

Factors Affecting the Success of a Construction Project

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Abstract: Different researchers have tried to determine the factors for a successful project for a long time. Lists of variables have been abounded in the literature, however, no general agreement can be made. The aim of this paper is to develop a conceptual framework on critical success factors (CSFs). Seven major journals in the construction field are chosen to review the previous works on project success. Five major groups of independent variables, namely project-related factors, project procedures, project management actions, human-related factors, and external environment are identified as crucial to project success. Further study on the key performance indicators (KPIs) is needed to identify the causal relationships between CSFs and KPIs. The causal relationships, once identified, will be a useful piece of information to implement a project successfully.

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Introduction

The construction industry is dynamic in nature due to the increasing uncertainties in technology, budgets, and development processes. Nowadays, building projects are becoming much more complex and difficult. The project team is facing unprecedented changes. The study of project success and the critical success factors (CSFs) are considered to be a means to improve the effectiveness of project. However the concept of project success has remained ambiguously defined in the mind of the construction professionals.

Various attempts were made by different researchers to determine CSFs in construction. A number of variables influencing project success have been proposed. Some variables are common to more than one list, but there is no general agreement on the variables.

The main aim of this paper is to conduct a thorough review on literature related to CSFs in seven major management journals—*Construction Management and Economics* (U.K.), *International Journal of Project Management* (U.K.), *Journal of Construction Procurement* (U.K.), *Journal of Construction Engineering and Management* (U.S.), *Engineering, Construction and Architectural Management* (U.K.), *Journal of Management in Engineering* (U.S.), and *Project Management Journal* (U.S.). The selection of these journals was based on the study of Chau (1997), who found

that these journals had the highest scores in the quality rating. Chan et al. (2002) and Li et al. (2000) adopted similar methodology in the study of design/build and partnering projects, respectively. Keywords for “searching” were success, performance, criteria, evaluation, critical success factors, and determinants. As a result, 43 articles were finally selected to include in this review.

Factors Affecting Project Success

A number of variables influencing the success of project implementation were identified following a thorough review of these articles. The term CSFs in the context of the management of projects was first used by Rockart in 1982 and is defined as those factors predicting success on projects (Sanvido et al. 1992). A careful study of previous literature suggests that CSFs can be grouped under five main categories. These include human-related factors, project-related factors, project procedures, project management actions, and external environment.

Project-Related Factors

Walker (1995) postulated project scope as a useful predictor for construction time. The importance of project scope factors is echoed by other researchers (Akinsola et al. 1997; Songer and Molenaar 1997; Belout 1998; Chua et al. 1999; Dissanayaka and Kumaraswamy 1999; Kumaraswamy and Chan 1999). The attributes used to measure this factor are type of project, nature of project, number of floors of the project, complexity of project, and size of project.

Procurement-Related Factors

A number of researchers identified the importance of procurement factors (Pocock et al. 1997a, 1997b; Walker 1997; Kumaraswamy and Chan 1999; Walker and Vines 2000). Dissanayaka and Kumaraswamy (1999) defined the scope of procurement as the framework within which construction is brought about, acquired or obtained. Therefore, two attributes are used to measure this

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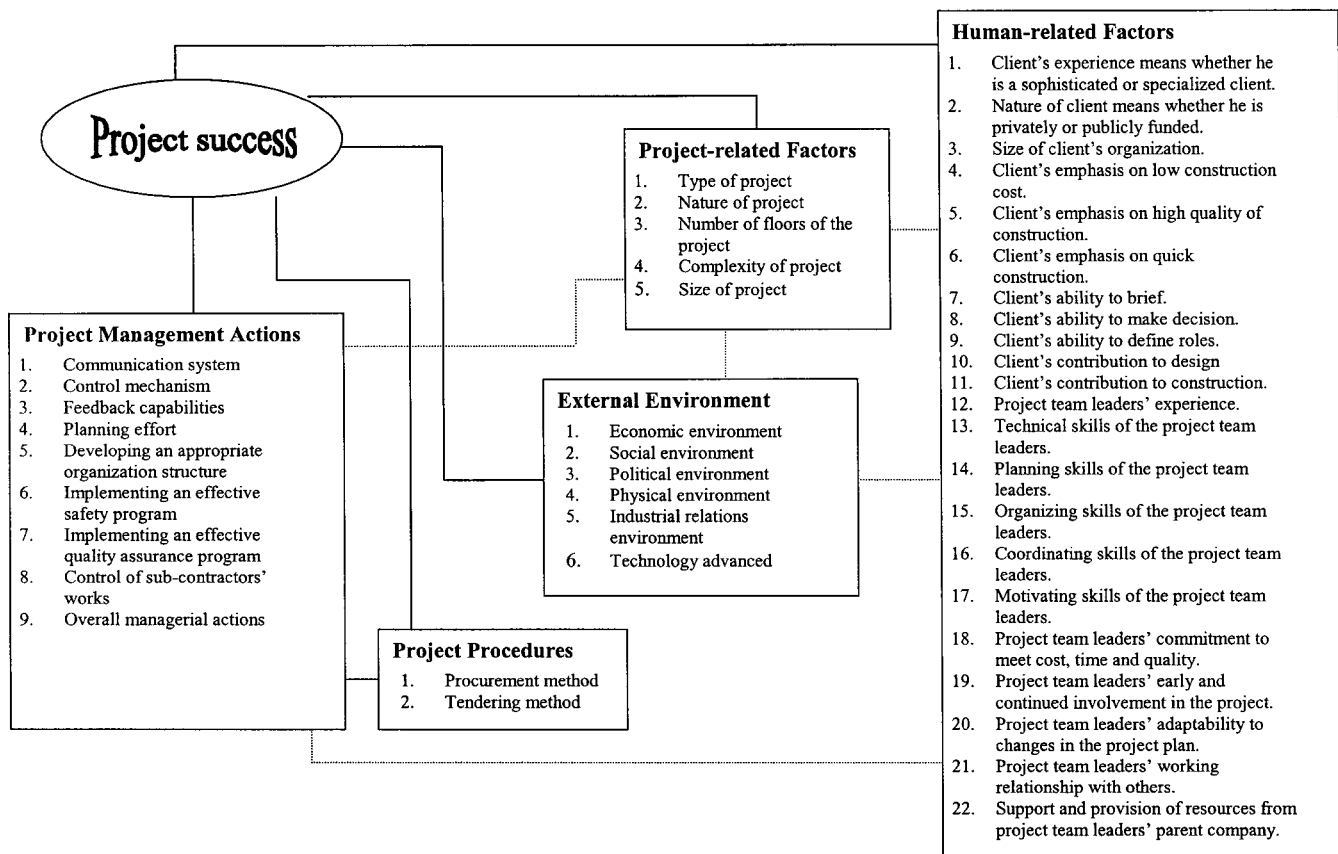


