

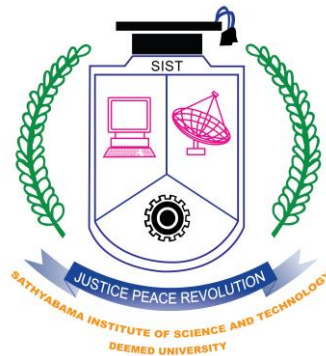
DEVELOPING STAKEHOLDER'S ENGAGEMENT IN CONTRACT MANAGEMENT

A Thesis

Submitted in partial fulfillment of the requirements for the award of
Master of Architecture degree in Building Management

by

GITANJALI (40840005)



**DEPARTMENT OF ARCHITECTURE
SCHOOL OF BUILDING AND ENVIRONMENT**

SATHYABAMA

**INSTITUTE OF SCIENCE AND
TECHNOLOGY (DEEMED TO BE
UNIVERSITY)**

**Accredited with Grade "A" by NAAC
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

May 2022



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This is to certify that this Report is the bonafide work of **G.GITANJALI (40840005)** who carried out the Thesis entitled "**DEVELOPING STAKEHOLDER'S ENGAGEMENT IN CONTRACT MANAGEMENT**" under our supervision from January 2022 to May 2022

Internal guide

(Ar. RAMESH KUMAR)

External guide

(Mr. S. SARATH KANTH)

Internal Panel Member

(Ar. SUKIRTHA SURESH)

DR. DEVYANI GANGOPADHYAY
Head of the Department

Submitted for Viva voce Examination held on **6TH May, 2022**

Internal Examiner

External Examiner

DECLARATION

I **GITANJALI** hereby declare that the Thesis Report entitled “**DEVELOPING STAKEHOLDER’S ENGAGEMENT IN CONTRACT MANAGEMENT** ” done by me under the guidance of **Ar. RAMESH KUMAR** (Internal) and **Ar. SARATH C. KANTH** (External) at Satyabhama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Master of Architecture degree in Building Management.

DATE: 6TH May , 2022

PLACE: Chennai

A handwritten signature in blue ink, appearing to read 'G. Gitanjali', with a horizontal line extending from the end.

SIGNATURE OF THE CANDIDATE

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ABSTRACT

The stakeholder engagement in contract management in residential building foremost Identifying different contracting project management process groups (initiation process group, planning process group, design process group, executing and monitoring process group, and close process group).The analysis starts with the case study of lump sum contract , item rate contract , and EPC contract where each of the contracting options gives different constraint in the three different case study , there gives the detail analysis on the stakeholder engagement in the contracting analysis using the constraints and made a framework of the stakeholders engagement on time , cost and quality. Determining the causes of commercial construction project failure in poor stakeholder management . Supplying logical solutions that have helpful roles in implementation of a project management methodology by using gathering data on different stakeholders perspective and this study was conducted depending on construction companies contracting operations , research methodology by Comprehensive survey using quantitative and qualitative methods ,Data gathering literature study , journal paper , case study ,results analysis using tools and techniques using lean and Mind mapping .

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CHAPTER 1

INTRODUCTION

1.1 AIM

To identifying the stakeholder engagement in contracting in commercial building to know the risk, challenges and issues for loss of time cost and scope .

1.2 STUDY OBJECTIVES

- Identifying and diagnosing the causes of commercial construction project failure by using different commercial contracting project management process into groups (initiation process , planning process , design process , executing and monitoring process , and closeout process).
- Determining the relative importance of the causes of commercial construction project failure in poor stakeholder management
- To analyze and Supply logical solutions that have helpful roles in implementation of a project management in contracting

1.3 STUDY LIMITS

- the gathering data on different stakeholders perspective on contracting
- this study will be conducted depending on construction companies contracting operations , types and methodology .

1.4 STUDY METHODOLOGY

- Comprehensive survey using quantitative and qualitative methods
- Data gathering literature study , journal paper , case study
- results analysis using tools and techniques

1.5 ANALYSIS

- Mind mapping
- Tools and techniques using lean and BIM software

4.2 STAGE WISE METHODOLOGY

Stage 1: journal comparative study
Three journal study
One thesis paper

Stage 2: literature analysis
Systematic & critical analysis
of trends, quality,
relationship, inconsistencies
& gaps

Stage 3: case study analysis
detail study of research in
applied area and survey
Interviews

Stage 4: tool and techniques
Application analyzing of data
Validation process

Stage 5: future goals and recommendations
Conclusion
Target achievement

1.7 RESEARCH QUESTIONS

- Who are our stakeholders?
- What are their stakes in the project?
- Contracting options to the stakeholders ?
- What opportunities do contracting wisely helps in failure model ?
- What challenges or threats do present in contracting ?
- What responsibilities do we have towards contracting between stakeholders?
- What strategies or actions should we use to make effective stakeholder contracting management ?
- Should we deal directly or indirectly with our stakeholder management ?
- Should we be aggressive or defensive in our treatment with the stakeholders in issues ?
- When and how should we accommodate, negotiate or oppose to the demands of our stakeholders using effective contracting management ?

1.8 Tools and techniques:

- Design charrette
- Contingent valuation mapping
- Delphi technique
- Strategic need analysis
- Stakeholder cycle

CHAPTER 2

JOURNAL PAPER

2.1 JOURNAL PAPER 1: INFORMATION SYSTEM FOR CONSTRUCTION CONTRACTS STRUCTURAL ANALYSIS - *Eva Trinkūnienė**, *Vaidotas Trinkūnas*

2.1.1 ABSTRACT

Construction contracts are regulated under civil law. There are major and additional conditions in the contract. The main problem are law, construction, management . It makes construction contracts multimodal and difficultly considerable document. In order to make considerate construction contract it is necessary to make its structural analysis. The aim of this article is to present the model of information system which main purpose is to help prepare construction contracts by presenting instrument for contracts structural analysis.

2.1.2 INTRODUCTION

- All the construction process, terms, financing conditions, security requirements, risk management and final results must to be considered and clearly described in construction contract.
- According to international NACE classification of main activities related to the construction sector civil engineering, specialized construction activities like demolition and site preparation, electrical, plumbing and other construction installation activities, building completion and finishing.
- The objective and formation of information systems model for construction contracts structural analysis to realize complex view to contract preparation and can be very helpful for construction contractors, subcontractors, investors and other related construction process participants.

