

Critical Success Factors in Construction Related Projects in Oman

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Abstract

There is an expansion in the project management field as an increased number of companies are becoming more “project-oriented” and are following and using technical knowledge in building the business models to help them their chances of success. In practice, many factors contribute to the success of project implementation. However, it is necessary to define the critical ones. Critical success factors (CSF) are extremely crucial as any organization is obliged to know which critical factors are utmost accountable and are the driver of project success. Therefore, this research provides an overview of the requisite success elements of a project for it to be profitable and to dispose of the chance of failure. The study concentrates on construction-related projects in the Sultanate of Oman. It reviewed the existing literature and hence, we identified nine critical success factors clusters that were critically analyzed via an online survey that was distributed to 120 different practitioners working at different companies in Oman with a respondent rate of 47.5%. Further, the survey asked respondents to rank specific sets of factors that lead to project failure. By the response, it is revealed that factors related to defining a project scope clearly (clear project definition) and team motivation to achieve project goals (competent project team members) are critical factors for a project to achieve its success among the other defined CSF. Further, the results show that inadequate planning is the most commonly encountered factor leading to failure in construction-related projects in Oman.

Keywords

Critical Success Factors, Project Management, Construction Projects, Project Success, Project Manager.

1. Introduction

Over the years, the success criteria changed and were developed according to the needs and requirements of the stakeholder. Earlier studies on project management are not only limited to study approaches used in managing projects, but some were expanded to include other aspects that effects project implementations such as communication, human

factors, stakeholders, advanced considerations, and knowledge transfer (Abylova and Salykova 2019). To promote changes, companies are putting into action the project management methodologies as a management tool, which ensures that adequate resources, complete project management, and strategic alignment are achieved.

Recently, an increasing number of businesses are distinguishing that elucidating company techniques into movements requires creativity (Baccarini 1999; Gunduz and Almuajebh 2020). The attention of the scientific community to define critical success factors (CSFs) contributing to the best project management practices that can explicitly or circuitously contribute to project performance has been the emphasis of several studies (Alias et al. 2014). Nevertheless, the definition of project success has revolved over the years (Vartiak and Lukas 2015). Different stakeholders perceive project accomplishment differently (Lim and Mohamed 1999). Consequently, misunderstandings and disputes between multiple parties over which factors contribute more to project success have risen (Collins and Baccarini 2004).

Earlier literature linked project management and project performance to the restriction of three objectives: the time or schedule, cost or budget, scope, or performance (Abdullah and Ramly 2006). Practically, in many projects, especially complex projects, it is exceptionally difficult for a project manager and his team members to decide on the project plan to accomplish the project's defined targets within the prearranged budget and period, tactics, and acceptable actions. Thus, the lead project manager is required to have structured, organized, ordered, and controlled decisions at all phases of the project, while knowing which factor increases the chances of success (Al-Hinai et al. 2020a). It is broadly acknowledged that project managers require concerted attempts to achieve an improved awareness of the possible impacts of the key performance indicators that could help their work and decisions on current and future project management (Alexandrova and Ivanoca 2012). Therefore, there has been a massive shift in research interest in the project management literature on elements that contribute to the high-quality result or non-success of projects (Al-Hinai et al. 2020b).

Some have defined project success as “the achievement of some predetermined project goals, which commonly include multiple parameters” (Lim and Mohamed 1999) while others defined it as “project success delivers established goals or objectives of the project” (Abylova and Salykova 2019). Basically, all projects require specific objectives and requirements to be met within the predetermined budget and schedule. Therefore, it is essential to ensure the project succeeds and set its failure probability to the minimum. Hence, the assessment of incentives that offer a rational, rigorous decision-making mechanism and strong selection process, etc. are crucial methods to enhance the effectiveness of project delivery (Chan and Chan 2004). Therefore, the prime focus of the study is to identify which CSF is mostly responsible for the project's success in construction-related projects in the Sultanate of Oman. Understanding these issues will help and guide the firms to take proper measures in decision-making throughout the project and reduce the possibilities of risk and failures of a project. To achieve this, this study will perform a systematic literature review to identify CSF's for the projects found in the literature and identify the most relevant ones. After that, a survey is conducted to rank the identified CSF from the perspective of practitioners in construction projects.

2. Literature Review

Several scholars have identified a large number of important performance factors that influence the progress of a project. It is noted that the depth and breadth of many studies targeting CSF are general. However, Pinto and Covin (1989) have long pointed out that factors that influence a project or scope range from project to project, from business to industry, or even from country to country. After reviewing related literature and consulting with experts from academia and industry, we were able to define nine most important factors' categories from the perspective of industry in Oman. These nine categories are discussed in the following subheadings.

