I. INTRODUCTION

During recent years, project management has been firmly established as a concept for organizing extraordinary, innovative as well as strategic endeavors. However, still many of these projects fail. What are the recommendations that research can provide to practicing managers?

The following contribution aims at providing general recommendations regarding project management. This effort is based on the assumption, that the project success depends on a relatively small number of variables, the so-called success factors. For the purpose of this study, success factors of project management be defined after BOYNTON and ZMUD: „Critical success factors are those few things that must go well to ensure success for a manager or an organization... [or a project].”

II. THE CONCEPTUAL FRAMEWORK

In order to select the most relevant variables for testing, a comprehensive review of the empirical research on success factors of project management was conducted. This review included 44 studies, which investigated a total of 5,760 projects (about 1,800 successful, 1,200 unsuccessful and about 2760 unclassified projects). The basic structure of this conceptual research frame differentiates between four classes of variables: People, Activities, Barriers and Success.

People:
- The factor top management includes direct support as well as the general interest of the top management for an individual project.
- The factor project leader refers to the formal authority of the project leader.
- The factor project team describes know-how and the social skills of the project team.

Activities:
- The factor participation refers to the involvement of the project team in decision making.
- The factor information/communication describes the formal information system as well as the effectiveness of communication.
- The factor planning/controlling focuses on effectiveness of planning and controlling.

Figure 1: The conceptual research frame

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**III. RESEARCH DESIGN AND DATA ANALYSIS**

The data for this research was gathered through a questionnaire which was distributed to the members of the German Project Management Society (Gesellschaft für Projektmanagement, GPM). After the initial contact by telephone, two questionnaires were mailed to each respondent, asking them to report on one project they regard as successful, and one project they regard as failure. The data collection effort achieved an overall response rate of 43%, resulting in a sample of N=448 projects. The literature on project management features only one study with a larger sample. The sample for the present investigation contains data on 248 successful and 190 unsuccessful projects. These two sub-groups are not entirely balanced because some respondents were unwilling to report on an unsuccessful project or didn't have any experiences in that regard.

The data analysis was conducted using the LISREL-Approach (Linear Structural Relationships), using LISREL version 7.13.

**IV. EMPIRICAL RESULTS**

The present model displays considerable explanatory power. The eight success factors explain approximately 59% of the variance in project success (r²=59).

The individual success factors exert their influence on project success in different ways, as will be explained below:

Top management directly promotes project success as ‘customer’ and highest organizational authority (γ_{11} = .24). Through transferring formal authority to the project leader (γ_{21} = .65) and by influencing the design of the project team (γ_{31} = .35), Top management provides the organizational environment for the successful completion of the project. Top management also impacts the process directly through the factor participation

(γ_{41} = .47). The considerably high impact of top management on project success can also be interpreted from a more critical point of view, as it could indicate an overly strong involvement of top management in the process of the project itself.

The project leader exerts influence over the factor information/communication (β_{62} = .10). The impact of the project leader on planning/controlling, however, was not supported by this data, so that this hypothesis has to be rejected. Additionally, there was no significant direct influence of the factor project leader on project success, so that this hypothesis had to be rejected too.

The project team is the main driving force for project operations and thus directly promotes project success (β_{13} = .36). A good team actively utilizes its decision making authority (β_{33} = .33). It’s know how leads to better planning and more adequate and flexible controlling of the project (β_{35} = .36) in addition to improved information flows/communication within and outside the team (β_{54} = .29).

Out of the group of activities, the factor information/communication shows the strongest direct impact on project success (β_{16} = .13). It’s influence on planning and controlling (β_{56} = .20) documents the importance of free information flows on that success factor.

Surprisingly low is the direct impact of planning/controlling on project success (β_{12} = .10). This result contradicts the widespread opinion that planning/controlling is one of the most important success factors. The relatively weak influence could be attributed to high levels of uncertainty, that force the project team to take ‘ad hoc’ actions as reactions to ever changing situations. In such cases, the need to react may outweigh the benefits of the preset project plans. Another explanation for this weak influence could be that the project team does not take the plan seriously, in which case the plan would serve as an alibi.

The strong negative impact of conflicts on project success demonstrates the significance of effective conflict management to projects. Oftentimes the causes for conflicts come from outside ‘the project’. For instance, differences between project and line management over authority as well as political activities are frequently being carried into the project from outside. Conflicts are particularly likely to occur in so-called ‘week’ project organizations, where project decisions have to be approved by numerous departments and hierarchical levels. Additionally, projects in theses organizations are more apt to experience high personnel
Figure 2: Path diagram of the empirical model (Level of significance < 1%)

turnover, which, in turn, may increase the chances for changes in goals (another obstacle to project success).

The second barrier, changes in goals, also displays a strong negative impact on project success. Because of complexity and uncertainty, project goals are often difficult to determine. However, our data documents that a lack of continuity in goals is significantly related to unsuccessful projects. Our research also suggest, that the potentials for conflicts and changes in goals are built up before project start, and thus are hardly controllable during the course of the project.

CONCLUSIONS AND OUTLOOK

Making use of LISREL, a structural model was developed which explains 59% of the variance in project success while taking into account causal effects among the eight success factors. The demonstrated indirect effects underline the importance of accounting for interrelationships in determining the relative impact of the eight factors on project success. Recognizing these structural issues, the analysis shows all eight factors to be significantly related to project success.

REFERENCES