2.1.3 CONTRACTING AND CONTRACT LIFE CYCLE

- **Contract request phase** –starting point and have to decide which type of the contract he needs.
- **Authoring phase** – there are a lot of different contracts, but in most cases it is impossible to use exactly the same contract few times.
- **Negotiation phase** –presentation of drafts and versions of authorized contracts for review by other employees, or even vendors/customers/clients
- **Approvals phase** –have to be checked by different stakeholders, Such reviewers can be authorized staff, different subject matter experts, legal and appropriate.
- **Contract execution phase** –prepared and signed final contract.
- **Obligations phase** – the life of a contract and its relationships continue doesn't stop after signing the contract. At this moment starts very important post-execution stage with alerts, workflow processes, risk assessment, spend management, compliance monitoring, and advanced reporting metrics.
- **Compliance phase** – reporting capabilities provide organizations with visibility into all contractual relationships including fully audit for contract.
- **Contract renewal phase** –organizations possibility to capitalize on each and every

renewal opportunity by identifying candidates for renewal, alerting employees to these contracts in time to make business decisions, and creating new contracts or drafts based on existing ones

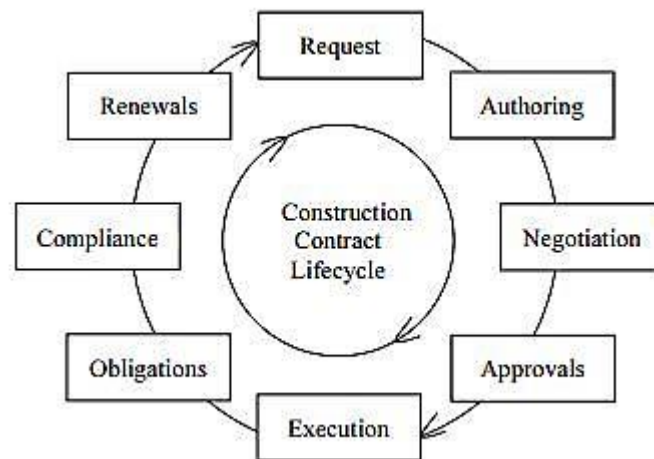


fig 2.1 construction contract lifecycle

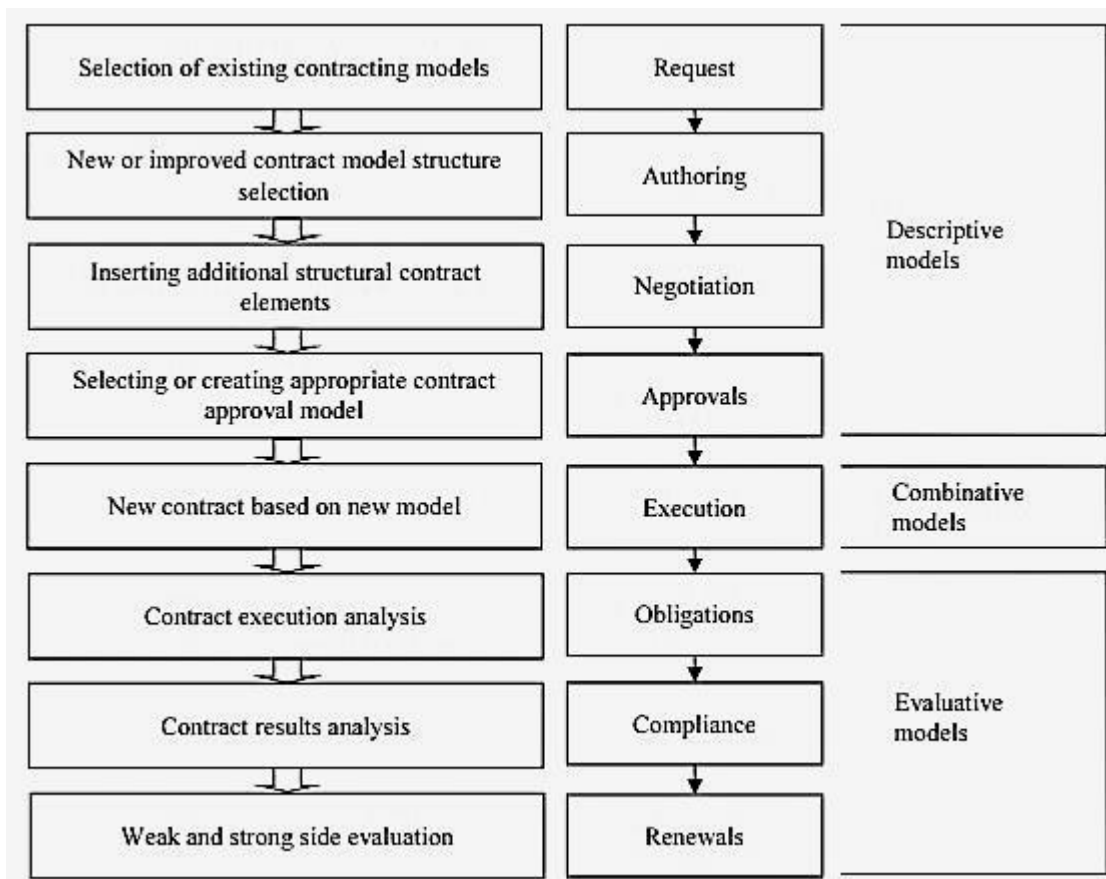


fig 2.2 multilayer contracts modeling system

2.1.4 DESCRIPTIVE AND COMBINATIVE MODELS IMPLEMENTATION

- performance of construction works according to the contract and following the requirements specified in normative documents of construction;
- performance of construction works keeping to the environment protection and work safety requirements;
- permits for construction works;
- supply of the construction site with construction materials, equipment, spare parts and other constructions;
- contractor 's duty to do all works independently, if not specified otherwise in the contract;
- a right to require recalculation of the contract price, if the factual price of the construction works increased over 15% due to circumstances not influenced by the contractor;
- client's duty to provide a land plot for construction in time;
- client's duty to pass to contractor buildings and equipment for use and to install temporary energy or water supply networks in cases specified in the contract;
- allow to use buildings and temporary energy or water supply networks;
- client's duty to pay for all works performed before conservation;
- implementation of client's rights related to construction supervision and control;
- acceptance of constructions works;
- cooperation of parties;
- recognition of the building as suitable for use;
- quality guarantee terms;
- payment for construction works;
- contract guarantee;
- contract suspension.

