

## IDENTIFICATION AND CLASSIFICATION OF PROJECT MANAGERS' KNOWLEDGE NEEDS

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**ABSTRACT:** This paper is set-out to identify and classify knowledge and skills areas that construction project manager had to acquire in order to deliver the project successfully. Classifications of their knowledge are drawn apart from the correlation between determination of project success and project management besides established from project management 'Body of Knowledge'. Range of project managers were interviewed in order to determine their knowledge needs and assessed on its impact and value to the project.

**Keywords:** Classification, knowledge, impact and value, project manager.

### 1. INTRODUCTION

Project management in construction encompasses a set of objectives which may be accomplished by implementing a series of operations subject to resource constraints. There are potential conflicts between the stated objectives with regard to scope, cost, time and quality, and the constraints imposed on human material and financial resources (*Hendrickson and Tung, 1998*). Hence, it is understandable that in a context of great uncertainty and on going competition, all projects will impose different challenges particularly on those involve in managing the project. The project manager is responsible for planning, organising and controlling the project. In order to deliver successful project, project manager and his team have to clearly understand what factors and criteria in the project needs to be managed.

Thus, to become a successful project manager who responsible in managing the successful project, he or she needs to possess an appropriate level of knowledge and skills. By possessing such knowledge on project management techniques, project managers would be able to plan and execute their construction projects to maximise the chances of project to success. Accordingly, this paper determines the knowledge and skills required by project managers in undertaking their jobs in construction project as its principal focus. It sets out to explore the wider range of knowledge and skills of project managers which are deemed as direct and attributed to the project success.

Following that, the identification and classification of their knowledge are developed. A number of project managers from construction background were interviewed and assessed on their perceptions about project success, current knowledge and skills and also impact of personal attitudes in delivering the project. In turn, the perceptions of their knowledge needs were then given by all hierarchical of construction project managers.

## 2. OVERVIEW OF PROJECT MANAGERS' KNOWLEDGE

In a construction project, project management can be defined as the process by which the project manager plans and controls tasks or activities within the project and harnesses the resources available such as people, material, time, money, information, knowledge, equipment and space to achieve set goals, standards and objectives (*De Wit, 1988*). Due to this diverse and complex nature of the project system, *Goodwin (1993)* suggests project integration as one of the key functions of the project manager. Consequently, this function requires a broad base of knowledge and skills.

The knowledge areas required by project managers for practice transcend the scope covered by the professional and accreditation bodies. Although the term 'Body of Knowledge' itself reflects the list of knowledge and skills required by professional project manager, it is not a guarantee for construction project manager to perform their tasks. Modern project management practice therefore, demands other general and management knowledge, coupled with skills that extend beyond the technical aspects of traditional engineering areas.

Generally, the Project Management Body of Knowledge (PMBOK) outlined by *Project Management Institute (2000)* contains a wealth of literature and training material dealing with every aspect of project management from scope control to financial management, from estimating to team building, from communication to contracting, and more. Nevertheless, these documented 'Body of Knowledge' are more accurately described as project management knowledge classification structures (*Curling, 1995*). Thus, it must be developed and attained through training, experience and the application of the acquired knowledge (*Edum-Fotwe and McCaffer, 2000*).

### 3. RESEARCH METHODOLOGY

This section outlines the methodologies that guide this project and the measures taken to obtain the necessary data. According to *Creswell (2003)*, the use of mixed method approaches between both qualitative and quantitative methods in the one study are become widely accepted. Thus, this study will use a survey approach (quantitative approach) that incorporates qualitative in-depth interview made across six construction project managers from various levels of experiences. The qualitative methods will include identification of project manager's knowledge needs from their perception. In sequence, this qualitative data will be used to establish a classification of construction project managers' knowledge.

#### 3.1 Qualitative Approach

The in-depth interviews along with questionnaires were adopted as a means in facilitated their perceptions on level of knowledge needed in undertaking their tasks. In all, six (6) respondents from four contractor firms were interviewed. Interviews were broken down into three different categories based on their level of experience and their discipline, in order to gain different perception on their knowledge needed in each category. These are namely junior (0-5 years), middle (6-10 years) and senior level (more than 11 years). The entire project managers were interviewed has obtained and qualified for membership from their professional institutions. Thus, consequently indicate that all respondents have basic understanding, capable and possess necessary knowledge in their particular field. The tabulation of project managers' qualification according to their categories are shown in Table 1.

