

A conceptual approach in developing a project manager's skills framework (PMSF) for improving the performance of complex projects in Kuwait construction industry

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Abstract. The aim of this study is to establish the conceptual of project manager's skills framework (PMSF) that is required in improving complex construction projects in Kuwait. The knowledge, skills, and experiences of the project managers in handling the various resources and processes related to project management had direct impact on the outcomes of the project. Large and complex construction project in Kuwait have been facing delayed deadlines. These escalate the cost of the project, and also negatively impact the quality of the project. The study uses mixed methodology in collecting the empirical data. The objective is to collect empirical data through survey, followed by interviews. The survey will be designed as closed-ended and using 5-point Likert scale and distributed to the project managers. The responses will then be used to carry out in-depth personal interviews with project managers currently involved in complex projects. The role of project manager as one of the most important is also understood from the findings. The literature and empirical findings are used to achieve the aim of developing the PMSF. The conceptual of Project Manager's Skills Framework (PMSF) development is also presented.

1. Introduction

The construction industry is one of the most important industries that play a key role in the national economy growth. This industry has witnessed remarkable development in various fields and in all aspects. In recent days, improving the performance of construction projects has been considered as one of the essential research topics. Construction projects could be recognised as simple projects, organizationally complex, complex in technical way and projects that are recognised as critical accomplished mission [1]. [2] clarified that simple projects are these projects that contain a repeated forms and designs which need only simple managerial and operational skills to be accomplished; therefore, such projects often succeed and directed by junior projects managers. On the other hand, organizationally complex projects are these types of projects that gain its complexity due to the nature of organizational surroundings that could directly affect the criteria on how managers can take decisions in the organization [2]. [3] mentioned that the complexity in such projects comes from the issue of deciding the best processes that could be implemented in organizational environment and could influence its overall performance.



1.1. Construction project complexity

The complexity of construction projects is constantly increasing due to the newly technological and operational initiatives. [4] stated that construction projects that are recognized as technically complex could be recognized in several forms, such as when using a new technology that are not understandable by the project members. In addition, this type could be specified when there is no qualified manager that could manage the new technology involvement although it is recognized to the organization [3]. [5] argued that the project complexity could be produced through two main features; which are uncertainty and structural complexity. Uncertainty could be produced through the uncertainty in utilised construction methods or either in the required goals [5].

[6] has classified the complex projects from another perspective, where he clarified that these projects could be identified as the projects that will demand managers with special technical and managerial skills that could make them able to show a high-quality performance level. Shane et al. [4] demonstrated that each organisation could face the challenge of continuous changes to cope with the newly technology innovations that could enhance the organisation performance. This will require a highly committed and hard worker manager with strong planning abilities that could enable such managers to adapt with the nature of complex projects [3]. The literature points out that there are various factors that contribute to the success of complex projects. However, one of the common and most important factors is the role of PM. Complex projects require highly skilled and knowledgeable individuals to head the project. There should be a strong link between skills of the PM and the elements of the projects to ensure successful outcomes.

1.2. Project manager's skills

Various authors [5, 6] have emphasised that the complex demanding and the dynamic requirements of the complex projects call for project managers with high capabilities who can manage the construction process from the early stage to the final stage of the construction project successfully [5, 6, 7]. Furthermore the complex projects require a project manager who holds critical specifications that differ from the specifications of the project manager of simple projects [3, 8]. The complexity of complex projects requires the manager to be able to develop new initiatives and new ideas that are not consumed in order to ensure the success of the project. On the other hand, the successful complex project manager must be able to transform the complex areas of the project into easy elements that are easily understood and realized by employees [7]. This means that the project managers must have the necessary management skills that will help them succeed in the project.

[9] stated that there is a set of characteristics and attributes that should be owned by the project manager to ensure the success of the project, where earning these qualities and characteristics is being through exposing to a wide range of complex projects. One of the main skills that each project manager must have is the ability to deal with various kinds of individuals in good way in different situations throughout the whole life cycle of projects. As the main responsibility of the project outcomes comes to the project managers; they must have the required skills that could enable them to influence the work members in effective way to cover the project objectives [3].

