

# Critical Success Factors Influencing Performance of Construction Projects

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**ABSTRACT:** The study of project success and the critical success factors (CSFs) is considered to be a mean for improving the effectiveness of project. Performance can be assured by identifying and eliminating the factors that cause poor project outcomes. Thus, project managers need better understanding of critical success/failure factors and how to measure them. The purpose of this study is to systematically investigate the causes of project failure and how these can be prevented, managed, or controlled. Construction projects are frequently influenced by success factors' which can help project parties reach their intended goals with greater efficiency. The aim of this study is to investigate the critical factors leading to construction company success. Many critical success factors such as factors related to project manager's performance, factors related to organization, factors related to project, factors related to external environment became apparent from this study. This study will help to identify factors that influence project success.

**KEYWORDS:** Critical Success Factors; Project Management; Project Success Criteria.

## I. INTRODUCTION

Project is a complex, non-routine, one-time effort limited by time, budget and resource and performance specifications designed to meet customer needs. A construction project is completed through a combination of many events and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment. Since the outcomes of the capital projects have strategic implications on the success and profitability of the business, the ability to deliver based on pre-determined objectives should be critical to the company's success. Project success can be defined as meeting the required expectation of the stakeholders and achieving its intended purpose. Success criteria or a person's definition of success as it relates to construction often changes from project to project depending on participants, scope of services, project size, sophistication of the owner related to the design of facilities, technological implications, and a variety of other factors [2]. The concept of "success factors," was introduced by D. Ronald Daniel in 1961. Daniel had discussed the problem of inadequate management information for setting objectives, shaping strategies, making decisions, and measuring results against goals. Daniel asserted that organizational planning information should focus on "success factors [4].

Certain factors are more critical to a project's success than others. These factors are called critical project success factors. The term Critical Success Factors in the context of the management of projects was first used by John F. Rockart, of MIT's Sloan School of Management, in 1979 as a way to help senior executives define their information needs for the purpose of managing their organizations. Rockart in 1982; defined as those factors predicting success on projects of key areas of activity that directly gives favourable results for a project goal [7]. Project success requires creating a well-planned project schedule as well as understanding of the key success factors also. It helps the project manager and the stakeholders to take the right decisions and act towards the project success. Most popular CSF' accepted by research community are-project mission, top management support, project schedule/plan, client consultation, personnel, technology to support the project, client acceptance, monitoring and feedback, channels of communication, troubleshooting expertise [10]. Quality can be assured by identifying and eliminating the factors that cause poor project performance.

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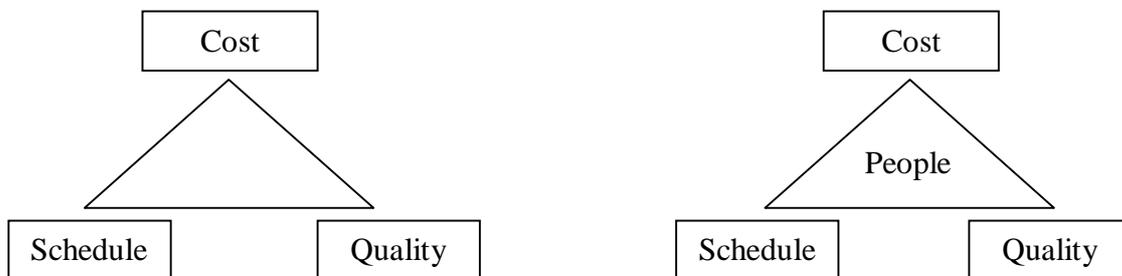
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Project managers would have a clear understanding of which aspects of projects might be critical for their successful completions. For a project to be successful, it is essential to understand the project requirements right from the start and go for project planning which provides the right direction to project managers and their teams and execute the project accordingly. A successful project is one that is delivered on time and managed within the budget, Time, cost and quality have been recognized as “triple constraint” or important elements of project success. The study of project success and critical success factors (CSFs) is often considered as one of the vital ways to improve the effectiveness of project delivery [12]. Successful construction projects greatly depend on how the project has been managed and controlled. The critical success factors are (CSFs) are more useful in decision-making support. Our purpose here is to define project success criteria, clarify their difference with success factors, analyse their importance in project management methodology and come up with a comprehensive list of critical factors that might affect project outcome. The study of project success/failure and critical success factors (CSFs) is a means of understanding and thereby improving the effectiveness of construction projects.

