Causes of Change to Project Success Criteria: A Study Based on Project Management Practices in Norway

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Abstract

This paper contributes to the project management literature by means of an investigation into the causes of changes to project success criteria. A combination of open questionnaires and interviews are used in this study. The questionnaire results are based on information obtained from 145 informants who are working on projects in different sectors, including and not restricted to those of: construction, IS, software, public sector, consulting, production, and aviation. The interview results are based on information obtained from 16 informants selected from the respondents of the questionnaires. Around 85% of the respondents who have replied to the questionnaires indicated that project success criteria undergo change during the execution phase. These changes cause a loss of project focus and generate unwanted outcomes such as delays, unsatisfied users, and financial losses.

The study shows that changes to success criteria occur because of three reasons. The first reason is attributed to a poor managerial attitude toward project success; after being defined and accepted, success criteria are subsequently neglected. In simple terms, success criteria are not used for actively managing or supporting the project. Changes of this category occur due to a failure to establish and adhere to proper execution strategies according to these success criteria.

The second category of change occurs because of a lack of measurability or alignment of success criteria during the initiation phase. The final category of change occurs because of shifting boundary conditions that lie outside the control of the project management process. The results of this research are intended to help academics and practitioners identify the necessary competencies to develop and manage project success criteria in a more effective manner. This paper suggests and profiles these competencies in the conclusion.

Keywords: Project Success Criteria, Success Criteria Changes, Project Management Education

Introduction

During the last 25 years, there has been intensive research on project success criteria (Collins & Baccarini, 2004; de Wit, 1988; Jugdev & Müller, 2005; Munns & Bjeirmi, 1996; Turner, 2004; Wateridge, 1995; Ika, 2009).

Ika (2009) classified the research on project success into three categories: (1) research on project success criteria (or dimensions); (2) research on critical success factors; and (3) research on a hybrid category that bridges criteria and factors. It is now a well-established consensus in project management literature that the understanding of project success has changed over the years (Jugdev & Müller, 2005). The definition of success has progressed from definitions that were limited to the implementation phase of the project life cycle to reflect an appreciation of success over the entire project and product life cycle (Müller, 2005). There are now several models that describe and classify project success criteria along project time-line, stakeholder perspective, or according to project type and size (e.g., Baccarini, 1999; Lim & Mohamed, 1999; Shenhar, Dvir, Levy, & Maltz, 2001; Lipovetsky, Tishler, Dvir, & Shenhar, 1997).

It was first de Wit (1988) who suggested a distinction between project success and project management success. Project success embodies the perceived value of the project when the result or product is in operation. Project management success, on the other hand, is considered the ability to comply with time, cost, and scope requirements. These triple constraints are called, in the literature, the "golden triangle" and are concerned with the efficiency of the performing project organization (Atkinson, 1999). Project management success is also referred to as the narrow view of success (Westerveld, 2003). Similar distinctions were suggested by Baccarini (1999), who also distinguished between project management success and product success. Product success measures the benefits of the project's final product. Lim and Mohamed (1999) made the distinction between micro and macro success. The micro perspective refers to the success perceived by the contractor or performing organization and the developer during the implementation phase. The macro perspective refers to the success appreciated by other stakeholders and users over the entire life cycle. Shenhar et al. (2001) expanded the definition of success to include four distinct success clusters: (1) project efficiency, which is similar to project management success; (2) benefits to the customer; (3) direct business and organizational success of the performing organization; and (4) preparing for the future. The last three clusters measure the short- and long-term impact of the deliverables, or the result on the customer and the performing organization.