The discussion here indicates that there is a difference between PM that handle complex project and simple projects. The characteristics and attributes of PMs in complex projects relates to the outcome of complex projects. This indicates the need to study the PM skills and project elements to identify and design a framework.

Each project manager must create strong relations with the team members to meet the project objectives, in addition to increasing organisation profits with keeping in mind customers' expectation [10]. There are six main skills must be owned by each project manager to make them succeed in their managerial practices. One of those skills is the manager cooperation, sincerity and his /her ability to understand various behavioural characteristics of the team members [11]. Adding effective leadership style is another skill that must be owned by project managers. The third proficiency is managers ability to influence and motive work team toward covering the organization objectives. This reflects the ability of project manager to respect each work member and accept individuals on their situation and without

any attempt to change them by force. Managers must also have the ability to recognize the conflict sources, influences and should own the managerial skills to solve conflicts. The final ability that must be owned by project manager is the awareness toward the cultural differences of the work members.

Furthermore, self-confidence is identified as another factor that could influence the ability of project managers to succeed. Self-confidence could provide managers with the ability to take the right decisions in the correct time [12]. Self-confidence could also enable managers to perform complex responsibilities and solve expected problems smoothly [3]. Additionally, project managers feeling toward their performance has an enormous effect on the project success, and this managerial skill play a vital role in succeeding construction projects [13].

1.3. Elements of complex project

[4] clarified different elements for project complexity, those elements were classified in different categories and each category comprised of several elements related to it. Some of those elements are: cost elements (material cost, cost analysis and estimation, payment restrictions) , schedule elements (unclear sequence of the construction process, resource availability, uncertainty in process and materials used in structure, risk analysis), technical elements (design methods and specifications, scope of the project, delays, technology usage and details required to complete the project clearly), political issues and legislative process, size and location of the project.

[3] have also investigated a number of complexity elements from the viewpoints of five senior managers of complex projects in five different organizations including: unclear project scope, type of project participants, technical problems of the projects, complex requirement of customer, uncertainty in scope and aspects of projects, uncommon feature and unfamiliar construction elements, political issues around clients, unusual structure design, incomplete and unknown elements in design, size and location of the project, lack of details, high level of risks and resources unavailability.

[14] mentioned that construction project complexity refers to the interactivity between project elements and the number of project complex elements that make it difficult to be managed and achieved. So, he represented thirty-seven different attributes and elements that were truly representative of construction project complexity. Some of those mentioned elements are: stakeholder management (complexity of customer requirements, inspection and approvals from regulatory agencies and entities, etc.), Governance (number of project's partners, number of times a change order on project has occurred, etc.), Fiscal planning (difficulties in paying to labours, number of funding phases, etc.), Quality (quality of materials utilized in project), Legal (number of permits to be required, difficulty in obtaining design approvals, etc.) , Design and Technology (difficulty and integrity in structural design , unfamiliar and uncommon construction elements, Uncertainty in the utilised construction methods, lack of details in design, company unfamiliar with technologies involved in construction phase), Location and size of projects (execution hard site, include many risks, huge size of the project), Scope (undefined and uncertain project scope), Project Resources (quality of labours, quality of materials, sequence of the projects due to the availability of sources).

1.4. Project manager skills framework (PMSF)

Delay in construction projects represents one of the most important factors that is significantly affecting Kuwaiti construction projects in a negative way and required a solution and a well management from their project managers [15]. The author also stated that time and cost overruns in Kuwait have largely been because of issues of attempting to utilize technically advanced solutions in construction while there is a huge lack in Kuwaiti project managers' skills and experiences. It is further demonstrated that the lack of qualified Kuwaiti project managers that are unable to manage simple projects, not just complex projects, and the non-existent of specific Kuwaiti PMSF, explains why the Kuwaiti construction industry is always faced with financial, delaying and insoluble conflict problems between its parties. This can be both time consuming and costly which may develop into great risks that affect the achievement and management of different Kuwaiti construction projects [15].

