management Success Versus Product Success

Baccarini [10] stated that project success criteria consist of Project management success and Product success. Baccarini [10] also mentioned that Project management success covers meeting time, cost and quality objectives. On the other hand, product success deals with the ability of the project's final product to meet the project owner's strategic organizational objectives; satisfaction of users' needs and satisfaction of stakeholders' needs where they relate to the product. In a subsequent study, Collins & Baccarini [12], discovered a positive relationship between project management success and product success.

1.7. Project Success Versus Project Management Success

A distinction has been made between project success and project management success by some researchers. De Wit [13], Munns & Bjeirmi [14] and Cooke-Davies [15] clarified that project success is measured against the overall objectives of the project while project management success is measured mostly against cost, time and quality (so-called performance). Moreover, Cooke-Davies [15] commented that delivering project success is necessarily more difficult than delivering project management success since it involves second order control.

1.8. Ambiguity

According to the classifications concerning project success factors, which have been discussed above, there is no doubt that a project success factor, which is taken into account by many researchers, might be interpreted differently by other researchers. For example, "Time" could be introduced as a project success criterion by one researcher and considered a project management/product success factor by another. In fact, these problems occur when there is no united definition of project success among different stakeholders of a project. It is important to bear in mind from whose eyes a project is to be defined as successful.

1.9. What is considered as a Project Success Factor/criterion?

Similar to the definition of success, PSFs are not universal for all projects since different projects and different people prioritize different sets of success factors. PSCs also vary from project to project and what is acceptable in one project without impact on perceived success is deemed an abject failure in another project. For instance, taking a week delay in an IT project to ensure the objectives are achieved may have a minor impact for this project in terms of success. However, this delay might be a disaster in building a function centre, which is supposed to be undertaken before its opening day.

2. Generic PSCs and PSFs

Some PSFs seem to be more significant than others. These criteria and factors are generic and can influence most types of projects including construction, IT, R&D and so forth. Below, some of these generic criteria and factors, which are mentioned by the most number of references, are discussed. For convenience and to avoid repetition of some researchers' names, merely one reference has been addressed for each factor as an example. For more information, the summary of the literature review is presented at the end of this section in table 1.

2.1. Time

More than half of the references (30) (i.e. [16] and [17]) demonstrated "Time" or "Schedule" as one of the most important project success criteria for any project. Time has been addressed as a criterion by which to evaluate a project's degree of success. It has also been mentioned as a factor, which can help the other factors/criteria be met. It is found in this study that the definition of “Time” is of great importance. "Time" as the date when a project is most likely to end can be a criteria, but "Time" as a manageable component might be considered as a factor.

2.2. Cost

Without a doubt, every project is dependent on its cost or budget. Cost has been addressed by many researchers (i.e. [18]) as a very important success criterion, where as having an intellectual budget plan and proper cost estimation have been mentioned as prominent success factors in some studies. However, Procaccino et al. [19] stated that a software project does not necessarily have to be within budget. Therefore, IT projects might be exceptions in this case.

2.3. Quality

Quality, whether it concerns the product or process, has been considered as both a project success criterion and factor by a variety of researchers. Some researchers (i.e. [20]) named it quality performance and considered it as a major project success criterion. In addition, some other researchers (i.e. [21]) addressed quality as a criterion under the name of product's quality. On the other hand, some researchers such as Collins & Baccarini [12] considered quality management process as a project success factor, which facilitates the success of other criteria and factors.

2.4. Project Control

Time, cost and quality are usually grouped together and known as the "Project Control Mechanism." This is because they allow a project manager or project team to monitor and control the project, leading it to success. In fact, “Project control”, which is introduced by some researchers as a project success factor (i.e. [22]), directly controls and monitors some key project success criteria such as the Project’s Time, Cost, Quality, Change and especially Scope.