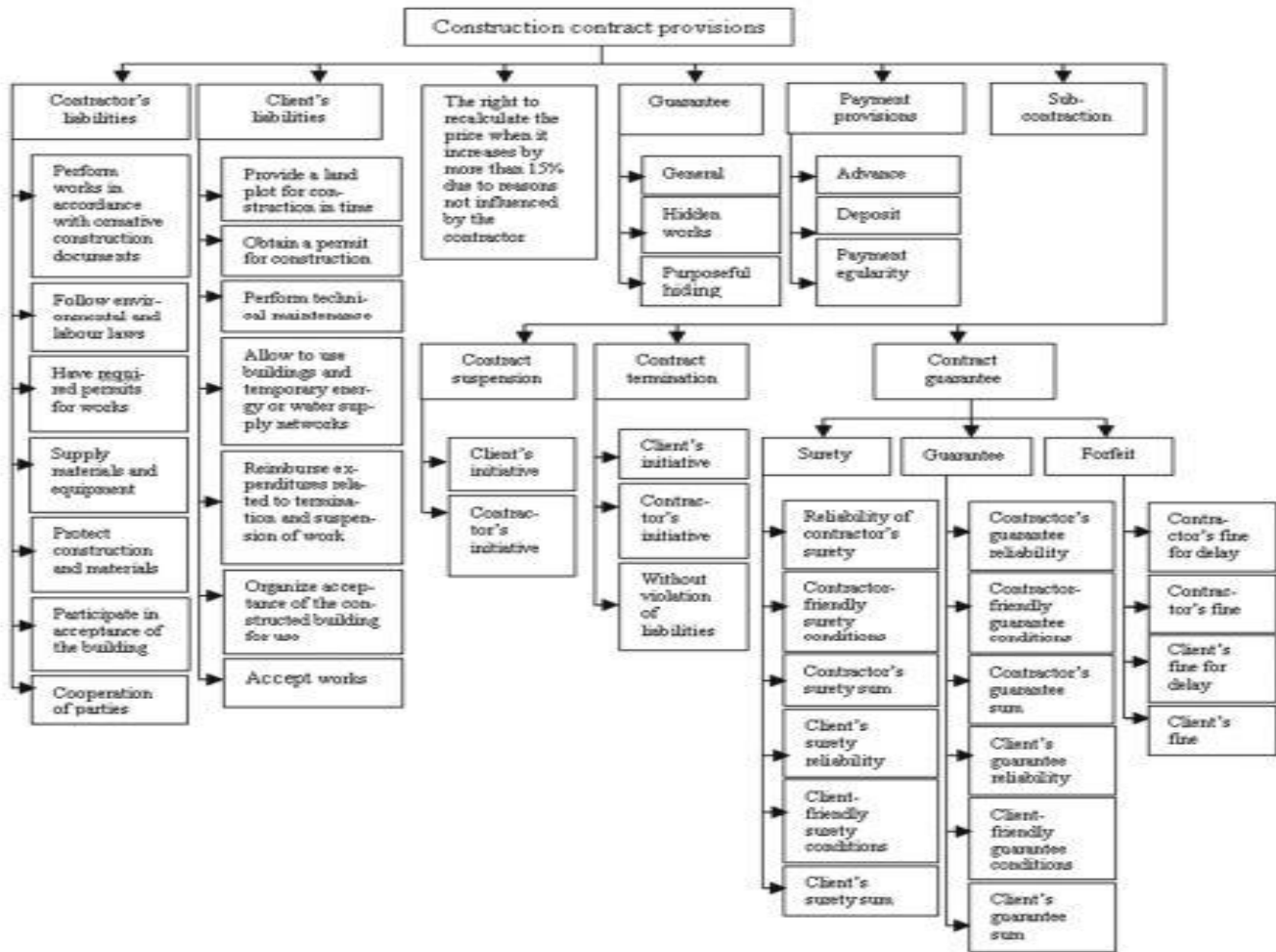


fig 2.3 construction contract provisions

2.1.5 CONCLUSIONS

Specialized information systems for construction contracts preparation allows not only collect big amount of related data, implement specialized models for contracts evaluation, but also made contract making structured, more clear process with possibility use collected experience in different fields negotiated under the contract. There for information systems model for construction contracts structural analysis was pre construction contract lifecycle and multilayer structure. The structure of proposed model allows realizing complex view to contract preparation and can be very helpful for construction contractors, subcontractors, investors and other related construction process participants which can improve construction contracting.

2.2 JOURNAL PAPER 2: ANALYSIS OF CONSTRUCTION CONTRACTS: SEARCHING FOR COLLABORATION

Thais da C. L. Alves and Nargis Shah

2.2.1 ABSTRACT:

Construction contracts play a vital role in construction engage participants in the pursuit best project. In some of the new forms of contracts, like integrated project delivery (IPD) due to a demand for more innovative solutions and techniques to be incorporated in projects, strong need to satisfy owners' needs. This study supports relationships and working practices in construction projects . Various contracts used in different delivery methods, and drafted by different organizations, in public and private settings were analyzed .collaborative practices have been identified, and contracts compared and contrasted to understand how these contracts are similar or different from a collaboration standpoint. The analysis revealed that IPD types of contracts have more instances where collaboration-related words and practices are indicated

2.2.2 RESEARCH QUESTIONS FOR ANALYSIS :

- do contracts that are considered to be more collaborative display when compared to traditional contracts?
- Comparative study of IPD types in working practices ?
- Collaborative practices and contract comparison ?
-

2.2.3 INTRODUCTION

- Contracts are legal documents that define rights and responsibilities of two or more parties involved in the exchange of goods and services.
- These documents define obligations related but not limited to cost, schedule, quality, and safety performance.
- They also indicate lines of responsibility/authority and management over different matters, timelines for processing documents and payments, and certification levels to be attained in sustainability-related project
-

2.2.4 COLLABORATION, DELIVERY METHODS, AND CONSTRUCTION CONTRACTS

Due to the fact that not all owners might be allowed to engage in IPD contracts for reasons that vary from cultural norms

- **Level 1** – typical collaboration with no contractual requirements defined, might include open-book, cost-plus with a guaranteed maximum price (GMP), fixed fee, best value.
- **Level 2** – enhanced collaboration with contractual requirements outlined, **might** include the requirements of Level 1 also using Building Information Modeling (BIM).
- **Level 3** – collaboration is put in practice via a multi-party agreement, might include previous items in Level 2, cost-plus without a GMP, shared financial risk/reward

2.2.5 COLLABORATION AND PERFORMANCE IN DELIVERY METHODS

- IPD projects were found to display lower change order processing times, lower construction problems, fewer requests for information, lower punch list costs and items, fewer resubmittals, and less construction waste .
- The success of IPD projects in performance metrics can include functioning of the project and the management of their different flows of work, materials, people, information, and money.
- Strategies: multiparty contract, financial incentives, fiscal transparency, intensified planning and team building, aligned project goals, integrated team structure, early involvement of key players, decision making, colocation, BIM, and interactive artifacts
- IPD contracts trust-building attributes collaborative planning, poor performance evaluation, early involvement of key players, effective communication system (e.g., BIM), relational form of contract, fair/equitable agreements, balanced risk/reward sharing, promote work related interaction, information sharing, behavior and interaction of partners, open dialogue/honest communication/ transparency, and collaborative and cooperative culture, shared similar culture and value, mutual respect and appreciation, mutual and liability waiver.