[15] added that changes in designs/drawings, finance and payments problems, delays in paying providers and contractual workers, poor administration of construction site, change of requests made, unanticipated conditions in the site, hierarchical changes, administrative changes, erroneously utilization of construction innovation and absence of decision making skills were all elements that cause of serious problems affecting the completion of projects and are caused due to the absence of qualified project managers and absence of specialized Kuwaiti PMSF that could guide project managers in their mission and enhance their management abilities in a way that ensure their productivity and efficiency in managing both simple and complex construction projects [15].

Poor management of the construction projects and the occupation of unskilled managers for complex projects may lead to several negative effects on the duration and completion of projects. Those construction delays and duration issues are frequently responsible of transforming productive projects into complex losing projects. So, these delays can be reduced or prevented by an increased pre-project planning and through successful project management as they are one of the most critical success factors of the construction project accomplishment [16]. Hence, this led the study to explore on developing a Kuwaiti PMSF that would solve the problems of complexity and delay that encounter the projects in Kuwait and increase the performance of project managers in a manner that improves project management and avoids delays and complications that may occur in projects due to lack of experience and skills of project managers.

The critical problem statement of this study that the construction sector in Kuwait face many risks and problems that hinder their progress and their success, especially problems of delay and cost overruns, as well as conflicts and disputes that are difficult to be solved. In addition, the Kuwaiti construction sector is witnessing rapid development that has led to the emergence of many complex projects that require high management skills from project managers which shows the need for a Kuwaiti PMSF for improving the performance of complex projects in Kuwait construction industry in which this framework is similar to those ones applied by construction industries of several countries around the world, such as Japan, China and the United Kingdom, which is based on adopting PMBOK's project management skills and help in guiding project manager to the most successful skills that must be possessed by him/her in order to achieve and manage their projects successfully. All of these previous mentioned issues show and demonstrate the incremental need to propose a project manager's skills framework (PMSF) to improve the performance of the complex projects in Kuwait, and this is the aim of this study.

1.5. Complex project success and challenges

According to all above, project managers may consider as the main reason of project success or either failure according to their attributes and communication skills. [11] stressed that if the project manager did not have the necessary skills to manage the project; this would contribute significantly in increasing the project failure rate. Complex projects face many challenges during implementing its activities, and the capabilities of these projects to face and deal with such challenges are low because of the nature of these projects. Therefore, many complex projects which cannot face the challenges from the beginning would be failed. [3] confirmed that the critical key for ensuring the success of complex projects is having a project manager who has the required skills to manage the project successfully.

1.6. Project manager skills in complex projects

Regarding the influence of the project managers' skills on the performance of construction projects, previous studies have indicated that the project manager's skills have a direct impact on the performance of the construction projects and therefore on the project's success [13, 17, 18, 19]. [18] pointed out that the use of appropriate skills in managing the different types of projects contribute to improving the performance of construction projects. [17] also stressed that there is a relationship between the skills used by project managers in the management and project performance, where these skills include teamwork, effective communication with staff and contractors, and effective resource management.. [17] added that applying these skills improves project performance. [19] concluded in his study that the

use of open dialogue, communication, effective planning and training, giving feedback to staff helps to minimize possible errors when implementing the project, and helps to complete the project on time and within the specified budget, thereby ensuring the success of the project.

1.7. Construction industry in Kuwait

It is noticed that the Gulf Cooperation Council (GCC) is witnessing a remarkable development in the construction industry due to many reasons which include the existing economic conditions, the increased population growth and prosperity of various sectors. Kuwait is one of the Gulf countries which is witnessing a great development in the field of construction industries. The facts have pointed out to the significance important of the construction industry at Kuwait. Further, decreasing the oil prices in Kuwait will contribute in continuing the expanding of Kuwait’s projects market and thus will affect the government finances. According to MEED Projects, Kuwait has awarded KD 1.5 billion (\$4.8 billion) worth of contracts in first quarter of 2016, where this has effect on the total size of the local projects market (private and public, active and planned) to reach KD 76.6 billion, i.e. an increase of 2.8% year-to-date. The previous figures emphasised on the importance of improving the performance of complex projects in Kuwait regarding the significant contributions of this sector in the Kuwaiti economy. In addition, the previous studies indicated that complex projects will demand managers with high managerial abilities and skills that could enable them to manage such projects successfully, including; strong communication, managerial and personal skills and intensive managerial knowledge. As a result of the importance of this aspect and the seriousness of its impact on the performance of complex construction projects in Kuwait; this study aims to develop a framework that could be utilized to enhance the complex projects overall performance, especially in Kuwait, through improving project managers skills and abilities.