2.5. Project Scope

According to (PMBOK [23]), "The preparation of a detailed project scope statement is critical to project success”. Scope, as a measurable concept, has been considered as either a criterion or factor. In fact, a project scope with clearly defined goals and objectives has been verified as a dimension for project success by some researchers (i.e. [24]). Agarwal & Rathod [25] considered it to be the most important criterion in a software project's success. Collins & Baccarini [12], on the other hand, considered a rigorous scope to be a factor which is necessary for meeting the owner's needs and thus achieving success.

2.6. Project Change

Change, which directly influences project scope, goals and consequently project planning, has been highlighted by researchers like Dvir & Lechler [26] as they have called it “Everything” for a project. Scope change through a mature scope change control process is also considered as a project success factor by Cooke-Davies [15].

2.7. Stakeholders’ Satisfaction

Undoubtedly, stakeholders, whether they are directly or indirectly involved in projects and have different views about success, play crucial roles in every project. Stakeholders' satisfaction, both internally and externally (including clients, customers, contractors, managers, etc), with the final product as a project success criterion is given special importance by almost all researchers (i.e. [27] and [28]). It is worthwhile to note that stakeholders' satisfaction is sometimes paraphrased as satisfying stakeholders' needs or meeting stakeholders' expectations. According to some researchers (i.e. [29]), stakeholder satisfaction is the most important success criterion in IT projects. There is a controversy over the measurability of stakeholders’ satisfaction. Nevertheless, most of the researchers including Collins & Baccarini [12] consider this term as a measurable project success criteria.

2.8. Project Team

In all projects almost all activities are dependent on human resources. In other words, it is fast becoming accepted wisdom that it is people who deliver projects and indeed people, who are directly involved in a project, facilitate achieving project goals and consequently "Project Success". A project team and its members are a key part of the human resource list of a project. Different researchers (i.e. [30]) have introduced some project success factors, which are all related to having a competent project team.

2.9. Top management support

Project management is deemed of high importance in project success. Some of the project management related success factors have already been introduced above. However, the most important factor was

introduced as “Top management support” (i.e. [31] and [32]).

2.10. Resources Availability

Some researchers (i.e. [33]) stated that one of the most important factors in project success is the availability of resources, including material and human resources, to ensure that there are sufficient resources for a project and that the resource allocation can be effectively applied to the project.

2.11. Project Contracts

Contracts, which are mainly applied for project procurement aims, can be cunningly designed for a project to facilitate the project execution and help the management optimize the cost of the project. A series of contracts which encourage the various specialists to behave as a team without conflicts has been considered as a project success factor by researchers such as Lester [22] and Phua [34].

2.12. Project Risk Management

A Project Risk Management plan is defined as a success factor by some researchers such as Verner, Evanco & Cerpa [35]. This document can cover a diversity of risk management aspects of a company such as market share price fluctuations, executive risks, technical risks and so forth. A Project Risk Management plan, if provided by the companies and organizations, can be measurable in terms of how accurate the possible current and future project risks are addressed in the document and how effective the risk management plan is.

2.13. Other project success criteria and factors

There are some other issues, which are sometimes considered as either a criterion or a factor. These issues are “Project size”, “Learning capability”, “Business opportunity”, “Market impact”, “Safety”, “Technical specification” and “Environmental impact”.

In summary, table 1, which is the result of the researchers' literature review, presents the generic “Project Success” criteria and factors from 56 references. According to the literature, the most important project success criterion is time, which stated by 30 references. Time is followed by cost (29), stakeholder's satisfaction (24), quality (24) and project management (12) respectively.