The connection between the different clusters of success has also been examined. According to Ika (2009), project management success may ultimately lead to project success, but the opposite is not true. Failure in project management may lead to project failure, except under casual circumstances. Shenhar et al. (2001) mentioned several examples of projects that were not delivered within time, cost, and scope constraints, but were still perceived as successful

projects because they delivered value for the owner, for example, the Sydney Opera House or the introduction of the Windows operating system. The project can also fail despite successful project management. This is because project success is affected by many other factors outside the direct control of the project organization. The Xerox Alto machine (the first computer designed for individual use) is an example of this category (Smith & Alexander, 1999). Project management success is therefore neither a necessary nor a satisfactory condition for project success. Munns and Bjeirmi (1996) asserted that failure of project management must be very extreme to cause project failure. It is now accepted that there exist clusters of project success. The individual project success criteria that exist in these clusters might differ between projects depending on stakeholder expectation, or on certain project characteristics such as uniqueness and complexity. The relative importance of success clusters is not defined yet in project management literature. Lipovetsky et al. (1997) showed that customer satisfaction is by far the most important criterion, almost twice as important as efficiency (project management success). The importance of the other two clusters, commercial success and future potential, was almost negligible. The importance of the criteria within each cluster has not yet been fully examined. Müller and Turner (2007) indicated that time and quality rather than time and cost are the two most critical project objectives for information technology (IT) projects.

The term "success factor" is well defined and extensively covered in project management literature. It refers to a set of conditions to which the project must adhere in order to achieve success. Initial research concerned with critical success factors of a project focuses primarily on the control aspects of projects. Pinto and Prescott (1988) demonstrated that the relative importance and significance of success factors will vary according to the project life cycle stage. They have further shown that critical success factors of project management fall into two distinct

sub-groups: those related to initial project planning and those concerned with subsequent tactical operationalization.

Munns and Bjeirmi (1996) attributed project success to the level of involvement and commitment of the client since they experience the longer term and wider benefit. Belassi and Tukel (1996) developed some important relationships between success criteria and factors. For example, they asserted that a manager's skill and communication between the team members becomes critical when time is a primary driver in achieving project management success. Dvir and Lechler (2004) observed that tactical issues become dominant as the project progresses if the 'internal' success measures are employed in adhering to budget, schedule, and performance goals. On the other hand, when "external" success measures (perception of project value and client satisfaction) are employed, front-end planning factors dominate tactics throughout the project's life cycle. Westerveld (2003) introduced the project excellence model that links project success criteria to success factors. It distinguishes between narrow and broad criteria and factors.

Although research on project management success criteria is plentiful, research concerned with changes to success criteria during the implementation phase and the impact of these changes on the overall performance is nevertheless scarce. Hartman (2000, p. 22) mentioned the variability of stakeholder expectation, and stresses that stakeholder's expectations routinely change during the project without an explanation of the underlying reasoning. The consequences and causes of change to project plan and objectives are however discussed in Dvir and Lechler (2004). In their study, they attributed change mainly to the inability of the performing organizations to meet existing requirements within the available budget and time, or change in the circumstance that impact the specification of the project end-product.

This paper contributes to the literature of project management with regard to project success criteria by investigating and categorizing the causes that engender change to these criteria during execution phase. The results of this research are intended to help practitioners better understand the challenges associated with the definition and management of project success criteria. Further, it should help academics to define the types of competencies in terms of knowledge, range of skills, and attitudes that should be considered or needed in teaching or developing lessons about the subject of project success criteria. The rest of the paper is structured as follows. First, it provides a description of the methods used to collect data. Then, the findings from the questionnaires and interviews are summarized. In the discussion section, the findings are compared with the best practice described in project management literature. In addition, major challenges associated with defining and managing success criteria are outlined. Finally, the conclusions and recommendations summarize the competencies needed in order to address these challenges.

Method

The method adopted in this research uses a combination of written questionnaires and interviews. A preliminary investigation of project success criteria in Norway was conducted by Hussein, Ramazany, and Hajikazemi (2011). The preliminary investigation used a sample of 54 responses from written questionnaires. The preliminary investigation revealed that mainstream projects are managed using an incomplete set of success criteria. It further revealed that projects are poorly initiated and focus only on narrow operational goals and that they are subject to change. This research builds from the results of the preliminary investigation and focuses on examining the scope of change to project success criteria and identifying reasons for changing success criteria in projects. The paper also outlines, in general terms, the required competencies

to manage the cause of such change. A full investigation and analysis of the instructional methods that are necessary to endow these competencies will be the subject of future research. The current research includes the following tasks:

- Explore the scope and reason of changing success criteria in the mainstream Norwegian project management practice. This study is therefore not directed at a specific sector or industry, but examines Norwegian project management practice in general. It includes respondents from both project driven and non-project driven organizations.
- Examine how project success criteria are identified in the early project phase and determine the degree of associated emphasis in the case projects. Compare this practice with the recommended best practice in the literature.
- Outline a profile of skills, knowledge, and attitudes that are needed in order to align the current practices of defining and managing success criteria with the recommended best practices.