Effective communication:

In developing an environment for project success, good communication is vital (Hartman and Ashrafi 2002). According to the quantitative index of reference, also known as the occurrence frequency, factors related to project communication mentioned in the concluding rankings are placed very high (Alias et al. 2014). Several researchers have underlined and reinforced the importance of good communication in general and two-way communication in specific in a project's success. Communication is not only relevant to be within the project team but is also between the team member and other stakeholders within the organization or outside of it (Pinto and Slevin 1989). Further, Martínez-Rojas (2016) has mentioned that the inability to connect efficiently is the main obstacle to the progress and

success of any project. In Milis and Mercken (2002) study, it is concluded that effective communication between team members can lead to more reasonable goals, stronger interactions, and more productive teamwork output. Nonetheless, all users who are involved in the company organization, including senior management, should be kept informed.

Project Scope Definition:

A project is distinct as “A temporary endeavor undertaken to create a unique product, service, or result” according to the definition of the Project Management Institute. The ideal definition is a prerequisite for its effectiveness and understanding of the project priorities and goals among all stakeholders (Lamprou and Vagiona 2018). Moreover, it is likewise vastly important that the project team comprehends the project along with its goal and objectives. Hence, understanding the project’s ultimate objective is a key factor affecting project success (Pinto and Slevin 1989). Furthermore, earlier studies showed that the statement of the objective requirement is to be vibrant and tangible (Pinto and Slevin 1987), accurate (Mills and Mercken 2002) and quantifiable (Wateridge 1998). Poor definition of the project’s scope leads to project failure (Mirza et al. 2013).

Top Management Support:

The management of the project relies on the top management authority, direction, and assistance (Black and Porter 1996). Thus, the encouragement and assistance of top management are known to have a large impact and major effect on the project performance (Zwikael 2008). In addition, the commitment and support from the senior management provides a crucial meaning to a project and can rise the accomplishment rate from the initial growth stage (Lamprou and Vagiona 2018). The versatile tools accessible for organizational resources were seen as a vital and primary prerequisite for the successful implementation of project activities. Without a definitive and well-timed response and help from the top management, this might be awkward (Alexandrova and Ivanova 2012). The team members’ perception of whether or not the project is worthwhile is influenced by direct managerial support. However, many senior managers are not aware of how their behavior can influence the success of a project (Young and Poon 2013). Recently, Moradi et al. (2020) have also concluded that top management support has contributed to success along with 64 other factors. Moreover, it has been emphasized that an undertaking supervisor could not attain the purpose of the project despite the leadership quality until and unless there is support from the top management. The existing reports and findings show that both consistency of a project managers’ leadership and the encouragement of upper management are critical for the project’s greater success (Kanwal et al. 2017).

Competent Project Manager:

In fields that have the greatest bearing on successful performance and outcomes, the expertise and competence of the project manager is a mandatory prerequisite. The rising questions about the expertise of project managers have raised attention in the conception of qualifications and certifications, which can be used to test, identify and direct the expansion of management skills (Crawford et al. 2014; Al-Hinai et al. 2020b). Crawford (2000) defined competency as a combination of abilities and experience and individual features. A survey conducted by Alexandrova and Ivanova (2012) has presented that over 80% of the respondents agreed that the competence of the project manager is extremely important towards the accomplishment of the project. Further, the project manager’s professional and managerial skills and diligence, and competency are key components during the project phases (Lamprou and Vagiona 2018).

Client/End-user Involvement:

As an imperative consideration for progress in project scope management, greater focus is now being placed on client or end-user involvement in the project. In many organizations, user involvement has now been more encouraged and acknowledged for facilitating success in project scope management (Alkhaffaf 2018). Furthermore, it has been also suggested to include and continue to involve users from the very foundation of the project as long as they are required to improve the requirements for the system efficiently and effectively (Pinto and Kharbanda 1996). Many researchers have identified that one of the major accomplishment stories of the projects is the stakeholder executive reliant on the aspect that the success of the project is highly reliant on the stakeholder satisfaction (Jiang 2007; Travaglini et al. 2014). The user is essential to be involved in the project management procedure and be heavily committed towards the project goals to result in a successful project.