Factors / References	Time	Cost	Stakeholders Satisfaction	Quality	Top Management Support	Project Team	Scope	Project Contracts	Project Risk Management	Resource Availability	Project Control	Project Change
Cooke-Davies [15]	√	√		√	√	√	√		√			√
Young [36]	√	√	√	√			√		√		√	
White & Fortune [37]	√	√		√	√	√			√	√		
Slevin & Pinto [38]	√	√		√	√	√				√		
Westerveld [28]	√	√	√	√		√		√				
Nguyen, Ogunlana & Lan [30]	√	√	√		√	√				√		
Ashley [39]	√	√	√	√		√						
El-Saboni, Aouad & Sabouni [40]	√	√	√	√								√
Ahadzie, Proverbs & Olomolaiye [18]	√	√	√	√								
Ashley et al. [41]	√	√	√	√								
Chua et al. [42]	√	√		√				√				
Collins & Baccarini [12]	√	√	√	√								
Kerzner [43]	√	√	√	√								
Armstrong [44]	√	√	√	√								
Lim & Mohamed [45]	√	√		√					√			
Lester [22]					√	√		√			√	
Thomas & Fernandez [46]	√	√	√	√								
Hartman & Ashrafi [33]	√				√		√			√		
Dvir et al. [9]	√	√						√				
Freeman & Beale [47]			√	√		√						
Dvir et al. [17]	√	√	√									
Hughes, Tippett & Thomas [20]	√	√		√								
Dvir, Raz & Shenhar [48]	√	√		√								
Linberg [49]	√	√		√								
Belout & Gauvreau [27]		√	√	√								
Ward [50]					√		√				√	
Paulk et al. [21]	√	√		√								
Rose [24]	√	√		√								
Munns & Bjeirmi [14]	√	√		√								
Chan & Chan [51]	√	√		√								
Sanvido et al. [52]						√		√				
Cleland & Gareis [16]	√				√							
Duncan & Gorsha [53]	√	√										
Arora [54]	√	√										
Phua [34]					√			√				
Iyer & Jha [32]					√							
Avots [3]					√							
Chung & Huda [31]					√							
Cooper & Kleinschmidt [55]		√										
De Wit [13]			√									
Dvir et al. [56]	√											
Lipovetsky et al. [57]			√									
Shenhar & Dvir [58]							√					
Shenhar [59]							√					
Agarwal & Rathod [25]							√					
Paolini & Glaser [60]			√									
Pinto & Mantel [61]			√									
Pinto & Slevin [62]			√									
Pinto & Slevin [63]			√									
Procaccino et al. [19]			√									
Procaccino & Verner [29]			√									
Verner, Evanco & Cerpa [35]									√			
Wateridge [64]			√									
Clarke [65]							√					
Shenhar, Dvir & Levy [66]			√									
Dvir & Lechler [26]												√
Frequency	30	29	24	24	12	9	8	6	5	4	3	3
Percentage	54%	52%	43%	43%	21%	16%	14%	11%	9%	7%	5%	5%

Table 1. "Project Success" Criteria and Factors: The References

3. Survey

A thorough survey has been conducted by the researchers in order to find the most important generic project success criteria and factors.

3.1. Questionnaire

To collect the required data a questionnaire was designed by the researchers to be sent to both professionals and academics by email. The questionnaire was a multi purposed set of questions, which comprised of 11 sections. All sections were designed to discover respondents' opinions about the generic project success criteria and factors. Some sections targeted one or two project success criteria and factors. Moreover, each section included some subsections. Table 2 presents the components of the questionnaire.

SECTION	NUMBER OF SUBSECTIONS	SECTION SUBJECT	SUBSECTIONS SUBJECTS	TARGETED PSC & PSF
1	6	Project Time	Activity Definition Activities Sequencing Activity Resource Estimation Activity Duration Estimation Schedule Development Schedule Control	• Time • Project Control
2	1	Project Cost	Cost Estimation	• Cost
3	3	Project Quality	Quality Plan Quality Assurance Quality control	• Quality • Project Control
4	3	Project Scope	Scope Plan Scope Definition Scope control	• Scope • Project Control
5	4	Project Plan	Clear Objectives Clear Project processes Project team member	• Top Management Support • Project Team
6	4	Project Communication	Communication plan Information Distribution Performance Report Stakeholders Management	• Stakeholder's satisfaction
7	3	Project Risk	Risk Management Planning Risk Identification Risk Monitoring and Control	• Risk management • Project Control
8	1	Project Change	Project Change Plan	• Project Change
9	2	Project control	Proper Project Control Troubleshoot	• Project control
10	3	Project HR management	HR Plan Acquire Project Team Manage Project Team	• Resource Availability • Project team
11	3	Project Procurement	Plan Purchases Plan Contracting Request Seller Reponses	• Project contracts

Table 2. The Questionnaire's structure

3.2. Questionnaire's Aims: Introducing Correct Project Success Management Definitions

As it is demonstrated, all of the project success criteria and factors introduced above were considered in the questionnaire. However, they were presented in various ways in order to attain the respondents' ideas from different perspectives. In each section, PSCs and PSFs were explained for the respondents so that they had a better understanding of the targeted issues. Researchers found this part very important since there is no unified definition of project success in industry. Let's target "Time" as a PSC.