2.2.6 RESEARCH METHOD

The authors have looked at Multi-party agreements (IPD or IPD-like), DB,CMAR, and DBB contracts used in the industry

Type of Delivery Method	Source	Type of Contracts Document/Agreement
1. Design-Bid-Build (DBB1)	Industry Organization 1 (IO1)	Owner-Contractor, Contractor-Subcontractor, General Conditions
2. Design-Bid-Build (DBB2)	Public Owner 1 – Education (PO1)	Owner-Contractor
3. Design-Bid-Build (DBB3)	Public Owner 2 – Transportation (PO2)	Owner-Contractor
4. Construction Management at Risk (CMAR1)	Public Owner 1 – Education (PO1)	Owner-Contractor
5. Design-Build (DB1)	Public Owner 1 – Education (PO1)	Owner-Contractor
6. Collaborative Design-Build (DB2)	Public Owner 1 – Education (PO1)	Owner-Contractor
7. Integrated Design-Build Contract – cost plus fee with final target cost (DB3)	Public Owner 3 – Education (PO3)	Owner-Contractor
8. Multi-party Agreement (IPD1)	Industry organization (IO1)	Multi-party, General Conditions
9. Multi-party Agreement (IPD2)	Industry organization (IO2)	Multi-party

fig 2.4types of contract and delivery method

2.2.7 ANALYSIS – THE USE OF KEYWORDS RELATED TO COLLABORATION

First phase keywords: collaboration and its variants The two Level 3 multi-party contracts (IPD1 and IPD2) and the Level 2 integrated DB (DB3)

- **Project organization** – work collaboratively, responsibilities, relationships and performance metrics ,commitment to work collaboratively, deliver the project in a collaborative manner, collaborative environment, collaboration shall occur at all times, collaborative relationship, work collaboratively, definition of a project/senior

management team and/or project executive committee to collaboratively work with stakeholders to address issues and foster collaboration among owner, design, trade partners

- **Commercial terms** – stakeholders responsibilities and performance indicators : collaborative development of budget, preliminary cost model, collaboratively monitor the cost, definition of collaborative relationships among parties and the resulting collaboratively shared risk/reward system, collaborative project risk analysis and allocation collaborative design principles.
 - Operational system –production /design management system is organized and its related tools /methods: collaborative use of Lean principles ,tools, and methods that foster collaboration (e.g., co-location, collaborative schedule development), use of collaborative technologies (e.g., BIM), definition of a collaborative environment (e.g., co-location plan), collaborative project reviews, collaborative constructability reviews.
- **Second phase keywords:** cooperate, participate, joint, jointly, together
the need for the owner to coordinate its resources, and the contractor to cooperate with the owner and other parties to develop progress reports, to develop work, to review schedules to allow activities to be developed (e.g., inspection, audits, review of claims). contract addresses schedules as deliverables, and meeting schedule milestones as a performance metric, but provides no additional details on development or review . the clauses give directives to contract signatories to participate in developing target criteria and defining the project program and its goals, developing recovery plans, participating in the management process of the work, developing risk analyses, managing budgets, and participating in workshops to carry out project related tasks

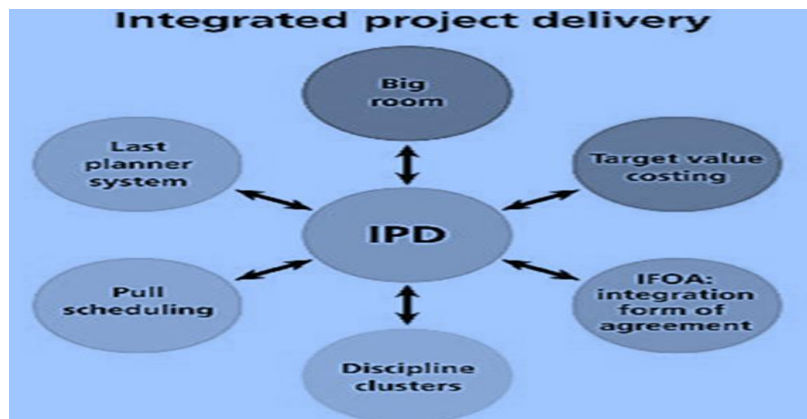


fig 2.5 intergrated project delivery

2.2.8 CONCLUSIONS

- Conversely, IPD contracts, and more advanced DB contracts aiming at fostering collaboration beyond the design build team, contain an abundance of clauses of integrated development of solutions.
- The analysis of paper collaboration in construction projects is the language of the IPD contracts is more prone to have words and terms related to collaboration and to suggest different ways people can organize to collaborate, whereas more traditional contracts have their language drafted mostly around compliance.

2.3 THESIS PAPER 1: CONTRACTORS' PROFICIENCY IN BIM

LEE SEOK CHAE

2.3.1 ABSTRACT

The use of Building Information Modeling (BIM) in cost and duration, enhanced facilities management, and positive Return on Investment (ROI). As construction is presently growing complex and is in need of many specialized skills, contractor's proficiency is getting more important than before. Selecting a qualified contractor is one of crucial and basic requirement to the success of a BIM project, because the probability of project failure is greatly related to contractor's competency. Although several contracting evaluation models have been introduced, it may have some challenges to be used by owners for client-contractor interviews. It is because some tools requires enough knowledge and experience about BIM, and some of them are self grading systems for improving contractor's weaknesses in terms of using BIM. A questionnaire that can be easily used for evaluating contractors' proficiency in BIM is what owners may need.

2.3.2 RESEARCH METHODOLOGY

1. to develop an effective questionnaire that can be used by owners when selecting contractors
2. to investigate the usability of the questionnaire by using in-depth interviews with Subject Matter Experts (SMEs).

user-friendliness and practicality in evaluating a contractor's level of BIM proficiency. which would ideally provide deeper and more informative responses from contractors when interviewed.

2.3.3 RESEARCH PROBLEM

To find a qualified contractor is very important and is a basic requirement to the success of a project Unfortunately, projects have a high probability of failure when the contractors are selected on the basis of low tender price rather than their qualifications. From the point of view of the owner, these cases would result in project failures since incompetence is a major cause of failure in the construction business. As a result, it is crucial for owners to select a general contractor that has a high level of proficiency in construction in order for the project to be a success

2.3.4 RESEARCH OBJECTIVE

(1) to develop a questionnaire that can be used for owners to evaluate the contractors' level of proficiency in BIM;

(2) to investigate the practicality and feasibility of the questionnaire;

Tasks were needed to achieve the objective of this research:

- Development of a questionnaire to evaluate the contractors' proficiency in BIM
- Validation of the questionnaire using an usability assessment method

2.3.5 RESEARCH SCOPE

The scope of this research is to develop a first prototype questionnaire that assists owners to select competent contractors. After completion of the questionnaire development, the draft

has been evaluated by the industry professionals. The collected responses that can be applied to the questionnaire are analyzed for improving upon in the next draft. This is a constant reiterating process to improvise the questionnaire according to the responses gathered from the previous feedback of the questionnaire.