The research methodology connotes the three aspects of validity, reliability, and generalizability (Crowther & Lancaster, 2009, p. 126). Generalizability measures the extent to which results can be generalized to other situations. Reliability relates to the extent to which a particular data collection method provides the same results on different occasions. Validity relates to the extent to which the research method measures what it is supposed to measure. In order to enhance validity, only informants that had relevant experience of the problem of the research were selected. The information provided by informants, therefore, is not based on opinion, but on actual experience.

Interpreting the findings using the existing literature should strengthen the reliability. Using both questionnaires and interviews also enhanced the reliability. As far as generalizability

is concerned, we believe that we have insufficient data to support generalization; therefore, any generalization of the findings is made with caution.

Questionnaires

The questionnaire was sent to a group of 358 project managers in the period 2010–2011. The questionnaires contained four open-ended questions and one question with suggested answers. Respondents were asked to base their answers on a project with which they had been involved in the last three years that was either completed or near completion. The respondents are continuing education students taking a project management course at the master's degree level. The genders, educational backgrounds, types of work, and experience profiles of the respondents are diverse. Some students are taking the course to satisfy an obligatory requirement in order to partake in a competence-based master's degree in organization and leadership. Others are enrolled in order to gain a greater insight into project management methods or in the pursuit of new career opportunities in project management. All have some project management experience either as participants or as managers. The respondents are working in both project-driven and non-project-driven organizations. The questionnaires were sent by email or handed out in person to respondents after completing the course. One hundred forty-five respondents returned valid responses for inclusion in the study. Respondents were asked to answer the following questions:

Q1. The respondents were asked to indicate years of project experience. Reponses from respondents with less than three years project experience were omitted in order to enhance the validity of the survey.

Q2. The respondents were asked to identify the method used to identify success criteria. Three choices were given: (1) agreed upon internally with no involvement from the project

sponsor/owner; (2) imposed by the project owner directly or through guidelines describing major business objectives; or (3) other methods to be specified by the informant. The objective of the question was to study the degree that selected criteria were aligned with owners' business goals or strategy and to examine the degree of involvement by the project sponsor or owner. Our hypothesis is that the higher the level of involvement in the definition phase, the less likely the criteria will be changed. Additionally, we wanted to examine whether the project owner had any formal guidelines used in formulating the criteria.

Q3. The respondents were asked to list all success criteria that were identified during the initiation or planning phase in their last project. The objective of this question was to examine the emphasis of these success criteria and to what degree they cover the entire project life cycle (including the operation phase). The author intended further to examine how this emphasis contributes to changes in a later stage.

Q4. The respondents were asked to indicate if any change occurred to these criteria and the scope of any change. The objective of this question was to examine the degree the project adhered to the identified success criteria during execution, and to understand what reasons and impact of these changes as seen by the informant.

Interviews

The second data collection method consisted of interviews. The objective of interviews was to discuss in detail the reasons for change to success criteria during execution. The author intended to also discuss the types of knowledge, skills, and attitudes that are missing or needed to avoid the causes of these changes. Sixteen respondents who have been involved in projects that underwent change to success criteria were interviewed. During the interviews, the results obtained from the questionnaires were presented to the informants and discussed. Most of these

interviews were conducted by phone due to geographical consideration. As such, the reliability of the results could have been influenced by the chosen medium. However, use of the phone did not seem to interfere in establishing a dialogue between informants and the author.