## II. PROJECT MANAGEMENT AND SUCCESS CRITERIA

Projects can be considered as a set of activities that must be completed in accordance to specific objectives which involve the utilization of a company’s resources. The project management is coordinating a process of interrelated functions such as planning, organizing and controlling construction activities for getting successful outcomes. Project management concept and techniques can be applied to any project ranging from simple task, office renovations or refurbishment to complex and complicated projects like the design and construction of an airport or shopping mall [7].

Success criteria are “measures by which success or failure of a project or business will be judged”. Early main criteria for success were assumed to be cost, schedule and quality.



Iron Triangle of Project Management

Golden Triangle of Project Management

**Figure 1** Golden vs. iron triangle of project management

The iron triangle of project management emphasizes the relationships among cost, schedule and quality. The golden triangle of project management emphasizes the relationships among cost, schedule, quality and people by placing people at the centre of the iron triangle (Figure 1). People are the one element that ties the other elements together. Mostly emphasis will be given to iron triangle. The emphasis on people in the golden triangle helps maintain a balance among cost, schedule and quality [8].

Later more potentially competing criteria like “the satisfaction of all stakeholders” were defined. Researches on project success show that it is impossible to generate a universal checklist of project success criteria suitable for all projects. Success criteria will differ from project to project depending on participants, scope of services, project size, and sophistication of the owner related to the design of facilities, technological implications, and a variety of other factors. On the other hand, common threads relating to success criteria often develop not only with an individual project but across the industry as we relate success to the perceptions and expectations of the owner, designer, or contractor.

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Success criteria according to owners, designers and contractors are as follows:

## ❖ Owner's criteria

Owner's criteria for measuring success are: on schedule; on budget; function for intended use; end result as envisioned; quality; aesthetically pleasing and return on investment.

## ❖ Designer's criteria

Designer's criteria for measuring success: satisfied client; quality architectural product; met design fee and profit goal; professional staff fulfilment; met project budget and schedule; minimal construction problems (easy to operate, constructible design); socially accepted (community response); client pays (reliability); and well defined scope of work.

## ❖ Contractor's criteria

Contractor's criteria for measuring success: meet schedule (preconstruction, construction, design); profit; under budget; quality specification met or exceeded; no claims (owners, subcontractors); safety; client satisfaction.

## ❖ Common Criteria

Priority item and one that appears in all three lists (designer, owner, and contractor) in some form is the financial reality of doing business. The owner wants the project completed on time and on budget, and the designer and contractor both expect to meet certain profit or fee goals. All three viewpoints also recognize the absence of any legal claims or proceedings on a project as a desirable outcome. In other words, this is a major criterion for measuring success. Another common thread among the three groups involves meeting an appropriate schedule as a way of measuring or determining if a project was successful.

## ❖ Unique criteria

It is also evident that there are some unique factors associated with each of the three groups. The designer for instance is looking for a project that will increase the level of professional development and professional satisfaction among his employees. Safety is a high-priority issue for the contractor that would not normally be an issue with the other two groups, because their employees are at much less risk during the design or operation of a building than the contractor's workers is during the construction of a building.

### III. CRITICAL SUCCESS FACTORS

Cooke-Davies (2002) eliminates a conceptual difference between 'success criteria' and 'success factors' [5]. He stresses that success criteria belong to specific measurement which needs to be formulated in order to conclude whether project succeeds or fails. However, success factors are more about particular levers that can be used by project manager to increase a probability of successful outcome of a project [10]. Project success factors are the elements of a project that can be influenced to increase the likelihood of success; these are independent variable that makes success more likely. Project success criteria are the measures by which judge the successful outcome of a project; these are dependent variable which measure project success. Success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business. Project success factors are not universal for all projects since different projects and different people prioritize different sets of success factors. Project success criteria 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. The project implementation process is complex. It usually involves attention to a broad Variety of human, budgetary, and technical variables. From a Project Management

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perspective, critical success factors (CSFs) are characteristics, conditions, or variables that can have a significant impact on the success of the project when properly sustained, maintained, or managed. There is a very close link between the type and scope of projects and respective Critical Success Factors (CSF).