2.3.6 RESEARCH QUESTION SCHEME

13. What relevant contents should be addressed in the BIM Execution Plan (BEP)?		Question
Direction: See if the interviewees cover the following items. - Project Information, Goals and Objectives - Assumed roles and responsibilities of the team - Collaboration plan - Planned Models, Model Components, and Model Analysis plan - Project deliverables - Project Milestones		Direction for Owners
	Score	
Have direct and expert knowledge of BEP.	A	Standards for Scoring
Mentioned minimum BEP with limited experience.	B	
Mentioned general execution plan not related to BEP.	C	
Have no idea about BEP.	D	
Comment:		Blank Space for Comment

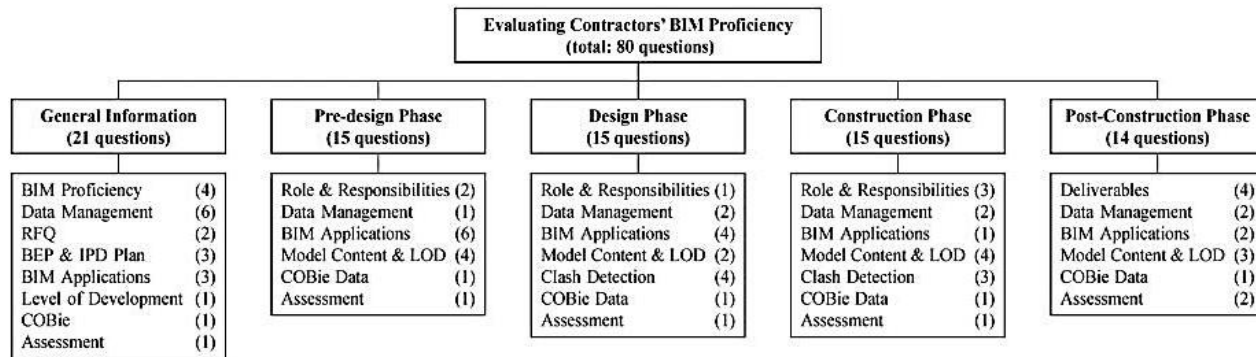


fig 2.6 evaluating contractor's bim proficiency

2.3.7 CONTRACTOR EVALUATION MODELS

Scoring Matrix

BimSCORE

VICO's Scorecard

IU's BIM Proficiency Matrix (BPM)

2.3.8 RESULTS

The findings from interviews were grouped into related topics of interests. The topics are as follows:

1. Whether or not the questionnaire is feasible to be used for evaluating contractors' proficiency in BIM.
2. The questionnaire contains related contents that owners wish to inquire of contractors.
3. Any suggestions or feedback from experts that will help develop the questionnaire

2.3.9 RESEARCH CONCLUSION

contracting evaluation systems had been introduced for qualifying contractors, some tools were required enough knowledge and experience about BIM to use them and the others were self-grading systems for improving the contractors' weaknesses regarding BIM . First, the questionnaire inquired a wide-range of content knowledge in terms of implementing. Second, since the questionnaire contains a surplus of questions such as categorizing by project type, size, or delivery method. Based on the SMEs interviews, it is reasonable to conclude that the questionnaire for selecting appropriate contractors is feasible and applicable but needs to be developed and updated for easier usability and efficiency.

2.4 JOURNAL PAPER 3 : LEVEL OF STAKEHOLDER ENGAGEMENT AND PARTICIPATION IN MONITORING AND EVALUATION OF CONSTRUCTION PROJECTS IN GHANA Callistus Tengan , Clinton Aigbavboa

2.4.1 INTRODUCTION

A comprehensive understanding of a successful project is one that has been completed within budget, on schedule, within pre specified scope, user expectation, quality, technical specification, client and project managers satisfaction, environmental friendliness and health and safety . The study seeking to report on the level of stakeholder participation in monitoring and evaluation of local government construction projects in Ghana.

Understanding Stakeholder Participation

* “An individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio” are the stakeholders .

- Project stakeholders as individuals, groups or entities who may possess the power to be a threat or opportunity to a project.
- These individuals are brought together to interact and relate to execute the project with the aim of achieving set standards ,in some cases the selection of stakeholders for a project is influenced by nature, complexity, and procurement method adopted as well as the source of funding
- In the Ghanaian construction industry, the broad categories of stakeholders have been identified by and as clients, contractors, and professional consultants.
- Clients, contractors, professional consultants and material suppliers are reported by this study as the internal project stakeholders involved in local government construction project delivery in Ghana.
- Stakeholder participation in monitoring and evaluation is essential since it keeps the projects on track and often ensures early detected of problem and reduces the likelihood of having major cost overruns or time delays and non-conformity to project specification.
- Participatory Monitoring and Evaluation
 - * It involves the setting up of goals and project success indicators for planning, undertaking continuous and systematic collection of data regarding the set goals and project success indicators (monitoring), and assessing the efficacy, relevance, impact, and sustainability of the project (evaluation)

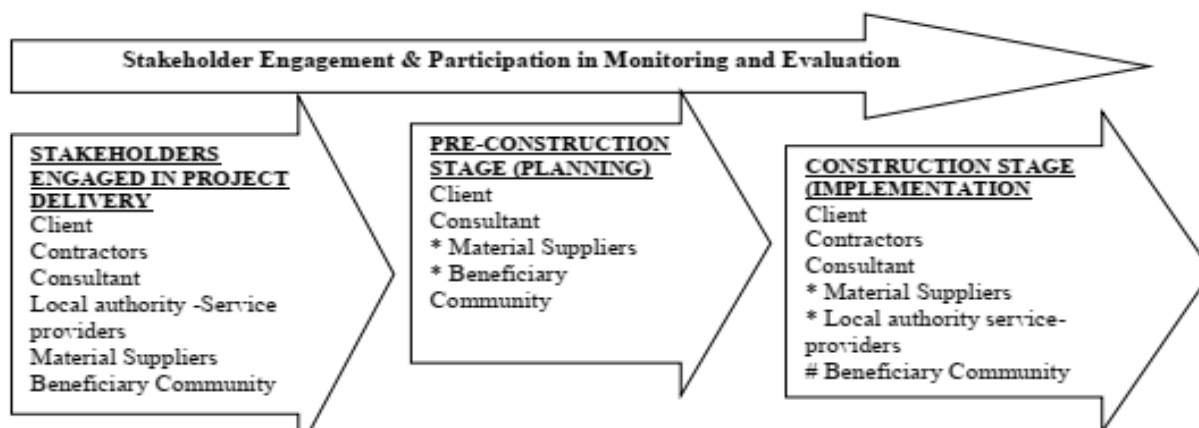


fig 2.7 stakeholders engagement participation in monitoring & evaluation

2.4.2 METHODOLOGY

* The study involved a total of ninety randomly selected stakeholders from the three Northern regions of Ghana.