Results

The data obtained from answers to question 2 are shown in Table 1. The results demonstrate that roughly 40% of the respondents indicated that the criteria were formulated internally within the project group with no inclusion from the project owner or other sponsors. This figure suggests poor project alignment practice on behalf of the project owner and in the performing organizations. During the interviews, the impact of this poor alignment was discussed with the informants.

The data from each respondent's answer to question 3 were grouped into three main success clusters: (1) the traditional on-time, on budget, and according to specifications; (2) criteria that are concerned with measuring user satisfaction such as number of complaints, number of corrections after delivery; (3) criteria that are concerned with measuring the achievement of business goals such as profit, business image, market share, or learning. This classification is largely consistent with the model described by Shenhar et al., 2001. Further, the frequency of each combination of these clusters was calculated. The combinations are presented in Table 2, which shows that 61% of the respondents reported that all the selected criteria of their projects belonged exclusively to the first success cluster. These criteria did not contain any reference to end-users, to business goals, corporate strategy, or any other long-term alignment. Moreover, the results show that only 12% of the projects had criteria that cover all the success clusters.

Respondents were also asked to specify if the chosen success criteria in their last project had to be changed or adjusted during execution. About 121 respondents affirmed that original list of success criteria was changed during execution. Based on the responses from the respondents, the changes to theses success criteria falls into two main groups:

- Adjustments. Examples include giving higher importance for one criterion and less for other criteria. For instance, assigning lower importance to completion within budget in order to achieve higher user satisfaction. Timely completion was singled out as the criterion that was frequently given higher priority during execution. Completion on budget was the criterion that was frequently given a lower priority during execution. Another type of adjustment identified concerned itself with change to the ambition level of the criteria. For instance, change that originates as a better understanding about contextual factors (environmental, political, and organizational) is gained. This implicitly depicts that that the factors were not suitably identified in the initiation phase.
- Addition or deletion. This includes adding new criteria that were not identified in the original list. It also includes deleting an existing criterion from the original list. Adding new environmental requirements that were not originally identified in the planning phase is an example.

On the basis of the answers obtained from question 4 and the discussion with the informants in the interviews, the reasons for change to project success criteria are grouped into three types:

1- **Type I**. Reasons that can be attributed to the definition phase. This includes the use of incomplete and/or ambiguous criteria.

2- **Type II**. Reasons that can be attributed to poor attitude towards the significance of project success criteria. According to Andersen and Jessen (2003), attitude is the willingness to carry out tasks. All projects where the identified criteria were not proactively used for managing the project fall under this category.

3- **Type III**. Reasons that can be attributed to external factors

Discussions

This section presents a detailed discussion about the causes of change. The results are then explained with reference to the supporting literature. In addition, some examples provided by the informants during interviews are presented and commented upon.

Type I. The results suggest that the first cause of change originates in the definition phase because of two main reasons: (1) ambiguity (lack of measurability), and (2) lack of alignment.

Ambiguity refers to the use of success criteria, which may be differently interpreted (Duimering, Ran, Derbentseva, & Poile, 2006). Ambiguous criteria are also known as soft criteria (Crawford & Pollack, 2004). Informants gave several examples of this category including user satisfaction, the quality of being intuitive in use, user friendly, easy to use, and safe. This category of criteria is hard to measure and therefore control. Time taken to clarify and understand the criteria may subject them to a new interpretation and therefore can become subject to change. Already several authors have stressed the importance of measurability to project objectives, for instance, through the use of SMART rule (Kerzner, 2006, pp. 290–291). Several informants from the ICT sector affirmed that agreeing on the measurability of the objectives has always been a subject of heavy discussion within the project group or with the performing organization.