Project Control and Change Management:

Most successful have proper control and reporting systems that provide adequate monitoring and feedback that allows the firm to compare team performance against the project goals. Given the complication of the project, most projects’ requirements adjust to a certain notch. When a project is being implemented, the change of control becomes vital to

the accomplishment of a project (Wateridge 1999). The plan, control, feedback, and remarks are defined as part of the project's organizational procedures and general framework (Yong and Mustafa 2017). In addition, appropriate tracking and response processes allow the project manager to anticipate difficulties, track counteractive steps and ensure that no shortcomings are overlooked. McLeod and Smith (1996) early noted that a structured change control framework is an essential and important component of a conformation management system. Besides, effective projects are not only handling the transition but also about rapport management and instability (Bourne and Walker 2005).

Project Planning:

It is well established that proper planning is required to achieve the successful implementation of projects. Time spent on planning the project activities will reduce the risk of failure and increase project success (Huang et al. 2019). There is an ample amount of literature that provides evidence that project planning is a critical success factor for projects (Baccarini and Collins 2003). Effective planning is extremely important in all phases of the project. Once the original preparations crash, the project manager who is reluctant to plan it again and has not expected the negative aspects, would initially find the project stalling and inevitably result in a project collapse. Moreover, a study by Baccarini and Collins (2003) identified that there is a need for thorough, adequate, and effective project planning at all stages for the team to provide the best opportunity to meet project goals and objectives during the time of project execution phase.

Competent Project Team members:

Besides having a competent project manager, a highly skilled and experienced team is required to manage and execute large projects. However, because projects involve a wide range of duties and operations, individual projects necessitate distinct sets of unique team capabilities. The project team players should possess the skills and expertise which is expected from them to carry out the project successfully (McLeod and Smith 1996). Some of the defined project team personal competencies include communicating, cognitive ability, effectiveness, professionalism, and management skills (Usman 2018). Usually, competencies for project managers and project team associates are considered together. The project manager must ensure that the priorities and ambitions of the entire project team are dedicated to the project as a whole goal towards achieving the project's main objective. Alexandrova and Ivanova (2012) mentioned that the knowledge, skills, and personal traits should not be the only considered factors, but also the honesty element and versatility of the project team. Therefore, it is very significant to select project team members carefully.

Project Management Software and Techniques:

Project Management tools and techniques help professionals work and implement the different project processes (Besner and Hobbs 2006). The appropriate selection of which tool, method, or technique to be used for which project or project phase enhances the success rate. There exists many methods, software's, tools, and techniques that are used in managing projects such as (Jugdev et al. 2013):

- Project Knowledge Areas proposed by the Project Management Institute
- PM software such as Microsoft Project, Primavera, Microsoft Excel, etc.
- PM tools including Gantt charts, Work Breakdown Structures, Critical Path Method, Program Evaluation And Review Technique (PERT), Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, etc.
- Decision-making (DM) methods, including cost-benefit analysis, decision analysis, sensitivity analysis, decision trees, etc.
- Risk assessment tools including probability analysis, life-cycle cost analysis, reliability analysis.
- Information communication technology (ICT) support tools: such as integrated groupware (email, collaborative tools, shared access to web portals), video conferencing, virtual environments, and voice over internet protocol

3. Research Methodology and Data Collection

The conclusions of this study were obtained only by carrying out online meetings and surveys due to the global COVID-19 pandemic and the lockdown associated with it when this study was conducted. Individuals found it difficult to conduct face-to-face interviews. The online survey included a set of multiple-choice questions and short open-ended questions. The open-ended questions asked the opinion of the participants on critical success factors other than what has been questioned in the survey. The targeted population is the employees working on projects related to construction in different industries in Oman. Therefore, a survey consisting of 57 questions was randomly administered to 120 participants via online means of distribution including emails and other social media. The survey questions were designed after consultation with experts from academia and industry. The survey clustered the

previously identified CSF categories. This is done to know which CSF cluster is more critical for project success. Furthermore, this survey also tries to identify the most common causes or reasons for project failure according to employee perception.

The survey questionnaire comprises of three major sections. The first segment aimed to extract the demographic information of the respondents that included:

1. Gender
2. Age
3. Years of total experience
4. Designation
5. Size of the Firm
6. Industry

The first section of questions helps in categorizing the collected data from respondents. The second section of the questionnaire survey includes questions analyzing the nine critical factors clusters. The multiple-choice questions are used to confirm the level of importance of the nine clusters by giving their importance. The last section of the survey requests respondents to rank nine main factors proposed by senior executives that lead to project failure by using the frequency of score.

