

# Success Factors For Construction Projects

## **Introduction**

In construction industry, there are a variety of factors affecting project success and some play a key role. Project success results in the satisfaction of client and this is usually attributed to the contractor having ability to meet the expectations of client. In project success, client satisfaction has become important recently in all fields of production. Client satisfaction is a very effective way for companies to gain competitive advantage and to improve quality. Client satisfaction has several benefits for organizations (*Rahman and Alzubi, 2015; Burns and Bush, 2006*);

- Improvement of communication between parties and enabling mutual agreement,
- Recognition of the demand of improvement in the process,
- Better understanding of the problems,
- Evaluation of progress towards the goal,
- Monitoring and reporting accomplished results and changes.

A contractor must pay a great attention to the client expectations if the project is to be satisfied at required level. Several factors can be considered to measure the success of any construction project. Figure 1 shows the client's requirements and a successful combination of these factors provides a satisfied client with the project (*Ashworth, 2004*).

Researchers have paid attention to the project success and they identify key factors for project success in order to use limited resources properly to meet client expectations. This paper highlights important success factors for construction projects in order to satisfy main stakeholders involved in the project.

## **1. Project Success Factors from Different Perspectives**

Many researchers have investigated the importance of client satisfaction in construction industry (*Rahman and Alzubi 2015; Yasamis et al 2002; Maloney 2002; Torbica and Stroch 2001*). Cheng et al (2006) states that "client satisfaction is a fundamental issue for construction participants who must constantly seek to improve their performance if they are to survive in the presence of the concept of globalization of construction services".

Rahman and Alzubi (2015) carried out a research to describe the most important factors that affect client satisfaction in Jordanian construction industry. The research results in that client satisfaction is affected by seven important factors. These factors are; Cost performance, Time performance, Safety performance, Site personnel skills, Management

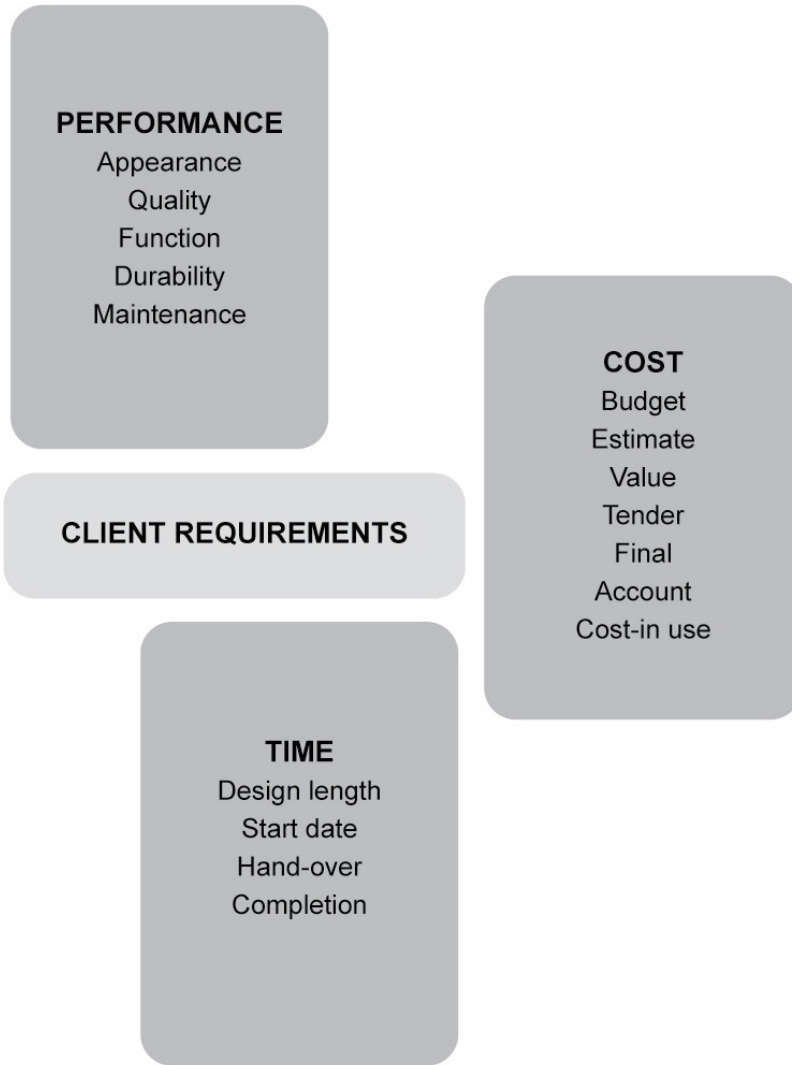
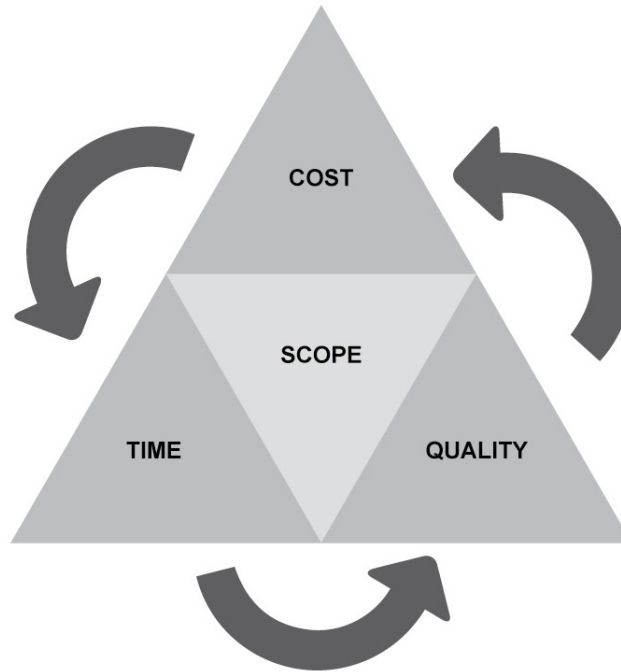