- A structure questionnaire guide was distributed to respondents and sometimes served as the interview guide for illiterate respondents.
- This included thirty selected contractors, fifteen material suppliers and nine consultants involved in construction project delivery

	Frequency	Percent
Contractor	30	33.3
Consultant	9	10.0
Client (MMDA) Staff	15	16.7
Material Suppliers	15	16.7
Assembly Man/Woman	15	16.7
Local Authority service providers	6	6.7
Total	90	100.0

fig 2.8 findings and data analysis – profile of stakeholders respondents

		Stage engagement in Project Delivery				Total
		Early stages	Latter stages	Through all stages	As and when needed	
Kind of stakeholder	Contractor	0	0	30	0	30
	Consultant	0	0	9	0	9
	Client (MMDA) Staff	0	0	15	0	15
	Material Suppliers	0	0	0	15	15
	Assembly Man/Woman	15	0	0	0	15
	Local Authority service providers	0	6	0	0	6
	Total	15	6	54	15	90

fig 2.9 stakeholder engagement in project delivery at mmda level

		Participation in Monitoring and Evaluation		Total
		Always participated	Not always participated	
Kind of stakeholder	Contractor	30	0	30
	Consultant	9	0	9
	Client (MMDA) Staff	15	0	15
	Material Suppliers	0	15	15
	Assembly Man/Woman	0	15	15
	Local Authority service providers	0	6	6
	Total	54	36	90

fig 2.9 stakeholder participation in monitoring and evaluation

2.4.3 Conclusion and recommendation

- therefore, evidence of high engagement level but a poor level of participation of stakeholders in monitoring and evaluation.
- In conclusion. These challenges included procurement lapses which resulted in poor payment schedules, non-conformity to project specification, delayed project delivery, lack of health and safety compliance, client's dissatisfaction, and corrupt practices in the construction industry.
- This may be achieved through community based development project (CBDP) delivery.

2.5 THESIS PAPER 2: A STUDY OF CONSTRUCTION PROJECT STAKEHOLDERS' MANAGEMENT METHODS AND THE CRITICAL SUCCESS FACTORS ESSENTIAL FOR SUCCESSFUL MANAGEMENT IN STOCKHOLM REGION. Prisca Akeyo Forsman

2.5.1 AIM

The aim of this study is to explore the methods used for managing construction project stakeholders in Stockholm Researchers have identified by semi-structured interview for successful management of stakeholders.

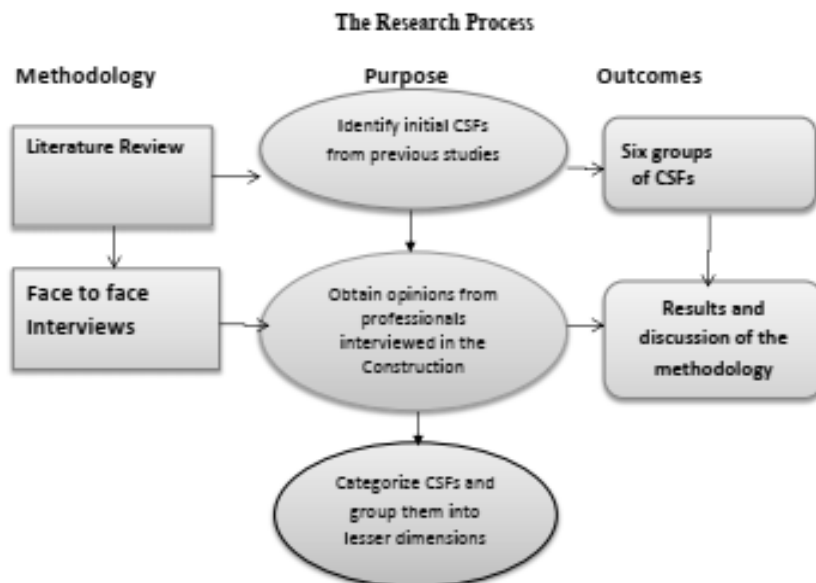
2.5.2 OBJECTIVES

1. identify the methods used for managing stakeholders in major construction companies in Stockholm.
2. categorize and group the CSFs to show which ones are important for managing stakeholders
3. explore critical success factors contributing to the successful management of the projects
3. compare the findings from each project organization and relate them results with the theory in the literature to validate the study.

2.5.3 SCOPE

- To do literature review of the various methods of Stakeholder management
- Analysis of the negative factors of Stakeholders' action on construction projects
- Investigating the problems caused by stakeholders in construction projects in Stockholm
- Explored the methods and critical success factors essential for successful stakeholder management

2.5.4 RESEARCH PROCESS



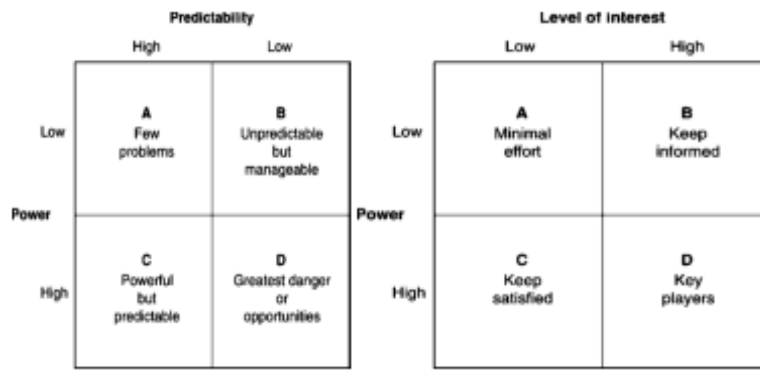


Figure 1: Power/predictability matrix

Figure 2: Power/Level of interest matrix

fig 2.10 methods for managing stakeholders

External		Internal	
Public	Private	Supply Side	Demand Side
Regulatory Agencies	Local residents	Architects	Client
Local Government	Local Landowners	Engineers	Financiers
National Government	Environmentalists	Principle contractors	Client's Employees
Public Agencies	Conservationists	Trade contractors	Client's Customer
Archeologists	Materials	Client's Suppliers	
Other external stakeholders	Suppliers		

fig 2.11 classification of project stakeholder

Stakeholder Group	Objectives and Roles
Client	The client can be public or private . The main difference between a private construction project and a public project is that the client and the beneficiary are the same in private construction project and in the reconstruction housing project the main initiator is the beneficiary and benefit accrues to the communities affected
Consultant	Provides the consultancy advice for the project on designing, evaluating the cost, technical issues/advice (engineering advice electrical, civil etc.) .
Contractor/Subcontractors	Engage in actual construction according to the designs, specifications, contract documents communicated by the relevant parties
Funding body/Sponsor	Ensures that the funds are utilized for the purpose and the sponsor makes sure that used according to the planned budget and time schedule . Ensures that deliverables are delivered on time at the specified and approved cost .
Municipalities/Land Owners	Provides the land on which construction work is carried out. Their support is important for the timely purchase, planning, execution and completion of the construction project .
Surrounding Communities	Their support, influence, interest in the project is important and must be assessed.
Politicians	The support of the politicians is important in project construction as they are the leaders of the communities surrounding the project . They influence and they have power .
Government and other Authorities such as counties	Ensure that the construction project is carried out according to laid down regulations and requirements .

