

Skills and Competencies Perceived of an Effective Construction Project Manager

P Girish¹, H S Jayatheertha², Vinay Kumar K S³, Vinayak A Hosur⁴

^{1,2,3,4}Assistant Professor, Department of Civil Engineering, Dayanada Sagar Academy of Technology and Management, Bangalore, India.

Abstract - The process of construction is dynamic and varied which involves multi-disciplinary activities being carried out at the same time. The construction project manager being the focal point of all the activities, this necessitates him/her to be competent and able to execute their available resources in an efficient way. Due recent trends in the construction sector showing increased time frame and cost expenditure for a given project which are attributable to various factors with the skill of the construction project manager being one of them. The aim of this study is to identify and categorise the skills and competence level of project manager for shouldering the risks and responsibilities of a construction project in a safe and efficient manner. A total of 58 questionnaires were drawn from various stake holders of the construction industry through which the frequency counts were calculated and the corresponding relative importance index of the skills were listed. The results showed the various parameters such as decision making, communication and leadership skill as the most important skill for a construction project manager. The implications of this results are discussed, herein

challenging construction sector. This is also evident that from the current trends in the industry, the project manager should evolve and adapt to the changing climate in the industry and tend to lead into multiple roles rather than just concentrating on the technical or any one particular skill.

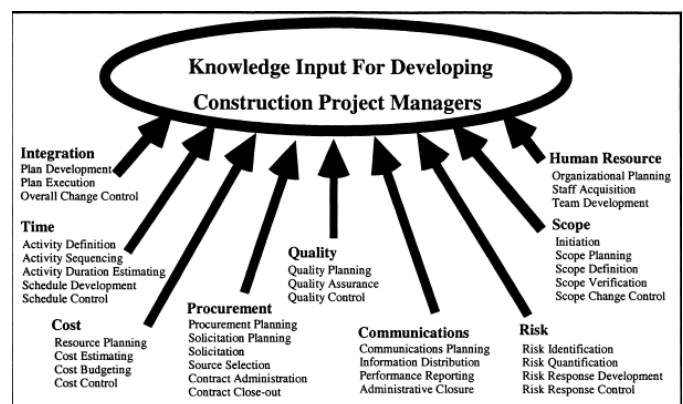


Fig -1: Knowledge area of Project Management (Source: PMBOK)

Key Words: Skills, Competency, Project Manager, Leadership, Decision Making, Construction Industry

1. INTRODUCTION

Skill is the ability that can be developed and which can be manifested into performance^[1]. The construction industry is a fast paced industry with ever changing dynamics. Any construction project involves huge budgets and risks associated with it, and completion of such projects with minimal budget conflicts is of utmost importance. It is the responsibility of the project manager to deliver the project successfully within the budgeted cost and time meeting the standards of the clients. The project manager is held accountable for the success or failure of any construction project. Russell and Jaselski^[2] have recognized the various functional aspects of a project manager and the need to supplement this knowledge with the other non-technical skills to meet the current demands of the construction industry.

The present day construction industry faces crisis due to budget overruns, lack of quality in the project and delay in the completion of a construction activity, all such problems can attributed to the project manager and his/her lack of skills and competence to overcome the difficulties of the

1.1 Need for the Study

Any project is deemed to be successful if the project is delivered as per the quality requirement of the clients within the budgeted cost, and scheduled time of the project. An ideal construction project is imaginary, no project can exist without risks and uncertainties. But the effect of such risks and uncertainties can be mitigated if the project manager is better equipped to handle and avert the crisis situations with the project environment. The project managers need to better understand the environment they are working in, and also no project two project environments are the same. The dynamics of each and every project changes with time and space.

1.2 Objectives of the Study

The primary objective of the study is to identify the various skills and competency levels required for successful project managers. The study also aims to rate the skills on the basis of importance as perceived by industry professionals and stakeholders. The authors also aim to establish a link between the findings and scope of inclusion of such skills sets in the academics of graduates.