- How do people think about time as one of the project success criteria?
- How do people think about time as one of the project management success criteria?

The general public usually believes that time as a project/project management success criterion merely means to finish undertaking a project on time. Is this the generic belief among all professionals? Basically, it might be critical for a contractor or managerial team to evaluate its time management success rate from the stage of defining a project's activities' duration up to the final stage of delivering that project on time. As such, for a contractor, time is considered as a project management success criterion.

In the designed questionnaire, the intention was to introduce all criteria's stages to the respondents so that respondents could contemplate more about the importance of i.e. time as a project management success criterion.

To facilitate the results analysis, all respondents were asked to answer the questions by means of numeric scales. They were asked to rank the importance of each PSC or PSF by means of scoring from 1 to 5. The scoring criteria are shown in table 3.

Rating	Score
Critical	5
Very Important	4
Moderately Important	3
Less Important	2
Ignorable	1

Table 3. Scoring criteria (The level of importance)

In addition to what has been discussed above, the second part of the questionnaire asked the respondents to express their opinions about the similarity between project success and project management success.

3.3. Cooperative Respondents

The questionnaire was originally sent to 384 individuals, including some PMPs, project management PhD students and some professionals, who are either involved or were involved in different projects as a project manager. Unfortunately, 44 people didn't receive the questionnaire since the emails were not successfully delivered. The targeted respondents are from different parts of the world such as Australia, USA, India and Great Britain. The respondents received the original electronic version of the questionnaire via email. Eventually, the researchers collected 65 responses from among all of these 340 individuals (19%).

According to the statistics, 39 respondents work in private sections, 18 in public sections, 4 in semi-public sections and 4 of them are involved in educational sections. Chart 1 shows the percentages of respondents and the industries they are involved in.

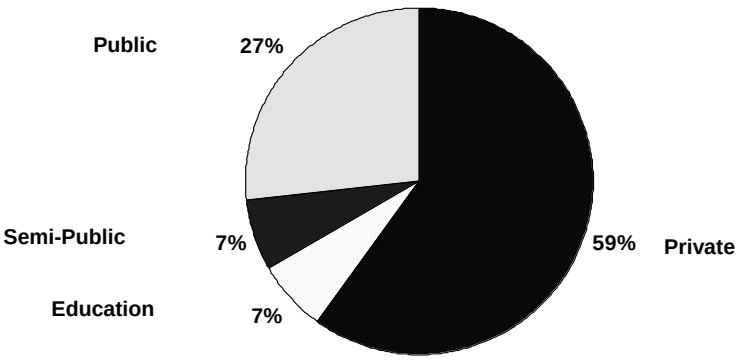

Figure 1. The respondents' industries

3.4. Survey Results

The results of the survey are presented in figure 2. It is shown that "Project control" was mentioned as a critical factor by 28 respondents, while 3 respondents considered it as an ignorable factor. The researchers received a very surprising set of answers from the respondents over the importance of some project/project management success criteria and

factors, which don't somehow agree with the literature. Table 4 indicates the relative importance of PSCs or PSFs to the respondents. In addition, the comparison between the importance of each of these 12 PSCs and PSFs in the literature review and the survey's results is presented in table 5.