*Table 1. Profile of Interview Sample*

Category	Years of experience as project manager	Discipline	Number
Junior	0 - 5	Building / Trades	2
Middle	6 - 10	Civil Engineering	2
Senior	> 11	Civil Engineering	2
TOTAL			6

Throughout an interview, relevant information about determination of project success in the project management and its relationship with knowledge, competence and skills can be gained. In addition, crucial and significant knowledge needed from the project managers' perception in undertaking their roles also discussed.

**3.2 Quantitative Approach**

As elicitations of information gathered through interviews are generally qualitative, the technique of scales derived from questionnaire was therefore adopted to enable quantitative analysis for the various information and notions expressed by the respondents. Evaluations were made on the crucial phases of construction project encountered by project managers in applying their knowledge and skills and the ranks of importance of knowledge and skills needed by project managers.

**4. RESEARCH FINDINGS**

**4.1 Identification and Classification of Project Manager’s Knowledge**

Based on the literature reviewed, project managers’ knowledge and skills had been identified fall under two main categories which is primary knowledge and secondary knowledge. As a construction project manager viewed as an expert who is proficient at providing effective solutions and managing project, he requires a sort of knowledge and skills which is came from experience and learning process. Thus, the identification of explicit and implicit knowledge tends to be more reflect to the knowledge that project manager possess.

*a. Classification of Project Managers’ Explicit Knowledge*

All project managers from the three different categories; junior, middle and senior level have indicated the need for a diverse set of knowledge and skills as mapped in Figure 2.

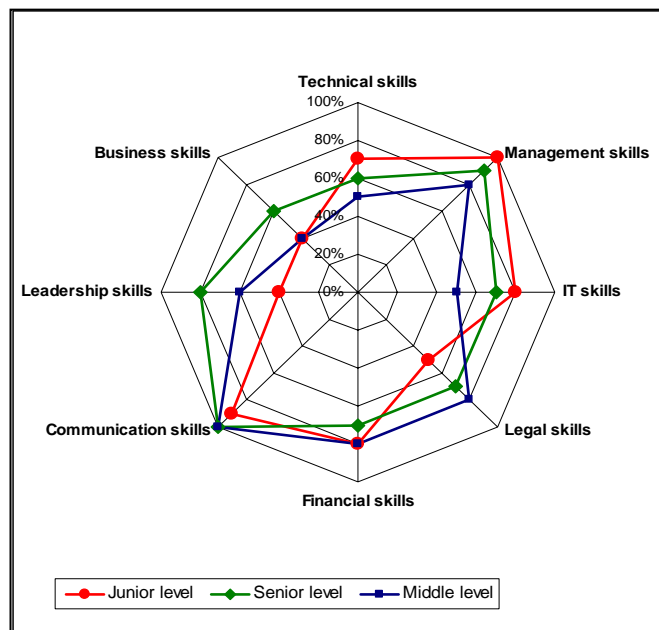


Figure 2. Relative Importance of Project Managers’ Knowledge in Each Category

Communication and management skills indicated the most essential knowledge and skills needed by all level of project managers relatively. Meanwhile, the financial skills were consistently indicated as the knowledge needed by all level of project managers with an average of 80%. For other knowledge and skills such as information technology (IT), legal, leadership and business are plotted randomly for its importance across all project manager categories. Surprisingly, technical knowledge is relatively the least essential project management skill with an average percentile score of 60% compared to management, communication and financial skills in all categories.

Apart from business skills, it indicates that project managers at the senior level are more concerned with the business aspects compared to middle and junior level project manager. While, in discussing the knowledge needed by each category, leadership skills have shown a significant knowledge needs by senior project managers while both the other groups did not. Apparently, from the result it shows that leadership skills are amongst the lowest knowledge and skills needed rated by junior project managers. It is believed that in such level, these skills are relatively less applied due to their less exposure in managing the projects. Accordingly, it is evident that across the level of project managers, the need for leadership skills is more significant.

