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Success Factors and Failure Causes in Projects: analysis of cluster patterns using self-organizing maps

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Abstract

The specialized literature on Project Management is plenty of lists of success factors and failure causes, thought there is not a general agreement on this matter and it is highly dependable of the perspective of the observer. Subjectivity is inherent to these concepts and they are also influenced by sectorial, cultural and geographical differences. This paper presents the study carried out to analyze these factors, specifically the patterns that can be draught from an exploratory study based on a survey. This work is part of a global study on analysis of success factors and failure causes in projects. A questionnaire has been aimed specifically to project managers to gather information on the degree of influence of different factors on the failure or success in a project. Behavioral patterns were found using clustering techniques, Self-Organized Maps (SOM) specifically, concluding that in the population sample there are 9 clearly differentiated groups (clusters).

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Keywords: project success factor; project failure cause; cluster; Self-Organized Maps

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1. Introduction and objectives

The success in projects is something much more complex than just meeting cost, deadlines and specifications. In fact, customer satisfaction with the final result has a lot to do with the perception of success or failure in a project. Furthermore, Baker et al. [1] conclude that, in the end, what really matters is whether the parties *associated with* and *affected by* a project are satisfied or not. Meeting deadlines and costs does not really matter if the final product does not meet expectations in its performance. A good review about Project Success can be found at [2]. For example, Pankratz and Basten [3] have identified eight success criteria in addition to traditional adherence to planning (ATP) approach. However, this paper is not really focused on the concepts of success or failure but on the study of the aspects that lead to the failure or success in projects, though obviously there is a strong relation between concepts. There are plenty of factors whose application is significant for the success of a project. One of the fields of study in Project Management is the success and failure factors in projects. In the literature, these are called *critical success factors*, and many studies have been devoted to define, clarify and analyse such factors. Success factors are subjected to the perceptions of the ones involved in the project development, depending not only on the *stakeholder* but also on cultural or geographical differences, which are reflected in the context of the organization [4]. There are also a lot of sectorial influences. For example, Huysegoms et al. have identified the causes of failure in software product lines context [5]. Other examples can be found in [6], [7], [8] and [9].

Obviously, projects fail due to many different reasons, if we understand 'failure' as the systematic and widespread non-compliance of the criteria which defines a successful project [10]. Nevertheless, due to the inner subjectivity of the concept, each person working in the same project has a personal opinion about the determining causes of its failure. These opinions can also vary depending on the type and sector of project, so that distinctive patterns of causes are associated with the failure of specific kinds of projects. The most usual is that a combination of several factors with different levels of influence in different stages of the life cycle of a project result in its success or failure. The interactions between the different factors or causes seem to be as important as each factor or cause separately. However, there seems to be no formal way to account for these interrelations.

The work here presented is part of a global study on analysis of success factors and failure causes in projects. A questionnaire has been aimed specifically to project managers to gather information on the degree of influence of different factors on the failure or success in a project. The questionnaire requests their perception on the most influential factors to be considered to reach success, as well as the most common failure causes they have most frequently encountered. A selection of critical success factors and failure causes were selected as a basis for the questionnaire, compiling previous research work results [11] and [12] with the most frequent causes reflected in the literature. The questionnaire is generic, not intended for any specific sector or geographical area. Although it is not focused on any particular project or field, it gathers this type of information to be able to correlate it. The survey was distributed anonymously to recipients through LinkedIn, an internet professional network.

Such study determines the most frequent failure causes and the most important success factors in real world projects. In the initial stage, a statistical analysis of the sample data was conducted with the aim of answering the question of whether the valuations depend on the geographical areas of the respondents or on the types of projects that have been carried out (this work has not been still published, although it is being now considered). Moreover, it has been found that there is no absolute criterion and that subjectivity is the inherent characteristic of those valuations. So, as a complementary study, clustering techniques are applied in order to find patterns in the set of received answers. This article describes this type of work and the results obtained.

2. Methodology

As discussed in the previous section, the grounds for this work is the questionnaire that was designed to gather information on the perception project managers have of what the success factors and failure causes are. After the information was gathered, a descriptive analysis was performed on the data with cluster datamining techniques.

The questionnaire has three parts with different questions on the following aspects:

- General information on the respondent and typology of projects he/she was involved in: country, type and size of project.