4. Discussion of Results and Findings

The number of respondents was 57 with a response rate of 47.5% working in various industries in Oman. This response rate is considered acceptable as it is higher than the expected average survey response rate is 19% in the meta-analysis (Shih and Fan, 2007). Therefore, the achieved response rate reduces the systematic biases due to the non-response. The respondents to the survey have an acceptable distribution representing industries with different sizes as shown in Figure 1. Of the 57 respondents, 35 were male (61.4%) and 22 were female (38.6%) with the majority of respondents having 0-5 years of experience which included 79% of the total sample. The survey recorded a 29.8% response rate from individuals working in construction-dedicated companies. Further, out of the 57 respondents, 59.6% hold the non-technical position and the remaining occupy a technical position at their respective company.

Besides the nine critical success factor clusters analyzed and identified in this study, 7% of the respondent in the open-ended questions have suggested other factors to improve project success. These suggested factors include self-evaluation, time management, constructive criticism, reporting weekly project status through a formal chain of communication, use of prince2 methodology in project management, and including buffer time to the due date for last-minute changes. Careful examination of the suggested factors reveals that these factors are actually included within the defined clusters in the survey.

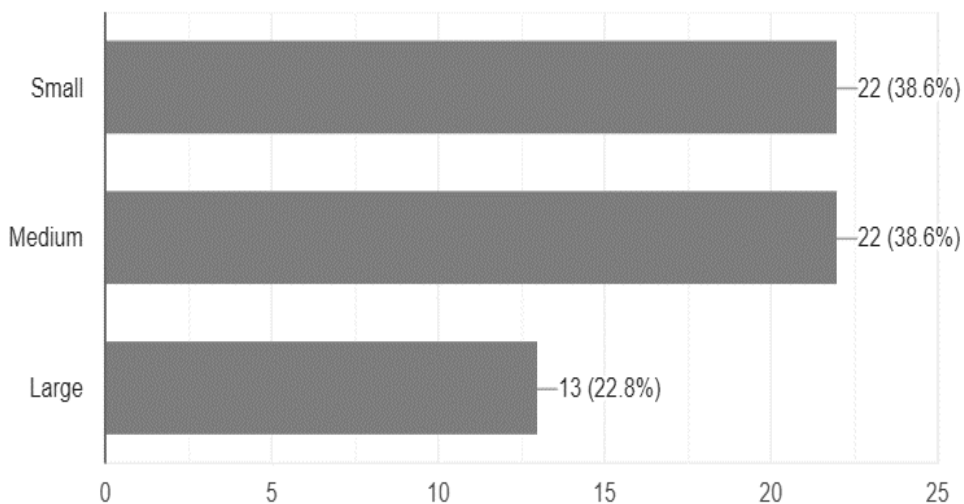


Figure 1: Placement of respondents by firm size

Table 1. Distribution of nine CSF Clusters by importance basis

CSF Cluster	Questions Related to Importance Level of:	Very Important	Fairly Important	Slightly Important	Not at all Important	I Don't Know	Total
Clear Project Definition	"The project has clear defined project scope"	72%	21%	5%	0%	2%	100%
	"The project's final deliveries are clearly defined at project startup"	55%	29%	13%	2%	2%	100%
Project Planning	"There is accurate budgeting and cost estimation at project startup"	57%	32%	7%	0%	4%	100%
	"There is adequate risk estimation at project startup"	53%	28%	18%	0%	2%	100%
	"An effective problem-solving procedure exists during project implementation"	47%	35%	14%	2%	2%	100%
Project Control & Change	"The project plan is updated on regular basis according to actual scenarios"	63%	18%	16%	0%	4%	100%
	"The project is broken down into smaller work packages with an appropriate level of detail"	50%	32%	13%	4%	2%	100%
	"The project progress is monitored closely by efficient tracking method"	48%	30%	14%	5%	2%	100%
	"There are suitable organizational environments for the project"	43%	36%	14%	2%	5%	100%
	"Documents are recorded regularly and managed well in project life cycle"	58%	32%	9%	0%	2%	100%
Top Management Support	"The Senior manager offers necessary help and support when requested"	44%	42%	12%	0%	2%	100%
	"The senior management commits to provide sufficient resources required for the project"	58%	30%	11%	0%	2%	100%
Competent Project Manager	"The project manager has sufficient PM knowledge, skills, and relevant expertise"	56%	25%	9%	2%	9%	100%
	"The project manager is capable of acquiring resources for the project"	58%	30%	11%	0%	2%	100%
	"The project Manager is authorized with appropriate power"	51%	33%	11%	4%	2%	100%
	"The team members are provided with required training"	63%	26%	7%	0%	4%	100%
	"The team members are motivated and committed to achieve same goal"	71%	16%	9%	0%	4%	100%
User Involvement	"Users requirements and expectations are realistic"	45%	43%	9%	2%	2%	100%
	"The Project stakeholders are well informed about the status of the project and the necessary information"	46%	46%	7%	0%	2%	100%
Effective Communication	"There is good communication, mutual respect, and effective conflict resolution among project team members, users, and project managers"	63%	27%	9%	0%	2%	100%
	"The project participant's performances are evaluated and feedback is given promptly"	39%	49%	11%	0%	2%	100%
	"A formal change management process exists in organization to manage project changes"	45%	27%	18%	0%	9%	100%
Project Management software and techniques	"Technology and Development methodology adapted in project satisfy project objective"	54%	26%	14%	2%	4%	100%
	"The project Management technique such as (Gantt chart, PERT, CPM) are used to support project management"	49%	26%	11%	4%	11%	100%