2. Methodology

This study uses a mixed methodology where the empirical data is collected through quantitative survey and qualitative interviews. The quantitative method is used to gather a generalized opinion from larger population. The qualitative method is used to gather in-depth data from subject matter experts. The data collection tool for collecting the quantitative data is self-administered questionnaire. These are designed as closed-ended and using a 5-point Likert scale. There questionnaire is designed in two sections – the project manager’s skills and elements of project complex. 27 items of the project manager’s skills and 23 items of the elements of project complex have been identified as shown in Table 1 and Table 2.

Table 1. Project manager’s required skills [3], [10], [17], [20]

List of project manager’s skills	
1. Be able to develop new initiatives and new ideas	9. Owing self-confidence
2. Be able to transform the complex areas of the project into easy elements	10. Owing high communication skills
3. The ability to deal with various cultures in good way and in different situations	11. The ability to focus
4. The ability to create strong relations with the team members	12. Owing a clear project vision
5. The ability to understand various behavioural characteristics of the team members	13. Good communication skills with different stakeholders
6. The ability to influence and motive teamwork	14. Owing high technical skills
	15. The ability to deal with risk easily
	16. The ability to negotiate
	17. The ability to keep up with changes
	18. The ability to organize the work
	19. Keeping Flexible
	20. The ability to plan effectively
	21. The ability to strategically planning

7. The ability to recognise the conflict sources	22. The ability to give constructive feedback
8. The ability to solve conflicts	23. Supporting the team

Table 2. Elements of the project complexity [14]

Elements of Project Complexity	
1. Complexity of customer requirements	10. Political issues related to customers
2. High technical requirements of the project	11. Exposure to many fluctuations and changes during project implementation
3. Complex requirements that require additional execution time beyond the specified time	12. Require a specific high level administration to perform successfully
4. The unclear sequence of the construction process	13. Include many unintelligible aspects before design
5. The unfamiliar and uncommon construction elements	14. The duration that exceeding the duration of the simple projects
6. Using structural elements with specific and distinctive characteristics	15. Require architectural challenges
7. The type of persons participating in the project who must deal with	16. The project site (location)
8. Blurred documents	17. The project size
9. Political issues related to the project	18. The amount of the available materials for the construction process (resource availability)

2.1 Data Collection: Questionnaire

The questionnaire for this study will be divided into three main sections, personal information, elements that constituted complexity in construction project as well as the skills that must be owned by project managers to manage complex projects successfully. Personal information section will include biographical details, qualifications and job experience/work position details. The followed up two sections will contain statements about complex projects' elements and another one for skills required to manage complex projects. The elements of complexity considered in the questionnaire have been selected because they are the most effective elements and prominent complexity characteristics that represent the complexity of projects and are the most influential factors that may affect the progress and achievement of them, as demonstrated in the literature and previous studies.

The study designs the questionnaire based on skills (23 items) and elements (27 items) that represent the most important components and the most influential characteristics that illustrate the complexity of the project, whether related to the physical or human components of the project, which were collected and were commonly agreed on them as the most important elements between various study and previous literature. Likert type scale was adopted by the study to be the proper scaling systems in answering the questionnaire of this study, where the alternatives are ranged from strongly agree to strongly disagree describing the different respondents' reaction degree to the questionnaire's statement. Likert scales consisted of declarative sentences followed by response options that indicate varying degrees of agreements with or endorsement of the statement; this was designed to solicit more definitive responses from respondents, rather that eliciting muted, unvarying responses. Moreover, Likert scale have distinct cut-off points and assume linearity and equal intervals between various response alternatives, therefore facilitating the statistical processing of interval level data and using parametric statistics. Likert scale has different types referring to the number of response categories or cut off points that are imposed on a scale such as 5, 7 and 9 Likert scales [22].