Fig.: 1  
Client Requirements (adapted from  
Ashworth, 2004).

capabilities, Communication skills and Contractor service quality. The study of Samrit and Patil (2016) undertakes the success factors at seven categories as Mission & Goals, Material Related Factors, Financial Resources, Pricing Policies, Owner Satisfaction, Owner-Contractor Relationship and Managerial Skills of the project manager. Among these factors, the most influential critical success factor is the pricing policies and the least one is the material related factor.

Chan et al (2001, 2002) define project success as “an abstract concept and states that determining whether a project is a success or a failure is highly complex”. Chan et al. (2001) present a framework for measuring success of construction projects. In the framework the factors affecting project success are; Cost, Time, Safety, Quality, Participants’ Satisfaction, User Expectation/Satisfaction, Environmental Performance and Commercial Profitable/Value. Kärnä et al (2004) approach the client satisfaction as the quality evaluation and the success assessment of a company’s quality improvement program. Factors for client satisfaction in the Finnish construction industry are considered as quality assurance and handover, environment and safety at work, personnel, co-operation, site supervision and subcontracting. Items of quality assurance and handover have a strong influence on client satisfaction.

Fig.: 2  
Triple Constraint of a Project



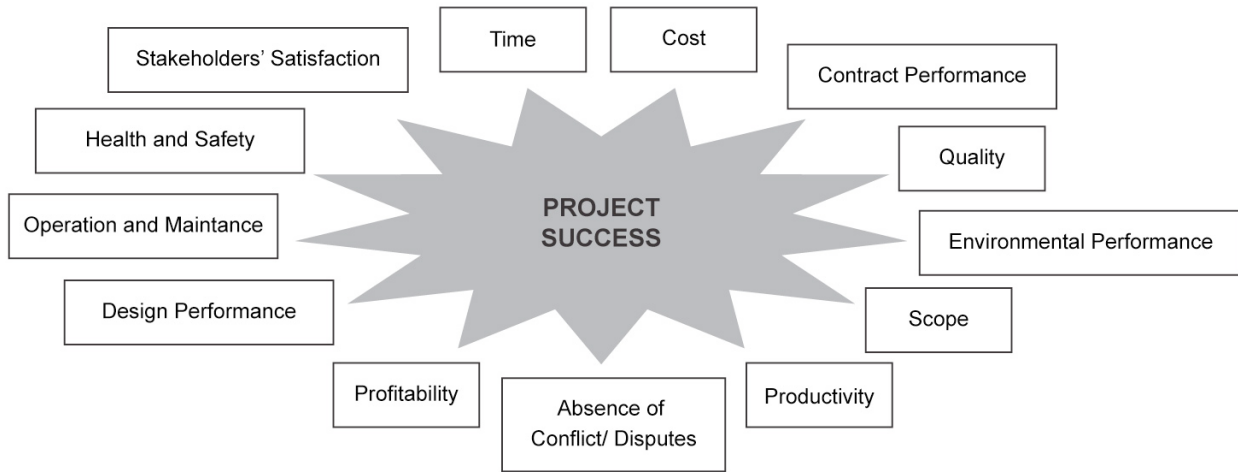
According to Parfitt and Sanvido (1993) the definition of success changes from project to project and it is the degree of meeting project goals and expectations. Construction organizations can assess the success of projects in a different way depending on their own objectives (Chan et al., 2002). Gunathilaka et al. (2013) review conceptual and empirical studies regarding the project success factors and success criteria. They present 21 success factors and 9 success criteria according to their relative importance. Project success criteria are considered as Budget/Finance/Cost performance, Technical performance, Schedule performance, Stakeholder satisfaction, Time performance, Customer satisfaction, Quality performance, User satisfaction, Productivity / efficiency.