2. Essential Project Manager Skills

Hornby (1998) [4] defines competency as the skill, knowledge and quality of an individual to complete a given set of activities effectively in the work environment.

There have various theories and hypothesis put forth by various authors Katz (1974) [5], Fryer (1979) [6], Kerzner (1989) [7], Goodwin (1993) [8] & Gushar et al (1997) [3] regarding the skills required for an able and competent project manager for the effective and successful completion of a project.

Table -1: Overview definitions of Important Skills for Project Managers

Skill	Definition of the Skill
Communication	Ability to interact effectively with others at all levels within and outside of the organization
Decision Making	Ability to take appropriate actions under the constraints of limited time, information and resources
Delegation	Ability to effectively distribute tasks to other members of the organization
Financial Management	Ability to understand financial statements and financial ratios and to deal with accounting firms and financial institutions
Leadership and Motivation	Ability to make correct decisions for firms and this influence others to contribute to attaining firms goals
Listening	Ability to perceive and effectively process information provided by others
Negotiations	Ability to engage in two-way discussions achieve interests of the firm
Organizing	Ability to align resources in such a way as to be the most beneficial for the firms
Planning and goal setting	Ability to assess and set objectives for firms., then plot a path to achieve those objectives
Problem Solving	Ability to analyse adverse conditions or conflict, identify root causes, provide a practical solutions, then implement it
Quality Management	Ability to manage production of goods or services within a clearly defined set of expectations
Technical Knowledge	Understating complex elements required to effectively complete tasks associated with a given profession
Time Management	Ability to successfully manage multiple tasks within given time constraints

Source. Gushar et al (1997) [3]

The findings of their research and the hypothesis can be summarized as according to the Table-1 stating the various skills to be acquired by the project manager.

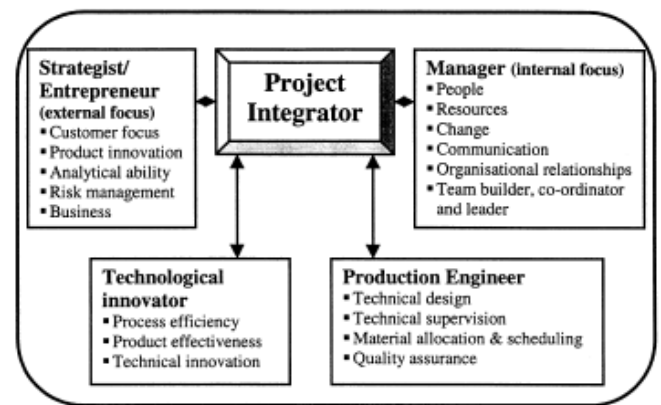


Fig -2: The Evolving role of Project Manager (Source: PMBOK)

The current project managers have evolved into more than managers with technical know-how and mere execution of the project. Katz [5] has stressed that mere knowledge of technical skill will not help the project manager in successful completion of the project. No two project are similar each and every project shall have its own challenges and dynamics. It is of paramount importance that the project managers tend to recognize these changes and adapt themselves into the every changing construction environment. Goodwin [8] suggests that the project manager should be capable of evolving into multi-disciplinary roles and networks through project and not just be restricted to one single role or skill.

Project Management competency is the capability to manage projects by applying the principles of management into the completion of a project. Garies [14] explains that the project manager's competency is the combination of knowledge and experience in the subject which enable the timely delivery of the project with approved quality.

The common perception on need for technical knowledge is to understand the specific requirements of the project in-terms of design and schedule. The technical skill of the project manager may also be required to solve problems that occur during the design and implementation phase of the project. Goodwin [8] has highlighted that their no compelling necessity of the project manager to possess technical skill but should have certain degree of technical knowledge to encompass the technical difficulties arising out of a project.

Sahlin [15] describes the duties of a project manager as to never tell his/her team how to perform a task; A project manager shall know what he/she is doing; A project manager shall always trust his/her source of information; A Project manager shall know and accept the limit of their skills, attribute and knowledge; A Project manager shall have sufficient technical knowledge to interpret the technical designs and flow of the project; A project manager should be a team player.