Lack of alignment can be attributed to the operational thinking that governs the initiation phase. The reason of change could be attributed to poor alignment with business objectives or a non–representative nature in relation to the expectations of all project stakeholders. Westerveld (2003) acknowledged the complications of agreeing on project success criteria not only because of the competing criteria, but also because the judgment is made by several stakeholders over different time horizons. This is evident in the results obtained from the questionnaires. The results indicated that the majority of projects (61%) were poorly aligned with corporate strategies and user needs, and are thereby poorly initiated and focused only on a narrow understanding of success. This figure might reflect a traditional thinking where the focus is on "getting the job done" and the perspective that success consists of delivering results on time, within budget, and according to written specifications. This operational mindset is reflected in literature, which has traditionally used time, budget, and performance as the main indicators of project success which lead to an incomplete and misleading assessment (Shenhar et al., 2001). Results obtained by Lipovetsky et al. (1997) in a study of the relative importance of the dimensions of success support the conclusion that there is agreement among assessors that the success dimension benefits to the customer/owner is of primary importance.

Several authors have stressed the importance of regarding projects as tools for value creation in the organization (e.g., Winter, Smith, Morris, & Cicmil, 2006; Ingason & Jónasson, 2009; Williams & Samset, 2010). In this respect, the results may suggest that there is a weak or missing alignment between project, business, and strategic objectives and this lack of alignment is only later clarified and precipitates success criteria change. Alignment value, according to Srivannaboon and Milosevic (2006), has proved important to project management performance because of the associated reciprocal influence with business strategy.

Hartman (2000) and Williams and Samset (2010) recognized the importance of alignment in the front-end phase during the project selection process. Mediation is also suggested as a mean to ensure proper alignment of the project between different stakeholders (Srivannaboon & Milosevic, 2006). However, the state of literature providing guiding frameworks to successfully align project management and business strategy is not significant.

Type II. The second type of change to success criteria during execution is a poor managerial attitude towards the concept of success criteria. During interviews, informants exemplify the manner of this category of changes. One informant from the IT industry explained that achieving customer satisfaction in their projects is an important success criterion in every project. Nonetheless, this objective usually does not materialize into any tangible measure such as defining the scope of involvement or defining approval routines by the customer. According to the same informant, late changes and adjustments are introduced in order to adapt the product to expectations in order to ensure customer satisfaction. This change had a significant negative impact on other objectives; it forced the project organization to give lower priorities to other success criteria such as completion on time and within budget.

Another example from an informant in the telecommunication sector suggested that the change was caused by the tangible mismatch between targeted success criteria and allocated resources for the project. This forced the adjustment of the ambition level with less focus on the achievement of one or several of these objectives.

Another informant from the construction industry depicted that a poor attitude with respect to the proactive use of success criteria impacted the changes to success criteria. This poor attitude forced the client to amend the ambition level of their targeted profit. The informant mentioned that in the last housing project, the original plan was to build a housing complex with

luxurious apartments that will be put out for sale after completion. An important requirement was that each apartment will have its own parking space in the basement. However, project management failed to conduct comprehensive investigation of soil conditions prior starting design and engineering activities. The soil conditions were then discovered later in execution stage and it was not possible to build the basement according to the original design. It was necessary to reduce the sale value of the apartments and to reduce the targeted profit from the project.

The informants have suggested that success criteria are not actively used in managing projects. Hussein (2011) explained that this poor attitude to the tendency of overt focus on a technical solution before defining the rules and constraints of management at an early phase. Poor management leads to poor intermediate results. Poor intermediate results lead to changing project priorities and this causes the project to lose focus (Dvir & Lechler, 2004). This implies that defining proper success criteria or clusters are simply not enough to achieve excellence in project management (Hartman, 2000). Proper measures in terms of strategies, rules, resources, and metrics should accompany these success clusters as well. For instance, achieving the long term and wider benefit requires strong involvement of the sponsor or the project owner as disclosed by Munns and Bjeirmi (1996). According to Belassi and Tukel (1996), when time is important for achieving project management success, then a project manager's skills and communication between the team members become critical.

Type III. The third category of change is the result of external factors such as changing political factors or unforeseen events. Several examples were provided by the informants: changing owners, changing state regulations, changing strategy or focus, a rise of urgent needs that force the project to change the priorities or to add new criteria to meet these urgent needs or

regulations, new contextual conditions. These kinds of changes are inevitable and are a part of uncertainty in projects which is often cited as a lack of "true" knowledge (Kutach & Hall, 2010).