In construction industry the clients also play an important role in the procurement. In any construction project, if the project is within the estimated budget and defined quality, then the client will be satisfied. Quality of a product may seem to be the priority of a client. However, quality is not directly dependent on the cost of the project. Quality of construction projects can be regarded as the fulfillment of expectations of those participants involved (Omonori and Lawal, 2014).

## 2. Important Success Factors

Researchers have point out a variety of success factors to improve the performance of projects. However, Time, Cost, Quality and Scope (Figure 2) are the main factors for the client satisfaction and thereby for the project success. These four factors are related to each other and any failure in one of them failed directly affects the others. Therefore, it is important that each factor should be clearly defined, planned and controlled at every stage of construction project process.

Regarding the success factors presented in current literature, it is considered that in addition to time, cost, quality and scope, the important project success factors should also include Health and Safety, Environmental Performance, Stakeholders' Satisfaction, Operation and Maintenance, Contract Performance, Productivity, Profitability, Design Performance and Absence of Conflict/Disputes as shown in Figure 3.



**Fig.: 3**  
Factors for Project Success (adapted  
from Chan et al, 2002)

### **Time**

Time is defined as encouraging the completion of a project within the specified duration by using available resources in an efficient way. In a construction project, it means planning, programming and monitoring of activities, using the resources of men, money, materials, machines and methods in an efficient way for the Project success. Project time and time overruns are key points for a project. Then, in this sense, the project performance is measured by comparing the planned and actual duration throughout the project cycle. Monitoring the progress of the work becomes important and if there is any, the reasons of deviations are determined to ensure that necessary revisions are made. Completing the project 'on time' is a substantial success criterion.

### **Cost**

Cost is defined as encouraging the completion of a project within the specified budget by using available resources in an efficient way. It is the budget estimation of the project from concept to completion. Project cost and cost overruns are key points for a project. The cost of a building is affected by a variety of factors such as building size, shape, planning efficiency, storey heights, total height and buildability.

Cost also refers to the estimation of a project cost at the beginning of the project process so that the client and contractor can make the necessary monetary preparations. An enlightened client will require cost estimation not on the basis of initial values but rather in terms of life cycle cost analysis. Recently, it is more important than ever to understand correctly what a project cost will be in a 'cradle to grave' concept. Therefore, the use of Life Cycle Cost (LCC) concept becomes important in construction projects regarding operation and maintenance costs. This is a valuable approach in terms of "value for money". ISO 15686:5 (2008) defines LCC as a methodology for the systematic economic evaluation of the life cycle costs over the period of analysis, as defined in the agreed scope. LCC is used to compare design alternatives regarding initial, maintenance, operational and disposal costs of a building.

As Figure 4 shows the greatest opportunities for influencing project performance occurs during early stages of project life cycle. Any decision made at early stage directly affects total project cost and can provide cost reduction at about 35 per cent. Influence of changes to cost at later stages is low.

### Quality

Quality is defined as encouraging the completion of a project meeting the requirements of materials, workmanship and machinery of the project. As quality is concerned, the factors also to be taken into account are technical specifications, function, and appearance. Hatush and Skitmore (1997) define quality as “the totality of features required by a product or service to satisfy a given need”. ISO 9000 (2000) defines quality as ‘the degree to which a set of inherent characteristics fulfils requirement’.

Everybody in construction industry is responsible from quality. As Arditi and Gunaydın (1997) mentions, quality is an integrated effort in the different phases of the project (*feasibility, design, construction, use and disposal*) to increase client satisfaction by continuously improving performance.

The most important factors for quality defined by Chua et al. (1999) are; owners need thoroughly understood and defined, regular quality control and quality assurance activities, regular monitoring and feedback by top management, top management’s support, and availability of resources as planned throughout the project. Rahman and Albuzi (2015) define client satisfaction as the difference between actual and perceived quality performance.