The most important CSFs within the Project life cycle are as follows:

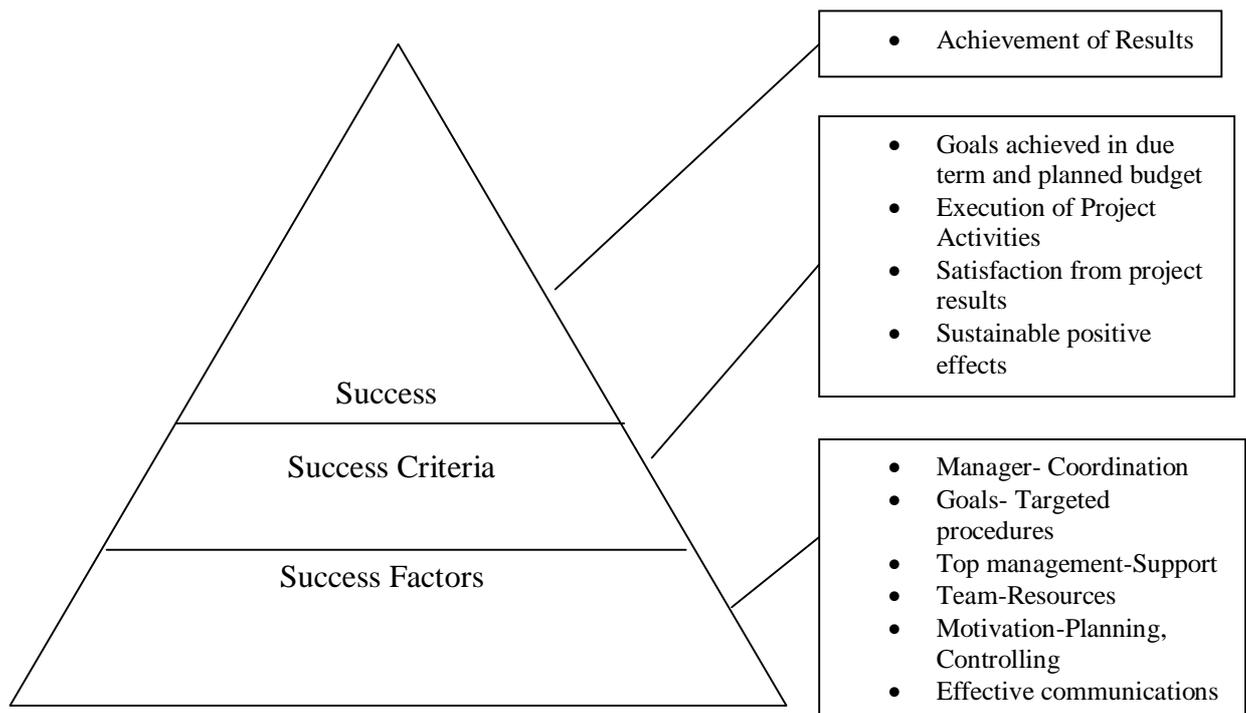
1. **Project Mission**-Initial clearly defined goals and general directions. The preparation of a detailed project scope statement is critical to project success.
2. **Top Management Support**- Willingness of top management to provide the necessary resources and authority/ power for project success. The flexible and adequate access to organizational resources is considered as a core precondition for effectively executing the project activities. This can hardly be available without definite and timely reaction and support from the top management of the project-executing organization.
3. **Competence of Project Manager**- The competence of project manager has been identified as the most important factor for the successful realization of their project. The technical and administrative skills of the project manager, as well as his/her commitment and competence, become the most critical component during the project life cycle.
4. **Project Schedule/Plan**- A detailed specification of the individual action steps required for project implementation.
5. **Client consultation** - Communication, consultation, and active listening to all impacted parties.
6. **Competence of Project Team Members**- Recruitment, selection and training of the necessary personnel for the project team. The knowledge, skills, personal aims, and personal traits should be considered not only as a vital component of the overall organizational culture but also as an essential factor of the integrity and multi-functionality of the project team.
7. **Quality of Suppliers and Subcontractors** -In the contemporary world, it is rarely possible for one and the same organization to have capabilities and competencies in every aspect of the work required. Competence of project partnership is vital for success of project.
8. **Technical tasks**- Availability of the required technology and expertise to accomplish the specific technical action steps.
9. **Client Acceptance**- The act of “selling” the final project to its ultimate intended users.
10. **Monitoring and Feedback**- Timely provision of comprehensive control information at each stage in the implementation process.
11. **Communication**- The provision of an appropriate network and necessary data to all key actors in the project implementation.
12. **Troubleshooting**- Ability to handle unexpected crises and deviations from plan.

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The conceptual model (fig.2) reveals the basic constructs and relationships between CSF and project success.



**Figure 2** conceptual model of critical success factors and project success

The first systematic classification of critical success factors in the area of project management is provided by Schultz, Slevin and Pinto (1987) [13]. They identify two groups of factors – strategic and tactical – which influence project performance at various stages of project life cycle. The “strategic” group consists of factors as project mission, top management support, and project scheduling. The “tactical” group includes factors as client consulting, human resource selection and personnel training. . Tactics is the deployment of wide variety of human, technical and financial resources to achieve strategic plans.