Conclusions and Suggestions

We witnessed through the interviews and questionnaires that changes to project success criteria are frequent and can be grouped as three main types; Type I—Poor or inadequate formulation of project success criteria in the definition phase; Type II— poor managerial attitude towards success criteria, this poor attitude towards success results into poor management and eventually necessitates the revision of project objectives; and Type III—Changing boundary conditions that lie outside project management control.

The study reveals that type I changes could be attributed mainly to a narrow focus on short-term success criteria as well as an ambiguous formulation of the criteria. There is a need therefore to educate the project community that there is more to project success than just meeting time, cost and quality constraints. It is about time to introduce the concept of success clusters rather than success criteria in field specific training and education models. There is also a need to provide training and education concerning skills and methods that could help practitioners to achieve higher measurability with less ambiguity in the formulation process. Education and training in using formal methods for the identification and validation of project success criteria are needed in order to enhance the quality of the formulated criteria and to reduce the likelihood of type I and type II changes. In addition, training in skills relating to the practice of initiation and alignment of both the owners' and contractors' organizations are needed in order to guarantee better alignment between projects and strategic objectives.

This research shows that selecting proper project success clusters is not only related to competencies of project practitioners, but has to do with the competency of project owners or

sponsor as well. That is, the ability of the sponsor or owners to link project expectations to business strategy as a precondition to determine the configuration and emphasis for each project management element (e.g., strategy, organization, process, tools, metrics, and culture). Therefore, there is a need to be more inclusive in the way project management training is conducted. Namely, the target group of the project management training should be enlarged to include functional managers, line managers and other executives in addition to project managers and practitioners, for example.

The study revealed further that type II changes could be attributed to poor managerial attitude or lack of understanding about the importance of proactively applying success criteria as a basis for managing the project. Therefore, training and education programs should emphasize the significance of using the defined criteria as a basis for management and control, and not only as a tool for evaluating or measuring success after completing the project. Project success criteria should be seen and used as a reference frame for developing a project management plan and in defining resource plans and other corresponding success factors. In addition, success criteria should be used actively to secure commitment from upper management.

Type III change arises because of uncertain external factors. Education and training programs should therefore create awareness about project uncertainty. Practitioners and executives should understand the dynamic nature of projects and be aware of the impact of the external factors impinging on the project. The informants suggested training in both reactive (problem solving techniques) and anticipatory mechanisms (such as project risk management). Li, Yang, Klein, and Chen (2011) suggested flexibility and responsiveness mechanisms to dealing with changing boundary conditions. Olsson and Magnussen (2007) suggested that the use of reductions lists as an approach to attain flexibility in response to uncertainty.

In summary, the suggested competency profile for defining and managing project success criteria in accordance with the best practice should contain the following objectives:

- Should provide an understanding about the classification and components of project success clusters.
- Should provide an understanding that success criteria/clusters are not only means for evaluating project results.
- Should provide training in skills and methods for defining success clusters that are accurately aligned with strategic objectives and reflect the expectations of stakeholders.
- Should provide training in skills for proper formulation of success criteria in order to avoid ambiguity and to increase measurability.
- Should contribute to a positive attitude towards using success criteria as a basis for developing strategies, ground rules, metrics, and measures during execution.
- Should provide training in skills for project risk management to help practitioners to select proper measures to manage project success criteria.
- Should provide training in skills related to project uncertainty management, including problem-solving technics.

The full description and evaluation of the instructional methods that are required to implement these learning objectives will be the subject of future research.

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Table 1: Methods used to identify the criteria.

N= 145	
Methods used	%
Agreed upon internally within the project	40%
Issued or decided by the owner/sponsor of the organization	49%
Others	11%

Table 2: The percentage of success clusters in the examined projects.

Combinations (N= 145 respondents)	%
Percentage of respondents who have reported using success criteria that belong to the first cluster (golden triangle)	61%
Percentage of respondents who have reported using success criteria that belong to combination of clusters 1 and 2	22%
Percentage of respondents who have reported using criteria that belong to combination of all the three clusters	12%
Other combinations	5%