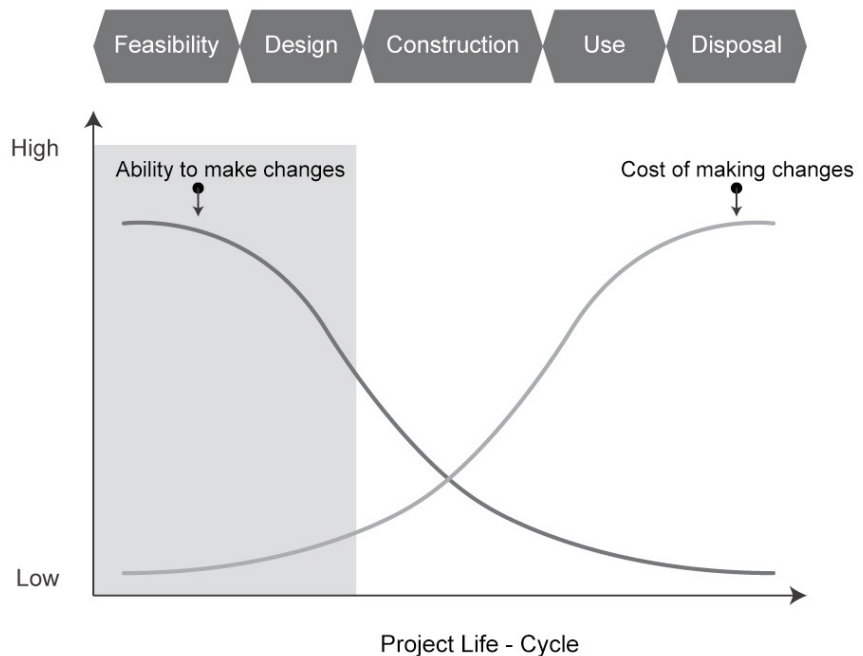
### Scope

Scope is defined in PMBOK (2000) as “the process required to ensure that the Project includes all the work required, and only the work required, to complete the Project successfully”. Scope has a direct influence on a client satisfaction. Therefore, it is important to define and control what is or is not included in the project. Scope management is the careful monitoring and control of the work necessary to complete the project (PMBOK, 2000).

### Health and Safety

Health and Safety are defined as encouraging the completion of a project without having fatal accidents and injuries. Many researchers (Kärnä, 2004; Maloney, 2002; Soetantoet al, 2001) consider safety as a dominant factor in all phases of a construction project As const-

Fig.: 4  
Ability and Cost of Changes



ruction sector is main contributor to fatal accidents, improving safety in construction has a priority in almost every country around the world, (Ahmed et al., 2000; Bhattacharjee et al., 2011). As mentioned by Bhattacharjee et al. (2011) almost 60% of all fatal accidents in the construction sector are caused because of the decisions made before construction stage. In the event of accident, the client and contractor will face financial losses and time delays as well as legal situations. Therefore, a safety program is must to raise safety awareness in the construction site.

### **Environmental Performance**

Environmental awareness is placed on the heart of construction sector implementation due to its high economic importance and strong environmental and social effects (Opoku and Fortune, 2011). Causing approximately 30-40% of total energy consumption and about 20-30% of greenhouse gas emissions, construction sector is the primary consumer of natural resources and is effective in environmental pollution (UNEP, 2007; Schultmann and Sunke, 2007).

Environmental impacts of construction sector include material, energy, water and land use and also waste generation. Energy consumption and gas emissions are directly related to global warming and the depletion of non-renewable energy sources (Forsberg and Malmborg, 2004).

Life Cycle Analysis (LCA) is a useful method in assessing the environmental impact of a construction project. As described in ISO 15686 (2008), LCA provides “a systematic set of procedures for compiling and examining the inputs and outputs of materials and energy and the associated environmental impacts directly attributable to the functioning of a product or service system throughout its life cycle”. Environmental satisfaction is measured by the reduction in energy consumption and waste; in using recyclable/renewable materials during construction process. In addition, indoor air quality is an important criterion for environmental assessment.

### **Stakeholders' Satisfaction**

While Liu and Walker (1998) consider the satisfaction as an attribute of success, Chan et al. (2002) describes it as the level of ‘happiness’ of people affected by a project. Many researchers agree that stakeholders’ satisfaction has been an important measure (Sanvido et al., 1992; Parfitt & Sanvido, 1993 and Cheung et al., 2000). Project stakeholders can be individuals and organizations involved in the project, or those may be affected by the results of the Project. In a construction Project, typical stakeholders are client, designers, contractor, subcontractors, project manager, users and suppliers. Their level of satisfaction can be an indicator of project success.