From Table 1, it is very much evident that 72% of the 57 respondents identified defining the project scope clearly as “very important” as means of the project achieving its success. In addition to this, the employees pointed out that the motivation of team members of the project (71%) along with applicable training (53%) is also another contributing factor to project success. In the literature, many researchers such as Nguyen and Mohamed (2021) have emphasized the vivid description of the project is a critical element along with a consistent definition of the aims mentioned in the mission statement that assists the team associates with what is compulsory from them to achieve the goals. Providing a clear specific project scope that includes the overall aims and objectives for the project is extremely crucial for all stakeholders to be aware of. Project Scope is one of the triple constraints along with other constraints i.e., time and cost. Van Wyngaard et al. (2012) have researched scope as the primary triple constraint variable among others. Moreover, training team members and developing their own capabilities by active participation in education is crucial leading to project success (Oh and Choi 2020). It also increases the skills of the team member, which can be later utilized on other projects. The individual’s efficiency and accuracy of the outcome are also increased because of training. Table 1 also presents that 11% of the respondents are not aware of the project management techniques and tools such as Gantt charts, Program evaluation review technique, or Critical Path method to use in project management. This could be mainly due to the absence of awareness about such tools and techniques. Hence, proper education and training on the basics of project management could enhance the skills of the team members that could result in a positive impact on the success of any project.

Furthermore, the survey requested respondents to rank nine main known causes of project failure as were identified by a number of senior executives. Table 2 shows the resulting ranking from 1 to 9, where 1 is the highest and foremost reason causing failure and 9 is the least cause.

Table 2. Ranking of main causes of project failures in construction-related projects

FACTORS OF PROJECT FAILURES	RANKING
Inadequate Planning	1
Unclear Project Goals and Scope	2
Ineffective communication	3
Unrealistic expectations	4
Unskilled team members	5
The project manager not meeting the expectations	6
Schedule overrun	6
Costs Overrun	8
Underestimation of risks	9

The topmost cause of project failure is linked to inadequate planning by respondents followed by unclear project goals and scope. This finding supports the previous finding of having factors related to defining the scope cluster as a critical success factor. Further, this is similar to the previously reported finding by Belassi and Tukel (1996), who stated that factors related to the Project Manager’s performance are ranked second in construction industries. On the other hand, underestimation of risks is ranked be the least cause of project failure. This can be explained by the fact that construction-related projects experience less unexpected disruption during their execution process. Most of the risks fall under know-unknowns’ criteria. Hence, the majority of companies are able to set contingency plans to deal with such disruptions.

5. Conclusion and Recommendations

The literature has mentioned an ample amount of critical success factors. The project failure rate can be minimized if careful consideration is given to defining critical factors leading to project success as well as defining the major causes of project failure. The main purpose of this research was to identify the major critical success factor which affects the construction-related projects in Oman as there is a growing demand in the construction industry. The study defined nine clusters of critical success factors. A carefully design survey was used to identify the level of importance of these clusters as well as rank the main causes of failure as seen by practitioners in construction-related projects in Oman.

The study concluded that factors related to clear project definition are very critical to project success and improper

planning is the most common cause of failure. Furthermore, this study has concentrated on a specific related type of projects executed in a specific geographical region. In addition, this research did not cover other types of factors such as environmental factors, social factors, political factors, etc. that may affect the project's success or failure. Therefore, the applicability of this study should be limited. However, these can be used as a basis for future studies.

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