

COMPETENCIES OF A PROJECT MANAGER TO EXECUTE TURNKEY PROJECT

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Abstract: - The competency of the project is an important factor in construction project that analysis and helps to gain the successful completion of the project, it is to deeply study that how others factor is affecting to conclude the turnkey projects as compared to the other contracts. This research states that the comparison of another contract with turnkey project. The data are collected from question survey, books, and literature review. The conclusion was the research the various factors are affecting a construction project. These factors are deviled in deferent groups like client related factors, design related factor. After collect data than analysis the data from RII method. Some major causes are more affect the project like design change, money problem, and poor supervision, government rule change, weather condition, any type of external factors, human related factor all are the major effect in overall project.

Introduction:-

To study and analyse the research methodology is one of the hard step in the work of the research. The introduction narrates the research aim and objective. For good and better results in research works the hard work is particularly important, the proper way of using methods and techniques is the important factor on other hand to analyze the main point objective becomes critical due to large contain of understanding. The research objective is to find out the proper proficiency of construction project manager to accomplish the turnkey project. The construction project while executing the project the project manager skills are needed to manage the project by using technical tools and proper planning to ensure the needs of the client and as well as the safety of the workers and it is the responsibility of the project manager to ensure that the skilled peoples are been working on the project to deliver the project as per the planned schedule and the allocated cost. This study is focusing and identifying on the proficiency of the project manager to analyse the workability and doing the project with turnkey project. To identify the proficiency knowledge of the project in charge it is important to find out the mindset of the higher authority and client's requirement it is an essential point to identify the objective of the research. The construction project it is important to manage the workers for the different execution of the activity. Turnkey project the whole project work from minor to major are done by the contractor side as fixed and final agreement after receiving the work order the work is started. The owner or contractor of the most of infrastructure project the evaluation and path of the turnkey contract the benefit of the turnkey contract is the whole responsibilities, and the minor or large risk burden lies on the contractor who agree to do the turnkey project. The contractor companies approach the bid of a full span of services, design, construction process itself and general contracting. The client can choose a ready - made project otherwise they will be offered an individual design after that the project begins after the approval. Before the starting the execution of the project it is important to solve some theoretical questions, making all necessary documents is an important aspect and the general contract should be made.

Objective: -

The objective of this research is to conclude the proficiency of project manager that are needed at the different stages to complete the project with full success. To ensure with proper techniques and quality of work are done in turnkey project. To identify the different phase of the project what competencies need to project manager to execute the work as per the good knowledge of construction management.

1. Competency of Project in Proposal or Negotiation Phase
2. Competency of project in project set -up phase
3. Competency of Project in Project execution Phase
4. Competency of Project in Close out Phase

Literature Review: -**Delft University of technology, Ayesha A Rehman**

The study has been concluded for the understanding of the effect of competencies on turnkey project and for the success completion. The author has studied the different industries to know how and what knowledge of the project managers are having in their field to execute the turnkey project. In turnkey project the most important thing is the communication and time to time the update of the work progress and the market study. The main factor is that how to achieve the target and techniques for beneficially to complete the work. After study and analysed the different industries, it states that the cost control. The conclusion of this study was the judgements effects on increasing of the market rates and the consumption of the time. The larger project the communication and monitoring are important to identify the cost and time. At the micro project or work it can be achieved.

Principles of construction management", 3rd Edition London: McGraw-Hill

The phase that matters while identify and choose the contract for the construction projects has studied in the research paper. After analysis of the different literature paper and the personnel interview were used to know for the important factors on the risk that are arising in executing the turnkey project in this research. The research has been done on the contract selection has been reviewed and after that the several interviews and the literature researched has been done. The question was to find out the difference between the types of contracts that have effect on the decision on the selection in contract type. After the project specific question was focused to the factors that affect the contract selection for construction project. The documentation researched was explored in order to find the different types of the contracts and compare it with each other for better understanding. The comparison has been done on the cost as well the time effecting on the project. The author has analysed the data while researching on the real projects that has been done in past.