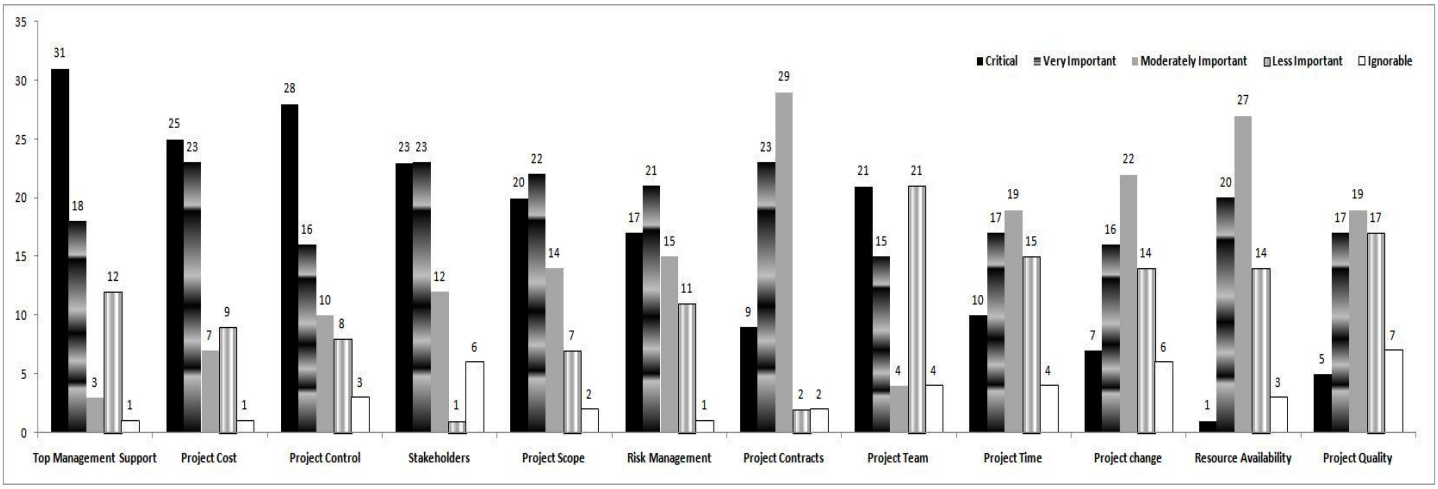

Figure 2. The Survey's results: The statistics

PSC/PSF	Score
Top Management Support	4.015
Cost	3.954
Project Control	3.892
Stakeholders satisfaction	3.862
Scope	3.764
Risk Management	3.646
Contracts	3.538
Project Team	3.431
Time	3.187
Project Change	3.062
Resource Availability	3.031
Quality	2.938

Table 4. Relative Importance of the most critical PSCs and PSFs: Questionnaire's results

The PSC/PSF	Ranking (Literature Review)	Ranking (Survey)	Difference
Time	1	9	-8*
Cost	2	2	0
Stakeholders satisfaction	3*	4	-1
Quality	3*	12	-9*
Top Management Support	4	1	+3*
Project Team	5	8	-3
Scope	6	5	+1
Contracts	7	7	0
Risk Management	8	6	+2
Resource Availability	9	11	-2
Project Control	10*	3	+7*
Project Change	10*	10	0

Table 5. A comparison between the survey's results and the literature review in relation to the importance of PSCs and PSFs

3.4.1. Project success criteria and factors

The information presented in Table 5 depicts unexpected findings concerning the importance of different project success criteria and factors. Some of these unexpected results will be discussed below.

3.4.1.1. Time

While the researchers considered that Time was the most important PSC, the results showed that Time is the 9th important one. It is important discuss this point. As mentioned previously, Time as a success criterion is deemed to be the completion time of a project, which should be close to the project plan. On the other hand, each project stakeholder has a different interpretation of time as a project success criterion. For example, a project manager might think of time as a time management procedure. When the researchers introduced Time in regards to the processes of activities, sequencing, duration estimation and schedule development, the respondents didn't feel that they should only think about the completion date of projects. Therefore, Time appeared less critical than usual.