3. Methodology

The authors collected the sample of the respondents through a questionnaire to test the hypothesis which was postulated for the study. The respondents ranging from different sectors of the construction industry such as Clients, Contractors, Architects, Services, Consultants were required to rate the skills they perceived as 1 for very important; 2 for important; 3 for somewhat important; 4 for not important.

Based on the response of the respondents the relative importance of any given skills was calculated using the relative importance index formula.

$$\text{Relative Importance Index} = (4n_4 + 3n_3 + 2n_2 + n_1) / 4$$

Where, n_4 is the number of respondents for not important; n_3 is the number of respondents for somewhat important; n_2 is the number of respondents for important and n_1 is the number of respondents for very important

The survey and questionnaire also aimed to represent the additional skill set that are required by the project manager that was not listed in the initial survey and the mean level of signification was obtained for the same.

3.2 Description of Testing of Hypothesis

The Two Tailed T-Test was carried out to test the hypothesis. It is a test that is used to determine if two sets of data are significantly different from each other, and it is most commonly applied when the test statistics are known.

The following hypothesis are developed in-order to determine the significance of the test.

First Hypothesis (H1) - "The Technical skill of the project manager will not perceived as the most important skill"

Second Hypothesis (H2) - "The mean perception of all the stakeholders of the construction project shall not have appreciable difference"

The Null hypothesis was defined to identify and rate the most skills as perceived by industry experts. The data for the testing the hypothesis value through the mean is tabulated.

3.2 Description of the respondents

Total of 98 respondents reviewed the survey and responded to the questionnaire giving their feedback through the online survey conducted. The Sample consisted of major stakeholders in any given construction environment, All respondents are from multiple projects within Bangalore, Karnataka, India.

About 25% of the respondents are architects who also worked as consultants in various firms across Bangalore. 30% of the respondents are contractors who have undertaken various construction activities in Bangalore with

majority of such activities being infrastructure and large-scale projects. Around 25% of the respondents are clients who have invested their resources into projects. And the last 25% of the respondents are made of essential services managers which consisted of mechanical services, electrical and other engineering services.

All the respondents have put in more than 15-20 years of experience in the industry and a majority of the respondents are project managers of various firms and projects.

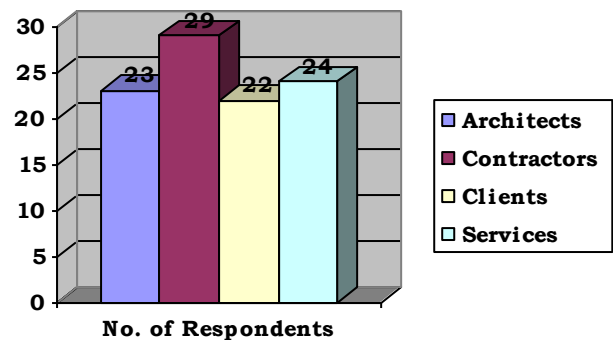


Chart -1: Number of Respondents in different categories

4. RESULTS and DISCUSSIONS

Table 2 shows the results of the mean and rank response of the skills of project managers are perceived by Architects in the construction industry. To the architect, the communication skill was rated as most important with a highest mean score of 0.977 followed by decision making skill with a mean score of 0.916. The least important skill perceived by the architects were financial management and delegating skills.

Table -2: Architects ranking important skills (N=23)

Type of skill	Frequency Response					Mean Score	Rank
	4	3	2	1	0		
Communication	21	2	-	-	-	0.977	1
Decision Making	20	3	-	-	-	0.916	2
Technical	18	5	-	-	-	0.879	3
Leadership	17	6	-	-	-	0.868	4
Planning and Goal Setting	17	3	3	-	-	0.845	5
Time Management	17	2	4	-	-	0.811	6
Negotiations	15	5	3	-	-	0.798	7
Listening	15	4	3	-	-	0.774	8
Problem Solving	13	7	3	-	-	0.762	9
Delegation	12	6	2	3	-	0.741	10
Financial Management	11	5	22	1	-	0.733	11

Table 3 shows the results of the mean and rank response of the skills of project managers are perceived by Contractors in the construction industry. The contractors perceive the leadership and motivation as the most important skill, followed by planning and goal setting skill. The least important skill as perceived by contractors are delegation and negotiating skill.