The study adopts 5 levels Likert scale, which was obtained from previous literature and studies that contain a similar questionnaire and measurement scale, for his designed questionnaire; because of the advantages of fifth Likert scale in which it is the most appropriate one for this study. The advantageous side of those fifth scales is that they are the most universal method for survey collection, therefore they are easily understood. The responses are easily quantifiable and subjective to computation of some mathematical analysis. Since it does not require the participant to provide a simple and concrete yes or no answer, it does not force the participant to take a stand on a particular topic, but allows them to respond in a degree of agreement; this makes question answering easier on the respondent. Also, the responses presented accommodate neutral or undecided feelings of participants. These responses are very easy to code when accumulating data since a single number represents the participant's response.

2.2 Data Collection: Interviews

Interviews will be carried out with experts to gather further in-depth data on the project managers skills framework (PMSF). The interviews will be semi-structured which will provide opportunity for the study to gather more information on the topic. Interviews will be voice recorded (based on interviewees' permission) and written down. Voice recorders will provide advantage of listening to the interviews several times and in transcribing the content. Interviewees that will not allow voice recording, the written information will be used for transcribing.

3. Sample Population

The case studies of various complex construction project in Kuwait will be conducted. A pilot study on the questionnaire and interviews with subject matter experts (senior managers of large construction companies involved in complex projects) will be carried out to prior to distributing the questionnaire to the target population. Simple random sampling will be utilized in order to get a true picture of the results and correspondingly not being biased. The study sample size is 150 estimated by using Slovin's formula as recommended by [6].

$$n = N / ((N \cdot d^2) + 1) \quad (1)$$

In which,

- n = total number of samples
- N = total number of populations
- d^2 = margin of error (0.05)

When it is impossible and inefficient to study an entire population, taking a smaller sample utilizing random sample technique would be effective. Slovin's formula allows a study to sample the population with a desired degree of accuracy. It provides the study with an idea of how large the sample size is needed to ensure a reasonable accuracy of results. The study applied Slovin's formula to get the proper sample size according to his desired level of confidence which was 95% (margin error of 0.05).

Questionnaires will be distributed online via emails to 150 construction project managers and highly experienced construction staff who are working at complex projects in Kuwait. The study has chosen questionnaires as a quantitative collecting data technique, with the aim of collecting data from large population, generalization, and to study the causal relationship, and develop a project manager skills framework which is currently lacking in studying complex construction projects in Kuwait. Questionnaires are also familiar to managers and staff, and reasonably low cost. Questionnaires are also they are easy to administer, and the format is adequate and familiar to most respondents. Survey data using questionnaire, is collected in a standardized way and respondents have time to think about their answers; they are not usually required to reply immediately, thus giving them time to participate and provide the response.

4. Data Analysis

The quantitative sample population is project managers and the qualitative sample population are top management and project managers. Quantitative data analysis will be analysed using Statistical Package for the Social Sciences software (SPSS). Analyses such as Cronbach’s Alpha for data reliability, descriptive analysis, and others statistical analyses will be used to study the data. Qualitative data will be analysed using software such as NVivo. The transcribed data will be entered into the NVivo software and themes and categories will be generated. The discussion will be based on the themes and categories that are generated by the NVivo software. Figure 1 shows the overall concept of the study,