As mentioned by the one of senior project manager interviewed, the fundamental key in the project management is about managing people and leadership skills and not necessary on the technical aspect of the particular project. Although the technical aspect of the project is essential but by having such knowledge and skills in management aspect, project manager can acquire better technical knowledge from his project team. Thus, with aid and teamwork spirit within the project team, it ensures the project manager to deliver the project successfully irrespective of any type of project.

In discussing about the needs of technical skills by each category, project manager from junior level were observed as the highest category compared to middle level and senior level. Instead of admitted a needs in technical knowledge, both groups; middle and senior level project managers stated that the importance by having technical knowledge is considered as a supportive knowledge and not an essential knowledge to become a project manager due to the characteristic of construction project that is different and unique for every single project. Thus, the needs of technical knowledge in the project are also varied. These concerns are

consistent with those expressed by *Edum-Fotwe and McCaffer (2000)*, whilst much of the knowledge needed to manage the construction projects is unique to project management. To summarise, communication and management skills are both two highly rated skills and knowledge by project manager, thus represented the most needed skills and knowledge by project manager in all level.

***b. Classification of project managers' implicit knowledge***

In project management, the intuition based on experience resembles implicit knowledge (*Tobin, 1997*). Implicit knowledge is considered as a part of integrated knowledge of project manager. This question aims to identify the personalities attributes as implicit knowledge for project managers in undertaking their job during crucial phases of the project. Both junior project managers interviewed acknowledged the personalities as a big issue in the construction industry nowadays. In fact, the personalities of the project manager is essential in overcome conflict arise during the construction phases despite of knowledge and skills he possesses. Consequently, it ensures the project manager delivers the job efficiently.

In discussing on the criteria for nominating project manager to lead the project, both junior project managers recognised the needs of experience and personalities are important rather than needs of higher qualification. As emphasised by the project managers interviewed, the ideal and effective project manager is a role model for others. He also stated that an effective project manager leads by doing. Thus, project manager are required to lead, correct and communicate with the team and workers.

Evidence from the questions about the selection of project managers indicates that personalities are one of the major factors besides of experience and knowledge on specific technical task. One of senior project managers interviewed who had been involved in the recruitment and selection process of project managers in his company affirmed that qualification and knowledge background in construction is not a key essential to become a project manager. One of the key assessments in selecting the project manager is personalities. However, this personality factor is elusive knowledge for project manager. Another senior project manager interviewed also mentioned the needs of personalities and individual factors have a contribution to the project success. Whilst carry out the project with the same company or organisation but with featuring different individuals, the result could not be the same and there are high risk of successful delivering a successful project.

#### 4.2 Implication of Project Managers' Knowledge in Project Life Cycle

Each phase in the construction projects are varied by its needs, characteristics and requirements (*Morris, 1998*). Apparently, each project phase requires formal decision point by the project manager. In order to assess the critical success factors in construction projects, the project life cycle had been used as a yardstick on measuring the critical success factors of the project. As the successful of project tends to be measured against cost, time and quality, it is important for the project managers apply their knowledge, either explicit or implicit during the project life-cycle. However, these two classifications of knowledge seem to be applied mutually in all phases of project life-cycle.

It perceived that each project phase involves different tasks and appropriate knowledge and skills needed to perform by the project manager and his team. As a result, all respondent were asked about their perception on applying knowledge and skills throughout the project phases. It is observed that the crucial stage of the construction project in applying the knowledge and skills by the project manager is relatively crucial throughout the project phases from the pre-design stage until project completion. As a project passes through its later phases and into routine operation, it requires the project manager to effectively planned, organised, monitored and controlled the tasks. In that, the project manager needs to rely and apply the knowledge and skills they possess.

At the planning stage, project manager and his team focus on breaking down projects into work package in order to allocate the resources to the project before executing it. Thereby, apart from project managers' explicit knowledge, knowledge and skills such as technical knowledge and management are required at this stage. The used of the implicit knowledge at this stage is heavily depends on their level of experience and similarity of the project managed in the past. According to that, senior group of project managers interviewed recognise that defining and understanding the client's needs in the project is essential.