Table -3: Contractors ranking important skills (N=29)

Type of skill	Frequency Response					Mean Score	Rank
	4	3	2	1	0		
Leadership	28	1	-	-	-	0.986	1
Planning and Goal Setting	27	1	1	-	-	0.963	2
Communication	25	2	2	-	-	0.922	3
Time Management	23	4	2	-	-	0.881	4
Decision Making	20	4	3	2	-	0.865	5
Problem Solving	19	5	3	4	-	0.816	6
Technical	19	4	3	3	1	0.801	7
Financial Management	15	5	3	3	3	0.794	8
Listening	12	6	2	4	5	0.785	9
Delegation	12	5	3	4	5	0.771	10
Negotiations	10	5	4	4	6	0.743	11

Table 4 shows the results of the mean and rank response of the skills of project managers are perceived by clients in the construction industry. The clients feel that time management, financial management and problem solving are most important skill of a project manager. The clients have rated the negotiations as the least important skill for a project manager.

Table -4: Clients ranking important skills (N=22)

Type of skill	Frequency Response					Mean Score	Rank
	4	3	2	1	0		
Time Management	19	3		-	-	0.961	1
Financial Management	18	3	1	-	-	0.948	2
Problem Solving	18	2	2	-	-	0.928	3
Decision Making	18	1	3	-	-	0.897	4
Communication	17	2	3	-	-	0.889	5
Listening	15	4	3	-	-	0.874	6
Leadership	14	6	2	-	-	0.866	7
Planning and	13	5	2	2	-	0.842	8

Goal Setting							
Technical	12	6	2	1	1	0.826	9
Delegations	12	5	3	1	1	0.798	10
Negotiations	10	5	3	2	2	0.775	11

Table 5 shows personal and professional attributes which are to be developed by the project managers of which have not been listed in the survey and the questionnaire. The recommendations and suggestions are provided and perceived by the industry experts based on their experience and requirements in the present day construction environment.

Table -5: Additional Skills and Attributes that are to be acquired by the construction project managers.

Skill	Mean Level of Signification (Out of 5)
Health and Safety regulations	4.48
Ethics and Responsibility towards society	4.98
Collaborative	4.77
Risk Taking	4.92
Commitment towards goals and team	4.65

Table -6: Results of 2-Tailed Signification test to the stated hypothesis.

Type of skill	2-Tailed T-Test Significance	Sample Mean	Hypothesis Valid
Leadership	0.944	0.906	H1
Planning and Goal Setting	0.787	0.883	H1, H2
Communication	0.961	0.929	H1
Time Management	0.637	0.884	H2
Decision Making	0.941	0.893	H1, H2
Problem Solving	0.893	0.835	H1
Technical	0.865	0.835	H2
Financial Management	0.721	0.825	H2
Listening	0.703	0.811	H2
Delegation	0.605	0.770	H2
Negotiations	0.578	0.772	H2

5. CONCLUSIONS

Skills, Knowledge and attributes required of a project manager towards successfully completing a construction project are attributed in this research. The management competency are highlighted from the responses received from the experts in the construction industry. The findings shows that the communication skill (i.e the ability to communicate with the resources within the outside of the project environment effectively) is perceived as the most important skill for construction project manager. The experts also perceived that the decision making skill of project manager should be sought as a most important tool, and his/her ability to take decision in the times of crisis is of utmost importance. The Leadership skills follows the findings of the most of previous research, which proves that the ability of the project manager to lead a team with example sets precedence of a successful construction project.