Engineering Construction & Architectural David Arditi Illinois Institute of Technology - 2017

The principal of the research is to identify the stage or point that affecting while using and selecting comparing of contracts as per the requirement and type of the work. The study is based on the risk while selecting the contracts and it is important to discuss the risk factor before executing the project because the quality of work is dependent in the construction project. So, the contractor and both should be aware and agreed to risk factor. The risk can be occurred while not taking the proper planning in the planning stage such like the unclearance of the scope project and the process and methods of the executing the work. So, keeping all the factor in mind it clears the perspective to select the contract. The conclusion of this research is that the both the parties must understand the risk and it is to be paid by any one of them as the contractor always study the market rates and analysed the factor of worker availability. So, the chance of the contractor side is less to undertake the risk. So, it is not cleared that who will be responsible for the risk. Turnkey contract in increasing the rates in the market the contractor demands the increased cost rate that may tend to create the disputed between the client and contractor.

Semarang, Indonesia - 2015

The author of this research paper has explained and studied the risk ongoing work and has compared it with another contract and analysed the turnkey project. From the contractor point of it has been identified that the risk factor of cost is the major point in the construction work. The different types of the contract have been studied to find out the risk. So, the author has done the survey and collected the data as comparison to unit price contract and turnkey project. Both contracts have advantages and disadvantages as keeping the factor of cost. The conclusion of the research is that from the survey it has been calculated that most of the respondents has positive response for unit price contract that it is high profitable and risk level is also low as compared to turnkey project and other contracts. The span of the things has done is not completed as per the specification and drawings, the grade of work done is also not cleared that what type of material is to be used. The other sites conditions have not been mentioned in the contract clauses.

Evaluation and methodology in turnkey project -2018

The literature review has main effect on the rates difference which has been given by client in construction projects that creates helps for the engineers or technical persons for ranting and taking effective measures to reducing the difference. The research has been understanding that the better techniques valuing Turnkey contract price or rates of difference order given by client for extra works that has the same character and same condition as per the agreed contracts rates should be as per PWD rates. For the evaluating the extra work has been and it has not been mentioned in the agreement of the

contract than in this condition the rates should be adjusted as the reasonable object, but as per the PWD rates.

Minnesota Department of Civil Engineering Research Services - Turnkey contract Estimating: Discovery and Simulation.

The literature review states that the competencies of a project manager on the turnkey project that has been equivalent the caution of the rates that have been implemented and used for the further scope of the research that increase the skills as well as the competencies to find the better solution of the problem that are arising in construction project. This research is also focus on the important effect on the project performance are as followed: -

Attempt to fraud from contractor based on competitive market pressure. The burden from the management to complete the work on time and the job security.

Anni Rehman (2017)

The literature review state that most point key causes of turnkey contract and impact of work on the project performance. The study has been focused on finding the effective methods to reduce the increasing in cost during execution construction project. The methodology carried out was questionnaires survey and response have been collected.

Basically, the questions are divided into different parts: -

Part A the Basic information about the respondent such as position, No. of years experience etc.

Part B question regarding effect of Turnkey contract.

Part C questions on impacts of Turnkey contract.

Data Collection: -

After considerable the research papers and literature review, a questionnaire was prepared to highlight the important phases of the competencies of project manager to execute the turnkey project. A questionnaire for the survey was developed to the factor that the competency of project manager in proposal phase, project setup, project execution and project close out phase. The objective of this research is done by two strategies first is the relative importance of 4 main factors and their sub factors is evaluated to identify the competencies of project manager.

Competency of project in proposal or negotiation phase

Competency of Project in Project Set-up Phase

Competency of Project in Project execution Phase

Competency of Project in Close out Phase

The research methodology in this study has done the questionnaire survey to analyze significant factors influencing time and cost overruns in turnkey project. For each factor or point the respondents were requested to answer using a five scale of 1 to 5 adopted. It is categorized as follow 5 = Extraordinarily strong, 4 = Strong, 3 =Moderate, 2 = Less, 1 = Very Less.