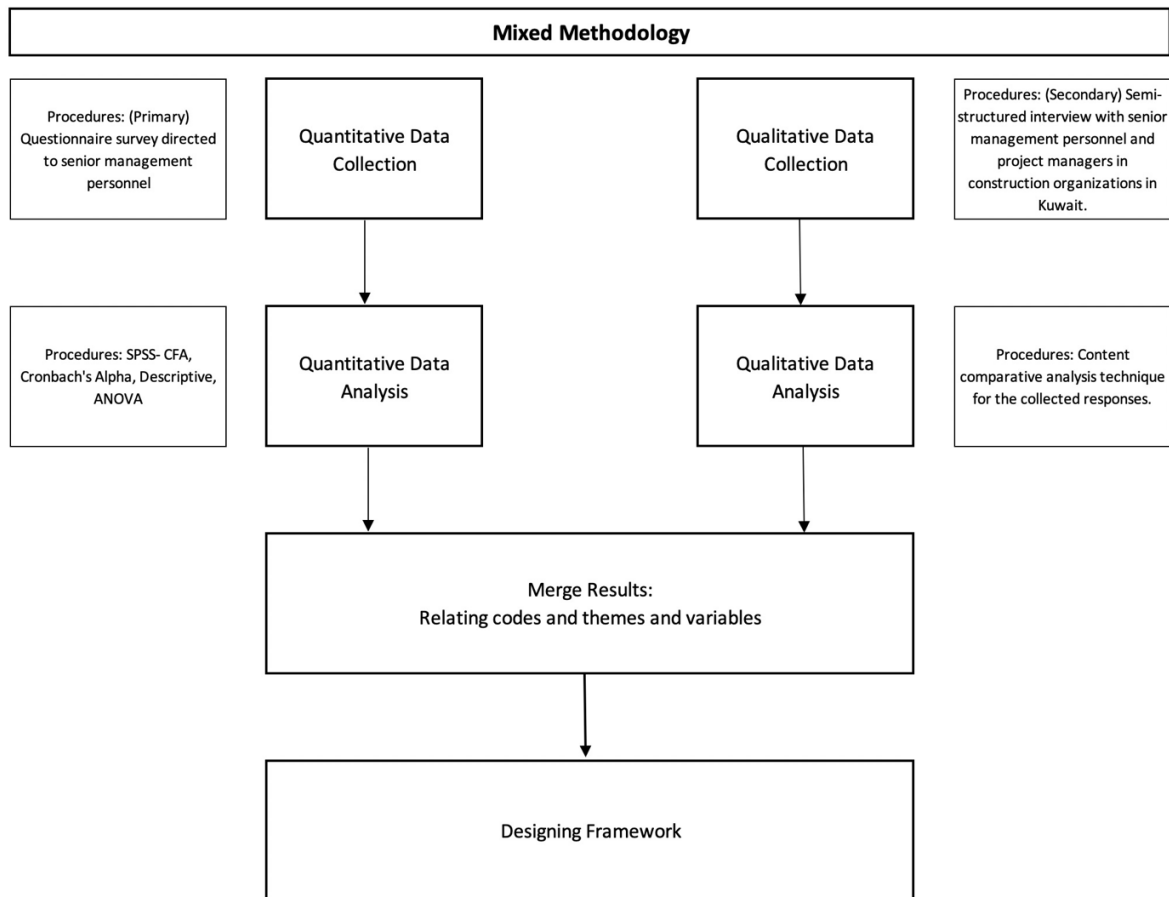


Figure 1. The conceptual of Project Manager's Skills Framework (PMSF) development.

5. Conclusion

This study intend is to find the factors that contribute to develop the Project Managers Skills Framework (PMSF) The literature provides the background in understanding the topic and findings of various studies. The study is based on empirical data through a mixed methodology. The survey will capture data from several project managers to understand a generalized perspective of the current situation with various construction projects in Kuwait. This will be followed by in-depth interviews with top management of constructions companies handling complex construction projects and project managers who are vested with the responsibility of completing the complex projects. This framework will be a contribute to closing the knowledge gap arising from lack of academic studies in Kuwait. Complex construction projects in Kuwait are facing several time delays leading to increased costs and quality issues. The findings of this study will provide understanding into the issues causing delays with emphasis on the barriers that project managers face towards completing the project successfully. In brief, this study will identify and assess the impact of project managers skills such as communication, teamwork, team building, planning and coordination, problem solving, and interpersonal skills on

project success. This will be achieved through mixed methodology using surveys and in-depth personal interviews.

6. References

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