fig 2.12 roles of project stakeholders

2.5.5 PRE-CONDITION: “MANAGING WITH SOCIAL RESPONSIBILITIES”

GROUP 1: “Top Management Support”	
1	Managing Stakeholders with corporate social responsibilities
2	Flexible project organization
3	Project Managers competences
GROUP 2: “Information Input factors group”	
4	Setting common goals and objectives of the project
5	Identifying stakeholders
6	Exploring the stakeholder needs and expectation
GROUP 3: “Stakeholder Assessment Factor Group”	
7	Assessing stakeholders’ attitude
8	Understanding area of stakeholders’ interest
9	Predicting the influence of stakeholders
10	Analysing conflict and coalitions among stakeholders
11	Evaluating the stakeholders’ power
12	Evaluating the stakeholder legitimacy
13	Understanding the stakeholders’ urgency
14	Determining the stakeholders proximity
15	Determining the stakeholders’ knowledge
GROUP 4: “Decision making factor group”	
16	Transparent evaluation of the alternative solution
17	Ensuring effective communication
18	Formulating appropriate strategies

GROUP 5: “Action and evaluation factors group”	
19	Implementing the strategy based on schedule plans
20	Flexibility in the implementing strategy
21	Evaluation of the stakeholder satisfaction

GROUP 6: “Continuous Support Factors Group”	
22	Communication with then engaging stakeholder properly
23	Stakeholder involvement in decision-making
24	Promoting a good relationship among stakeholders

25	Analysing the change of multiple stakeholder engagement
26	Obtain support assistant from higher authorities
27	Mutual trust and respect amongst the stakeholders
28	Reduce the uncertainty
29	Maintain alignment between or among the stakeholders
30	Access to resource and knowledge

2.5.6 RESEARCH FINDINGS AND RESULTS

CASE STUDY 1: STOCKHOLM SLUSSEN PROJECT ORGANISATION

- Client: City of Stockholm
- Collaborating Architect: Berg Arkitektkontor
- Structural Engineer: ELU, Arup, Dewhurst McFarlane and Partners
- M & E Engineer: SWECO
- Landscape Architect: White Architecture
- Additional Consultants: Spacescape AB, ACAD, Fire Safety Design AB, Tyrens AB, Tikab Structure Mechanic AB, WSP, Structure Enviromental Bureau, Stockholm Stakeholder Management method at Stockholm Slussen

The Stakeholders include:

1. Property owners in Stockholm South area
2. Cultural preservationists interested in keeping the original Slussen
3. The residents in Stockholm South who are opposed change of environment
4. Motorists whose routes are diverted during the construction works
5. Pedestrians who find it difficult to find their way in the construction area
6. Cyclists who have nowhere to park their bicycles
7. The local politicians who considers the project as a necessity to the society
8. The Elites of Stockholm city supporting the various groups

The Stakeholders claimed that

1. there was no danger about the old place
2. the new construction was changing the environment of the residential areas
3. the new construction was changing the cultural set up of Slussen
4. the motor ways were diverted causing a lot of traffic problem for motorists
5. the cyclists did not have parking place
6. the elites of Stockholm just wanted to support the local stakeholders
7. the pedestrians could not find their ways around construction sites
8. the new construction created complication in the area
9. the stakeholders did not want change of environment

Plan B Strategies After Stakeholders Actions against the Project

In planning communication methods, transparency and openness were crucial and a list of issues to consider in communication were spelled out:

i)	Transparency and openness
ii)	Information input and update
iii)	Identifying the approach
iv)	Communication with facts, details, accessible ways and explanation of what happens

v)	Creating and pursuing good relationship with the stakeholders
vi)	The Municipality Management Board working together with development committees.
vii)	Social Media, website, information brochures, email.

Communication was based on facts and channeled through:

1. Websites which is quite detailed
2. Newsletters
3. Maps and designs
4. Meetings with residence and landlords in the area
5. Hot-line for direct telephone to the project coordinator
6. Open Day visitors to visit and ask questions
7. Relationship with Media
8. Accessible Instagram twitter, etc.
9. Joint social responsibility in which Stakeholders are engaged.
10. Study visits to the construction sites

Table 2.1 JOURNAL PAPER INFERENCE TABULATION :

Journal paper topics	Author	Objective / compliance	tools	Inference
Journal paper 1: Information system for construction contracts structural analysis	-Eva trinkūnienė*, vaidotas trinkūnasb	To understand the contract lifecycle in various activities , analysis to realize complex view for contractors and investors .	Descriptive model , combinative model , evaluation model.	Analyzed the multilayer contract modelling system and lifecycle .
Journal paper 2: Analysis of Construction Contracts: Searching for Collaboration	- Thais da C. L. Alves and nargis shah	To understand the integrated project delivery (IPD) for more innovative solutions and techniques to satisfy owner's need	Multi-party agreements (IPD or ipd - like), DB,CMAR, and DBB contracts	Analyzed in phase wise on collaboration & performance in delivery method on project organization , commercial terms , operational system and participants engagement
Thesis paper 1: CONTRACTORS' PROFICIENCY IN BIM	- Lee seek chae	To evaluate the contractors' level of proficiency in BIM in practicality and feasibility of the questionnaire using an usability assessment method	Scoring matrix bimscore vico's scorecard iu's BIM proficiency matrix (BPM)	Tools were required enough knowledge and experience about BIM to self-grading systems for improving the contractors' weaknesses regarding BIM appropriate contractors is feasible and applicable but needs to be developed and updated for easier usability and efficiency.
JOURNAL PAPER 3: Level of stakeholder engagement and	Callistus Tengan , Clinton	The study seeking to report on the level of stakeholder participation in	Stage wise methodology , survey questionnaire,	Analyzed stakeholder participation in monitoring and

participation in monitoring and evaluation of construction projects in Ghana	Aigbavboa	monitoring and evaluation of local government construction projects in Ghana.	frequency analysis of participation	evaluation stage .
thesis paper 2: A Study of Construction Project Stakeholders' Management Methods and the Critical Success Factors Essential for Successful Management in Stockholm Region.	Prisca Akeyo Forsman	identify the methods used for managing stakeholders in major construction companies in Stockholm, categorize and group the CSFs to show which ones are important for managing stakeholders, explore critical success factors contributing to the successful management of the projects	Investigating the problems caused by stakeholders, critical success factors analysis.	Analyzed the methods for managing stakeholders and csf on successful management .

CHAPTER 3

LITERATURE STUDY

3.1 WHAT IS CONTRACT MANAGEMENT?

Contracts govern your organization's relationships with vendors, customers, partners, and employees. Effective contract management ensures these relationships are efficient and profitable — that your business benefits from every agreement and you get optimal financial returns. It also ensures that the implementation or delivery of every contract, whether a legally binding written or oral agreement, is satisfactory to all parties.