Users are the most important participants actually spending most of time in the final constructed facility. Therefore, ensuring that the users’ expectation and satisfaction are met is essential. Torbica and Stroh (2001) believe that if end-users are satisfied, the project is accepted as successful in the long run including operation and maintenance stages. In the opposite case, a failure in user satisfaction means the failure of the project.

### **Design Performance**

The design of a construction project is consisted of function, technology and aesthetics. Researchers highlight the importance of functionality. As stated by Kometa et al. (1995) as well there is no point in undertaking a project if it does not fully function as intended. Design performance is an indicator of the meeting of project stakeholders’ expectations and the degree of conformance to all technical specifications (Chan et al., 2002). Quality, technical performance, and functionality are important parameters for all parties involved in the project.

Functionality of a project indicates that the project will eventually be used. If a project

does not function as required, then it probably results in dissatisfaction to its users. A good designer should be knowledgeable about the materials, men, machines, money and methods, which will be required for the design. Aesthetics is considered as a combination of the building purpose and location within the built environment (Ashworth, 2004).

### ***Productivity***

Productivity is assumed as the amount of resource required to complete a task (Chan, 1996). Productivity is mainly considered in construction where most of the work activities are going on. It is another indicator of success. The contractor should organize the available resources in an efficient way to meet the cost and time targets (Chan et al, 2002). Productivity influences the cost-effectiveness of projects.

### ***Profitability***

Financial success of a project is measured by profitability. Therefore, construction firms should be aware that their project is properly managed to gain profit (Chan et al, 2002; Parfitt and Sanvido 1993). Norris (1990) measures profit as the increase in the ratio of revenues to cost. Profitability refers to the total net revenue over total costs.

### ***Contract Performance***

In order to carry out works on site a contractor must be awarded with a contract. According to Guidelines for a Successful Construction Project (2003) the primary objectives of every contractor is to successfully deliver the project to the owner. In other words it is desired that the project be delivered to the owner at the time, cost, quality, safety and reasonable profit. Maximum efficiency and successful project delivery will be possible when the specific characteristics and requirements of each construction project are defined in the contract terms and the responsible party performs the general conditions work.

### ***Operation and Maintenance***

Operation and Maintenance stages are considered as necessity in order to ensure that a building functions and operates properly during its whole life cycle. As Ashworth (2004) states maintenance-free construction is largely a myth. A good design, selection of appropriate material and method of construction, and also the proper use of the components will help in reducing maintenance problems and costs. A good maintenance process will keep the project maintained for long time.

The operability ensures that equipment, system and plant are in functioning condition as defined previously. Maintainability is concerned about how quickly and easily a system can be restored after a failure has occurred (URL 1).

### ***Absence of Conflict/Dispute***

Smith (1992) defines conflicts as ‘endemic’ in construction industry. Regional features have a direct affect on the cause of conflicts. According to Wall and Callister (1995), conflicts can lead to difficulties in communication between individuals, as well as personal and professional relationships. As indicated by Cheung and Suen (2002), if the dispute is not properly managed, the project success can be damaged due to the increase in project duration and cost and the decrease in team motivation.

David (2009) suggests some important success factors to prevent disputes. These factors are; owner needs thoroughly understood and defined, regular monitoring and feedback by top management, adequate communication among all project participants, availability of resources as planned throughout the project, and timely and valuable decision from top management. In case that any conflict during construction is not resolved, dispute becomes more complicated and difficult to resolve. Disputes and conflicts can be highly avoided if the project scope is clearly defined by the owner and if it is understandable

for both contractor and project manager. Top management and owner can also help in resolving the conflict (*Tabish and Jha, 2011*).

### 3. Conclusion

Project success varies from project to project depending on their properties and means different to participants with different perspectives and goals. A variety of factors are presented in this paper. These factors are; Health and Safety, Environmental Performance, Stakeholders' Satisfaction, Operation and Maintenance, Contract Performance, Productivity, Profitability, Design Performance and Absence of Conflict/ Disputes. Early design stage of a project life cycle is the most cost and performance effective stage to the changes. Therefore, a good management of design phase is one of the most challenging phases in construction industry. It is suggested that the success factors should be carefully studied at the beginning of the project cycle in order to achieve the project success at the end. Satisfaction level of each factor can be measured throughout the project process. While time, cost and quality can be assessed in both design and construction phases, health and safety, productivity, absence of conflict/dispute and contract performance can be measured at construction phase. Environmental satisfaction is the concern of construction and use/disposal phases. Profitability, design performance and operation and maintenance are taken into account in use phase. The participation of the stakeholders to the project from beginning to end will help the overall success of the project●



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