Due to the largest impact upon the final cost outcome of a project is to be attained during the earlier stages of project life-cycle that is design stage, the needs of implicit knowledge such as decision making and communication are deemed to be necessary for project managers. By having knowledge and skills in decision making, it can prevent the project from running over the time period and budget. Thus, without such knowledge and skills, it will affect the successful of project. Without the confidence

shown by a project manager to make quick and correct decisions, the project team tend to lose confidence with the project manager.

At a construction stage whereas theoretically crucial stage for carrying on with subsequent operations and thus for making the project a success, project managers' implicit knowledge were needed and anticipated at this stage. As mentioned by the project managers interviewed, during construction stage project manager needs to effectively planned, organised, monitored and controlled the tasks. The implicit knowledge anticipated during this stage is basically came from learning-experience such as health and safety issues which require project managers' own decision and experience.

#### **4.3 Impact and Value of Project Managers' Knowledge in the Project**

As discussed in the literature, characteristics of projects are considered as the influence factor of the management of projects. Another aspect which is consistently referred to is the organisational scope in which the project; the project manager and team are required to operate. A project manager's involvement in the phase of projects starting with inception and concluding with project close-out is one of the person's primary roles. (*Chan et al., 2004*). Thus, question about how the project managers' knowledge had an impact and value to the project was posed to all respondents.

All the project managers indicated that project managers' knowledge had an impact and value to the project in various ways. One of the middle project manager believed by having a general knowledge such as management and leadership, those project manager can give an impact to both the client and project team. He referred to the ability of project manager in coordinating resources and personalities in the project team led the project to be completed on time, cost and quality. Besides of project managers' knowledge, the experience of project manager is also essential and contributed to the value of the project they manage. Further, four of the project managers agreed that by having an experience of the similar type of project, the project manager can easily identified and rectified the problem arose during the construction period.

The comments raised by the junior groups of project managers interviewed emphasise that project manager can apply their knowledge on the specific area such as technical, business, financial and information technology in order to give an added value to the project. Thus, by posses all of the combination of that knowledge, project manager could give significant impact on client decision, thereby minimise the risks in



the project and minimising costs and completion of projects within time. In addition, the value of project will increase, when it has a key purpose and focuses on mission and strategic priorities of project that came from project managers' knowledge.

A group of senior project manager had their own perception on how project manager can add value to the project. They emphasised that a key enabler to enhance the project value is through the project managers' knowledge in management and their personalities (implicit knowledge) hold in the project. Thereby, in managing and to satisfying the parties involved in the project, it is essential for project manager to ensure his project team do their work efficiently. It is by encouraging the team and trusting the team to use their experiences, ability to encourage team to communicate and ability to recognise strength and weaknesses of his project team.

It can be concluded that apart of project managers' knowledge, combination of explicit and implicit knowledge can enhance the project value. Risk, time, and quality improvement are the indicators mentioned by the respondents on how project managers' knowledge can give an impact to the project value.

## 5. CONCLUSION

Throughout the discussion in this paper it was evident that in order for the project manager to deliver the project successfully, he must possess a combination of explicit and implicit knowledge and skills. Apart from the explicit knowledge that had been classified, communication and management skills are both two highly rated skills and knowledge by project manager, thus represented the most needed skills and knowledge by project manager in all level irrespective of their level of experience and maturity. In turn, the implicit knowledge needed by project manager is good personalities and behaviour such as decision-making, self-confident, motivator, leadership, and organisational commitment.

Subsequently, this implicit knowledge had been acknowledged as indirect attribute to the project success. Apart from their combination of explicit and implicit knowledge, it shows that such knowledge can enhance and bring the impact to the project. In discussing about the crucial stages of project in applying project managers' knowledge, it has been identified that throughout the project phases, it is more essential for project manager to rely and apply on knowledge and skills they possess at each phase. It requires the project manager to effectively planned, organised, monitored and controlled the tasks.

Apart from the classification that has been made, it can be used for establishing project managers' knowledge requirements and as a basis for developing guidelines to improve project managers' knowledge needs and their career path. Through the guidelines, assessment on level of knowledge required in such level of appointment can be made. For organisation, particularly human resource manager it can be used as a tool to measure project managers' performance against a range of key performance criteria based on measurable competencies and personality traits.

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