The response of the stakeholders was in agreement of other peers in terms of communication, leadership, decision making and problem solving skill. All the respondents have agreed that these are the most important skill for a project manager to provide and efficient and successful project delivery in terms of budget, time and quality.

The stakeholders also perceived that the listening, delegation and negotiations were least important skill and attribute for a project manager. This does not mean that these skills are not necessary for the project manager, but it concludes that these skills do not directly affect the outcome of the delivery of the project.

The authors have also identified skills and attributes which makes a project manager effective by defining additional skill set and attributes. The skills and attributes were listed by industry professional and stakeholders of the industry. These skills are not highly recommended but if developed will bring in an overall development of the project manager. The authors highlight the ability to risk and be ethical in the construction environment as an important trait of the project manager.

The findings of this research can be utilized to train project managers on the specific skill set and to encourage them to develop such skills for overall enhancement and development of the individual and also to result in the best possible outcome of the project in terms of budget, quality and resource management. The ranking of the skills set is a guide which can also be used to evaluate and appoint project engineering and project managers in the firms to lead a successful construction project. The authors have represented the case scenario of project managers of Bangalore region which by-large follows the same trend of that of other researchers in most of the aspects of skill development.

ACKNOWLEDGEMENT

The authors would like to thank the management of Dayananda Sagar Institutions for their valuable support and encouragement through the research.

REFERENCES

- [1] KT Odusami, "Perceptions of Construction professional Concerning Important Skills of Effective Project Manager" *Journal of Management in Engineering* , Vol. 18 Apr. 2002, pp. 61-67.
- [2] Russell JS, Jaselski EJ, Lawrence SP. "Continuous Assessment of Project Performance". *Journal of Construction Engineering and Management*, 1997;123(1): 64-71
- [3] Gushgar, S.K, Francis, P.A and Saklou J.H (1997). "Skills Critical to long-term profitability of engineering firms" *J. Management Engineering.*, 13(2), 46-56
- [4] Hornby, D. and Thomas R. (1998), "Towards a better standard of Management", *Personal management*, Pan London.
- [5] Katz, R.L (1974), "Skills of an Effective Administrator", *Harvard Business Review*, Sept-Oct 90-102
- [6] Fryer, B. (1979), " Management Development in the construction industry", *Building Technology and Management*, May 16-18
- [7] Krenzer, H (1989)," *Project Management: A System Approach to Planning and Scheduling*", 3rd Edition, Van Nostrand Reinhold, New York.
- [8] Goodwin R C (1993)., "Skills Required for an Effective project manager". *Journal of Engineering Management*, Vo. 9, Issue 3, 217-226.
- [9] Turan Ceran and Albert A Dorman, "The Complete Project Manager", *Journal of Architecture Engineering*, Vol.1, 1995, 123-130
- [10] Leland S Riggs., "Educating Construction Managers", *Journal of Construction Engineering and Management*, Vol. 114, 1988, 279-285
- [11] James Sommerville and Colin Campbell, " Project Management: The Paradigm Shift", 16th Annual Arcom Conference, Vol.2, 2000, 723-732
- [12] *A Guide to Project Management Book of Knowledge (PMBOK) 6th Edition*
- [13] Syed M Ahmed, "Desirable Attributes and Skills for Graduating Construction Management Students" Jul 2015.

[14] Garies, R and Huemman M (1999), Specific Competencies in the project-oriented society, Project Management Days'99: Project Competencies, Vienna 18-19 November

[15] Shalin. J P (1998), "How much technical training does a project manager need?" PM Network, 35-36

BIOGRAPHIES



Prof. P Girish currently working as assistant professor at Dayananda Sagar Academy of Technology & Management, Bangalore.



Prof. H S Jayatheertha, currently working as Asst.Professor at Department Civil Engineering DSATM, Bangalore



Prof. Vinay Kumar K S currently working as Asst. Professor at the Department of Civil Engineering

DSATM, Bangalore



Prof. Vinayak A Hosur currently working as Asst. Professor at the Department of Civil Engineering

DSATM, Bangalore