3.4.1.2. Quality

According to the survey, similarly to Time, Quality was not addressed as an important project success criterion. In fact quality, which was believed to be the third most important project success criterion alongside stakeholders' satisfaction, was considered the 12th and least important factor by the respondents. The reason is related to the definition of quality as a project success criterion. Basically, quality has been introduced in the literature as either the quality performance or product's quality. This proves that there is no single definition of quality as a project success criterion. When quality was introduced to the research respondents as quality plan and quality assurance, they considered it as project quality management.

3.4.1.3. Project Control

Project control, which was completely ignored by many researchers, emerged as a very important project success factor according to the survey's respondents. In fact, project control was recognized by the respondents as a very crucial device to control time, cost, quality, risk management, change and scope of a project and has been considered as the third most important success factor.

3.4.1.4. Top management support

Ranked the first by the respondents, top management support, has been revealed as the most important project success factor while it was the 4th most important factor according to the literature. This shows how simply a very important project success factor can be ignored in comparison to the other criteria and factors.

3.4.1.5. Cost

Cost was one of the rare project success criteria which were found to be a very important project success criterion by both the literature and survey. Although cost was defined to the respondents as the project cost estimation process, the respondents unanimously supported the theory that cost is the second most critical criterion. This matches the results from the literature review.

3.4.1.6. Project Management Success Versus Project Success

Another important result of the survey was the discovery of the similarity between project success and project management success. The survey's results, presented in figure 3, show that 46% of the respondents believe that project success differs from project management success, while 43% of the respondents considered them as the same thing.

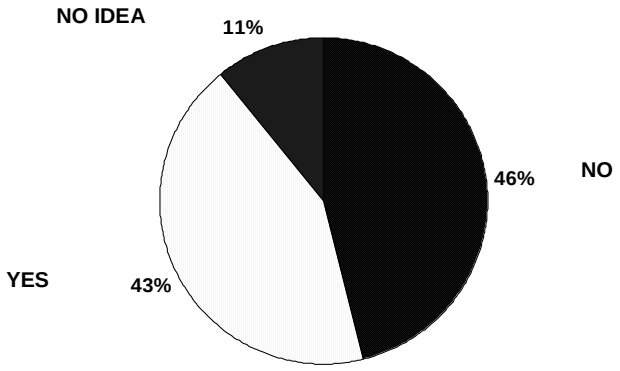

Figure 3. Is Project Success the same as Project Management Success?

3. Summary and Recommendations

This research proves that there is sometimes a major difference between what is recorded in literature and professionals' opinions over the importance of project success criteria and factors. While the literature review showed that time is the most important project success criterion, "Top management support" was the most important factor by the survey respondents. Moreover, the respondents believe that time, cost, quality, risk and finally scope control should be centralized under a general definition of "Project control", which was considered as a very important success criterion.

As a matter of fact, when the research respondents were told to state the three most important project success criteria, most of them mentioned time, cost and quality. However, when they were faced with the revised definition of time and quality in a project they didn't consider these two criteria more important than some other criteria like top management support or project control. Surprisingly, they noted that some project success factors should be considered as measurable project success criteria.

Another finding of this paper is that 43% of the professionals surveyed believed that project success is indeed project management success while 46% of respondents indicated that they are totally different.

As a result, it is concluded that there is an urgent need for research on the difference between these two topics and this should be undertaken in a variety of industries since the results could be surprisingly different.

To summarize, it seems that idea of considering a successful project when it merely meets the time, cost and quality purposes is now becoming outdated. This can be supported by Collins & Baccarini [12], who believe that time, cost and quality are not merely project success criteria and that there is an urgent need to educate project managers to consider criteria other than these three.

Thus, all researchers should realize that it is important to consider from whose eyes they wish to define success. It is very important not to generalize the definition of success to all project's stakeholders since success is perceived differently by different stakeholders. Therefore, it is somehow impossible to introduce a limited number of parameters as project success criteria to evaluate projects against. Indeed, according to the survey's respondents, taking some previously called "Project success factors" into account as criteria is necessary.

Nevertheless, there is still a major problem, which is how to quantify all project success criteria by means of a unified scale. This concept should also be investigated thoroughly in the future.

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