A careful study of previous literature suggests that CSFs can be grouped under seven main categories. These include: (1) Project Management Factors; (2) Procurement-related Factors; (3) Client-related Factors; (4) Design team-related Factors; (5) Contractor-related factors; (6) Project Manager-related Factors; and (7) Business and Work Environment-related Factors.

- **Project Management Factors:**

Project management action is a key for project success. Competent Project Managers can use management tools to plan and execute their construction projects to maximize the project’s chances of success. 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. 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.

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- **Procurement-related Factors:**

Two attributes are used to measure this 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).

- **Client-related Factors:**

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, well-defined scope, owner's risk aversion, client project management.

- **Design team-related Factors:**

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

- **Contractor-related Factors:**

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.

- **Project Manager-related Factors:**

The project manager is another key stakeholder in a construction project and his competence is a critical factor affecting project planning, scheduling, and communication. Variables under this factor consist of the skills and characteristics of project managers, their commitment, competence, experience, and authority (Chua et al. 1999) [4]. 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.

- **Business and Work Environment-related Factors:**

Akinsola et al. (1997), [1] 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.

## IV. SIGNIFICANCE OF CRITICAL SUCCESS FACTORS

✚ Critical success factors (CSFs) can reduce organizational ambiguity. Developing and communicating a set of CSFs can reduce the dependence on the perceived aims of the organization. CSFs reflect the implicit, collective drivers of key managers and as a result are a more dependable and independent articulation of the organization's key performance areas.

✚ CSFs are more dependable than goals as a guiding force for the organization. An organization can set good goals that, in theory, will move the organization toward its mission. However, if the goals are poorly articulated or developed, this is not guaranteed. CSFs are reflective of what good managers do well to move the organization toward its mission, regardless of the quality of the goals that have been set.

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- ✚ CSFs are the essential areas of activity that must be performed well to achieve the mission, objectives or goals for business or project. By identifying Critical Success Factors, you can create a common point of reference to help you direct and measure the success of your business or project.
- ✚ CSFs help everyone in the team to know exactly what's most important. And this helps people perform their own work in the right context and so pull together towards the same overall aims.
- ✚ CSFs are more likely to reflect the current operating environment of the organization. Goal setting tends to be a yearly activity that is seldom revisited until performance measurement. Used properly, CSFs are likely to be more dynamic and to reflect current operating conditions because of the many sources of CSFs.
- ✚ CSFs provide a key risk-management perspective for the organization to consider. The risk perspective of executive-level managers is built into CSFs, so their “radar screen” is exposed to the organization as a whole.
- ✚ CSFs can be valuable for course correction. When CSFs are made explicit, managers often realize that their perception of what is important to the organization may not match reality or they may realize that they don't fully understand the current operational climate. Thus, they can use CSFs to realign their operating activities.
- ✚ A unique strength of the CSF method is that it takes into account the changing environment with which organizations and managers must deal. Also, CSF is especially suitable for top management and for the development of organisation; the method produces a consensus among top managers about what is important to measure in order to gauge the organizations success.
- ✚ Involvement and commitment of top management, linking quality initiatives to customer and linking quality initiatives to supplier are found to be the most important CSFs to the construction companies. Leadership and commitment of top management, cross-functional teamwork and commitment of middle managers are found to be the most CSFs for successful introduction of Six Sigma.
- ✚ Determining critical success factors will give organization/company a competitive edge and is the bottom line of success in fulfilling the responsibility of a project management companies. This in turn will give rise to satisfied investors, professional bodies and make the project management company prosper.

## V. CONCLUSION

Success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business. The context of the critical success factors (CSFs) to be considered when examining project management practices and project outcomes. The studies of critical success factors will be beneficial to all parties involved in construction industries to enhance project success.

- Critical success factors perceived as most influential in avoiding or preventing critical delay factors can lead to better performance within construction industries and they are likely to improve success in building construction projects.
- Identifying CSFs is important as it allows firms to focus their efforts on building their capabilities to meet the CSF's, or even allow firms to decide if they have the capability to build the requirements necessary to meet CSFs.
- Identifying critical success factors would assist in taking proactive measures for successful project management of construction projects.
- The identification and study of CSFs will also be useful for effective management for all type of construction projects, thus helping to raise overall level of productivity in construction industry.

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