Fig. 1. New conceptual framework for factors affecting project success

factor; they are procurement method (selection of the organization for the design and construction of the project) and tendering method (procedures adopted for the selection of the project team and in particular the main contractor).

Project Management Factors

Project management action is a key for project success (Hubbard 1990). Jaselskis and Ashley (1991) suggested that by using the management tools, the project managers would be able to plan and execute their construction projects to maximize the project's chances of success. Then, the variables in project management include adequate communication, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure, plan and schedule followed, and related previous management experience (Belout 1998; Chua et al. 1999; Walker and Vines 2000).

A number of attributes will affect this factor, including the communication system, control mechanism, feedback capabilities, planning effort, organization structure, safety and quality assurance program, control of subcontractors' works, and finally the overall managerial actions.

Project Participants-Related Factors

Chua et al. (1999) defined project participants as the key players, including project manager, client, contractor, consultants, subcontractor, supplier, and manufacturers. Walker (1995) considered influence of client and client's representative as a significant factor

on construction time performance. The client-related factors concerned with client characteristics, client type and experience, knowledge of construction project organization, project financing, client confidence in the construction team, owner's construction sophistication, well-defined scope, owner's risk aversion, client project management (Chan and Kumaraswamy 1997; Songer and Molenaar 1997; Dissanayaka and Kumaraswamy 1999).

Designers play a vital role as their work involves from inception to completion on a project. Chan and Kumaraswamy (1997) considered that design team-related factors consist of design team experience, project design complexity, and mistakes/delays in producing design documents.

The main contractor and subcontractors start their main duties when the project reaches the construction stage. The variables include contractor experience, site management, supervision and involvement of subcontracting, contractor's cash flow, effectiveness of cost control system, and speed of information flow (Chan and Kumaraswamy 1997; Dissanayaka and Kumaraswamy 1999).

The project manager is another key stakeholder in a construction project and his competence is a critical factor affecting project planning, scheduling, and communication (Belassi and Tukul 1996). Variables under this factor consist of the skills and characteristics of project managers, their commitment, competence, experience, and authority (Chua et al. 1999).

A construction project requires team spirit, therefore team building is important among different parties. Team effort by all parties to a contract—owner, architect, construction manager, contractor, and subcontractors—is a crucial ingredient for the successful completion of a project (Hassan 1995).

The attributes of this factor can be mainly divided into two categories: one is related to client, another is the project team. For the first group, it includes client's experience and ability, nature of client, size of client organization, client's emphasis on cost, time and quality, and client contribution to the project. For the second group, it includes project team leaders' experience and skills, project team leaders' commitment on time, cost and quality, project team leaders' involvement, project team leaders' adaptability and working relationship, and the last one is support of the project team leaders' parent companies.

External Factors

Various researchers support "environment" as a factor affecting the project success (Akinsola et al. 1997; Kaming et al. 1997; Songer and Molenaar 1997; Chua et al. 1999; Walker and Vines 2000). Akinsola et al. (1997) further described "environment" as all external influences on the construction process, including social, political, and technical systems.

The attributes used to measure this factor are economic environment, social environment, political environment, physical environment, industrial relation environment, and level of technology advanced.

Conceptual Framework for Factors Affecting Project Success

The various variables affecting the factors are identified in the previous section. Variables within each group are interrelated and intrarelated. A variable in one group can influence a variable in the others, and vice versa.

To study how these factors affect project success separately and collectively, it is hypothesized that "Project success is a function of project-related factors, project procedures, project management actions, human-related factors and external environment and they are interrelated and intrarelated."

It is further hypothesized that the project will be executed more successfully if the project complexity is low; if the project is of shorter duration; the overall managerial actions are effective; if the project is funded by a private and experienced client; if the client is competent on preparing project brief and making decision; if the project team leaders are competent and experienced; and if the project is executed in a stable environment with developed technology together with an appropriate organization structure. Furthermore, a new conceptual framework is developed and shown in Fig. 1.

Conclusion

A new conceptual framework that includes and regroups the identified variables affecting project success is developed. Hypotheses on implementing a project successfully have been developed. It can be used as a base for further detailed investigation on general construction projects, as well as a specific project, such as hospital or hotel. A more systematic way of determining project success is established. This paper focuses on the CSFs and not on the measurement of project success, i.e., the key performance indicators (KPIs). Further study should be directed to identify the KPIs, so that the causal relationships between CSFs and KPIs can be identified. The causal relationships, once identified, will be a useful piece of information to implement a project successfully. It can help in selecting project team members, identifying the de-

velopment needs of the project team members, and most important for forecasting the performance level of a construction project before it commences.

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