In this research study the different source of the data has been collected, as like the client who are the owner of the project and are the in charge to appoint the project in charge or managers to the dissimilar projects. Another point is the project managers himself that what are the things and how they are going to handle the situations. The last objective is the agencies and workers which are involves in the construction execution and the methods, techniques and machinery which are leaded by the project manager. The all above factors have been considered and the information has been collected to identify the four different phases the knowledge and the proficiency that project manager should have in the execution of the project. After considering all the factors the two different questionnaires have been prepared. The questionnaires have been made by consulting the higher engineers and it is used the main objective to collect the data from the construction professionals in consulting and contracting organization.

Sample Size:

For collecting the data while doing the questionnaires survey

$$\text{Sample Size} = (Z^2 * P * (1-P)) / C^2$$

$$z = 90\%$$

$$P = 50\%$$

$$E = 5\%$$

$$N = 273$$

Where,

Z = Z score that is determined based on confidence level.

P = Population proportion

C = Margin of error

$$\text{New Sample Size} = SS / (1 + [(SS-1) / \text{Population}])$$

$$= 80 / (1 + [(208-1) / 80])$$

$$= 80$$

Finally, we have to determine a sample size of 80.

For collecting the data, the respondent must be 80 and after receiving the response and the data then the analysis of the work will be started.

Table - I

RESPONDENTS DEMOGRAPH

Type of respondents	Frequency
Owner	16
Project Manager	34
Site Engineer	26
Intern Trainee	4

The important factor for project manager for executing the Turnkey Project:

Design process

Project Scope

Schedule of construction activities

Proper cost controlling plan.

Assurity of quality

Communication with all persons which are involve in project.

Risk management

Purchasing and market rates.

Project documentation and baselines.

Data Analysis: -

The method to identify the response to the questions has been calculated by the relative importance index method for each answer option has been given, so that it can be analysed the response to the option of the answer the most given importance. The answer which has the highest relative importance index is the most preferred choice. The questionnaires survey is collected and solved for giving the rank place on Relative Importance Index

$$RII = \Sigma W / AN$$

Where,

RII = Relative Importance Index.

W = response given to each question by the respondents (ranging from 1 to 5)

A = Highest weight (i.e., 5)

N = Total number of respondents

The marks or rank are applied in reverse. The respondent's which has given the answer as 5 is having highest weightage and the answer 1 is the lowest weightage. For example, 5 = Extraordinarily strong, 4 = Strong, 3 = Moderate, 2 = Less, 1 = Very Less.

Results of analyses:

The information has been collected by questionnaire which has been framed by the personal asking question in the organisation and consulting of the construction project. Responses have arranged in the manner that supplicated to the proficiency of the project in turnkey project. In order to identify the difference and knowledge that acquire has been arranged.

TABLE II
RELATIVE IMPORTANT INDEX METHOD

Sr.No.	Factor	RII	Point Scale
1.	Does Change in the Design effect on the project	0.8985	4
2.	Sufficient data collection and survey before design	0.8875	3
3.	Lack of Knowledge of construction management	0.9068	4
4.	Should have knowledge of market rates	0.9364	3
5.	Should have Knowledge of Vendor analysis	0.8958	2
6.	Proper Detailed specification of the activities	0.9435	3
7.	Knowledge of the Drawings	0.8745	5
8.	Does Change in the Design effect on the project	0.8465	4
9.	Does the Competencies of project manager affect the project success	0.8175	4
10.	Communication Between Client as well as hierarchy of organization	0.8785	4
11.	Co-ordination with Purchase and account department	0.8985	3
12.	Duration of project such as change in market rates, Machineries, shortage of labour effect the project	0.8885	5
13.	Error in Measurement and quantity and estimation	0.7845	3
14.	Maintaining Documentations of work	0.8485	4
15.	Proper Planning in execution phase	0.7785	4
16.	does the project manager should have planning of setup phase	0.8180	5
17.	Should have preparation of uncertain work	0.8380	3
18.	Does the Competencies of project manager affect the project success	0.8485	3

19.	Turnkey project from a cost reimbursable contract as compared to another contract	0.8985	4
20.	Benefits of Turnkey project as compared to lump sum contract.	0.8885	5

Proficiency in Proposal stage:

The starting the project the first step is proposal and agreement stage where the proposal has been located and the bidding has been done from the contractor side and this stage is the analytical phase where the project manager must justify the rates and methods to execute the projects. The main factor in this stage is cost and it should be the state where the price should be not less than the market or higher because the amount has been fixed and the contractor is also agreed to do the work in the said price. In the project if any of the work is done by contractor then he must pay the amount of that work because each work responsibility lies on the contractor from minor to major work. The project manager should under the responsibility that no work should be left, and he must have the experience to handle the tasks. The project manager must be noticeably clear that what quality of the work is to be done and what method must be practice on the project to ensure the clients requirement and he has to evolve in the communication between the higher authorities and contractor to the clear the state of the requirement from both the side. After the finalization of the rates the contract has been made.

Proficiency in establish Stage:

After the proposal stage the establish, stage was the how the work is going to be executed and what are the things, tool, machinery is required to complete the work are arranged by the project manager. The resource allocation is done to complete the turnkey project and planning for the execution has been done in this stage. It is the stage where all the information and testing reports is to be collected. In turnkey project all the things and arrangement are to be accurate as the all the burden lies on the contractor small mistakes turn into the serious issues. This is the stage where proper planning must be needed that what agencies what types of work they will do, and the different task has been assigning to the different persons. The schedule and the resource are finalized in this stage. This all the skills of management require in the project manager to complete this stage for the project succession.

Proficiency in execution stage:

In this stage the planning comes into existing the visualisation and the paper works come into the reality. This stage is the longest stage where many things are happened, and many hard decisions are taken the project manager should be very sharp and smart minded to achieve the planning because many factors can affect, and many changes can be done here, and this stage is important because it is depended on the project completion and success. In this stage the project manager have fulfil the planned activities as in he had made in the setup stage he has to conclude that the work is going on are as per the contract are not and the responsibilities lies that he has to conclude that the work is as per cost control plan because in the turnkey project to maintain the cost is the toughest task and if the expense are arising than it is on the contractor firm. The project manager must deal this stage very smart and efficiently to tackle the turnkey project. The main objective is to achieve the set goal and handle the work as per the contract and wisely. In the stage the proficiency should be the highly manager skill needed in project manager to complete the complete the turnkey project.

Proficiency in ended stage:

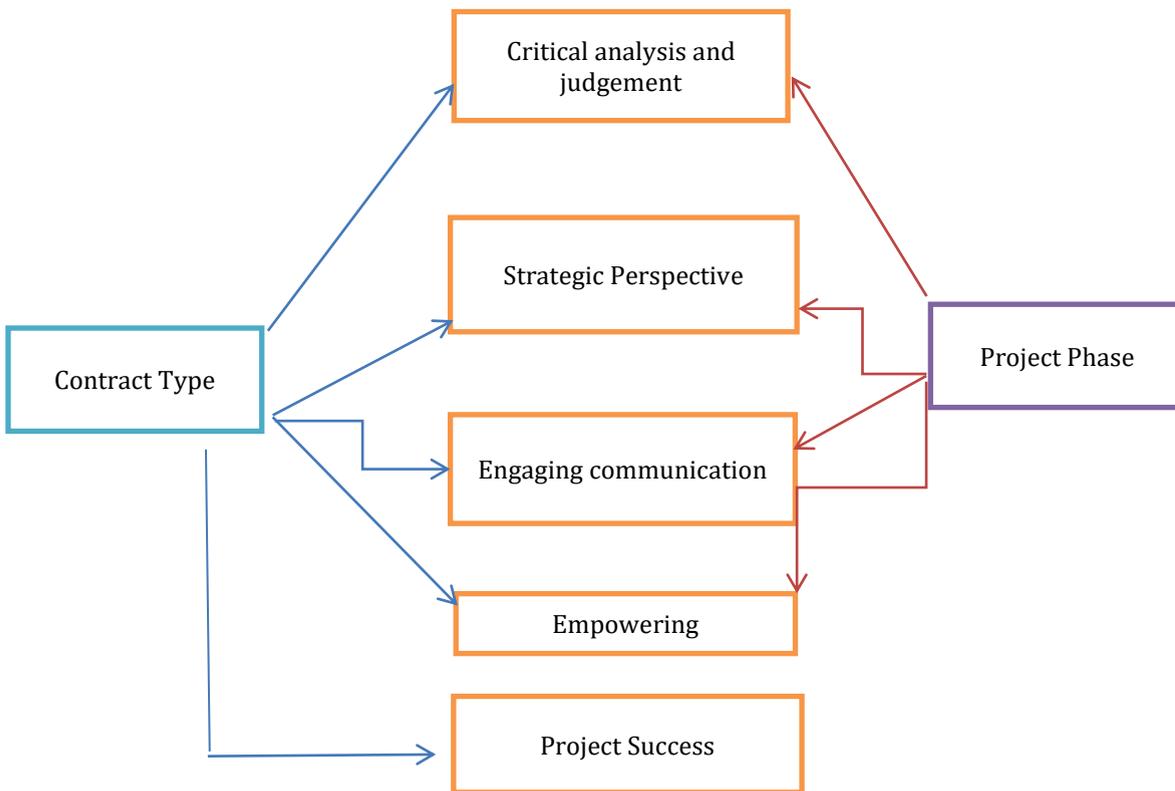
This stage is similar to proposal where all works are checked that it has been done as per the contract or not. This the stage where all the planned activities and work has been completed by the contractor's firm. The main factor of this stage is to check the quality of work and the cost has been increased, extra time has been consumed or not in turnkey project all the extra work and late delivery of the works are lied on the contractor firm. The project manager must be clear and manage the situation very smartly and always have the communication between the client as well as the contractor and the team involved in the project. The extra work which has not mentioned in the contract and that has done by the contractor then the client has to pay that amount to it, but the project has to make sure that work has been done. If the increasing in market rates is arise that the client must understand the situation of the contractor and must pay the small extra amount. In this stage the main point is about communication the project manager must understand the both the side and peacefully agreed both the parties. The managing skill is the important point in this stage that all the work has been ended and the payment should be made to contractor firm.

Conclusion:

The conclusion of this research states that the project manager must have proficiency to handle the different situation and task of the work. As per the stages have been analysed the knowledge and the style and mindset has been in the different task. As the study of the stage 1 it has been learned that the proficiency of markets rates and quantity evaluation is important so, that the profit of the organisation is maintained. In stage 2 the proficiency to proper planning and arrangement of the tools and equipment's are made so in that stage the project manager must adopt the intelligence to make sure proper arrangement and plan. In stage 3 the planning, visualisation of the project manager come into existing, and it the longest phase were many up and downs are arising. So, the project manager must be truly clear to make decision. In stage 4 the proper quality of work and each and every activities are analysed that from minor to major things if all the works are done as per the contract, then the payment should be done to the contractor firm.

Competencies of Project manager

Proficiency of Project manager



While appointing the project manager the skills and proficiency should be consider. Because every person has the different ability, pattern, and style of work and different mindset to do the work. The project manager should be that who provides all his effort for success completion. In turnkey project the manager must work very wisely to ensure that from beginning to the end of the work are in the straight line as per the planned.

Future Scope:

To identify the alternatives of material and study workability object to reduce the cost in turnkey projects. The future research could potentially allow for new innovative applications such that it can be applied at scheduling and rates analysis to minimize the risk management. The effect of management tools in turnkey project to ensure the project to complete on time.

References:

1. Vignesh kumar, Modern practices in project management of Turnkey engineering and construction projects, ISBR management journals, volume 3 27th November 2018.
2. Bhushankumar Gaikwad, Contract selection strategy in construction projects, IJARSE Volume 6, 06th June 2017.
3. Abhijit Langhe, Comparative analysis of three major types of contract with case study, IRJET 10th October 2018.
Primary details from Modeshwari constructions working on turnkey projects in engineering and construction industry. Zainab Mohamad zainodin, Methods of valuing construction variation in lumpsum contract from the client's perspective (2018) Risk Assessment in turnkey contracts and its impact on construction project, IJRSET (2018)