3.2 CONTRACT LIFE CYCLE MANAGEMENT?

Contract life cycle management (CLM) covers every step of a contract, from drafting to approval, implementation, utilization, and expiration. CLM is vital to every business. The life cycle has three stages that encompass these actions: pre-award, award, and post-award. Each step creates, contributes to, or uses contract data.

3.3 CONTRACT MANAGEMENT PROCESS?

streamlines the management of each contract through all its phases, from creation, negotiation on terms and conditions, and approval, through execution, performance, and compliance on deliverables and deadlines.

3.4 CONTRACT MANAGEMENT OBJECTIVES:

1. delivered on time, at the right place and in the right quantity;
2. completed to the required specifications, standards and quality;
3. completed within the agreed price.

3.5 TO DO THINGS :

1. effective and efficient management of performance, delivery and payment;
2. methodical and measured change control;
3. active risk mitigation and management;



fig 3.1 role of the contract manager

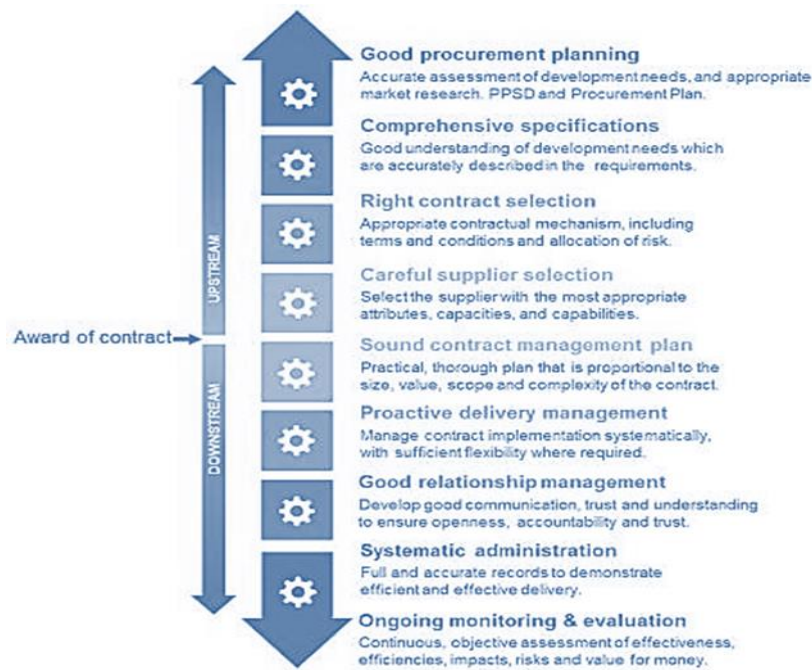


fig 3.2 upstream & downstream of contract management

3.6 CONTRACT MANAGEMENT FRAMEWORK?

- Establishing Governance and the Contract Management Team
- Planning, Establishing, and Executing Contract Administration
- Managing Relationships
- Managing Performance
-

3.7 IMPORTANCE OF CONTRACT MANAGEMENT?

- Improves the process for generating, negotiating, signing, and renewing contracts
- Creates strong relationships with your partners and vendors
- Supports strategic decision making
- Supports commercial management
- Helps you assess, monitor, and mitigate financial, legal, and procurement risks
- Creates standard processes for routine contracts
- Types of construction contracts
- Cost (Plus) Contracts
- Lump Sum Contracts (Also known as Fixed Price Contracts)
- Piecework Contracts
- Unit Pricing Contracts
- GMP Contracts (Guaranteed Minimum Price Contract)
- Rate Contracts
- Target Contracts
- Time and Materials Contracts
- Again, in Cost Contracts there are:
- Cost Plus Percentage Contracts
- Cost Plus Fixed Fee Contracts

- Cost Plus fluctuating Fee Contracts
- Similarly, under the Rate Contracts there are:
- Item Rate Contracts
- Percentage Rate Contracts

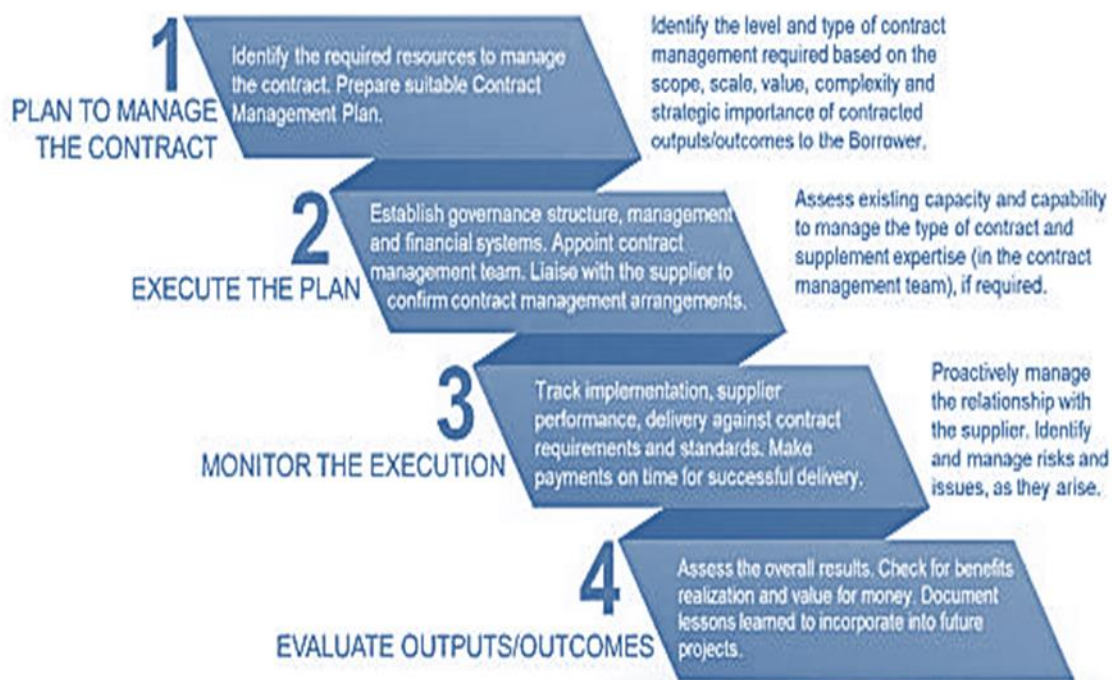


fig 3.3 plan, do, check :

3.8 THREE OTHER TYPES OF CONTRACTS

Operate, Maintain and Transfer (OMT) Contracts (popular in roadworks);
Build Operate Transfer (BOT) Contracts; and
Build Own Operate Transfer (BOOT) Contracts.

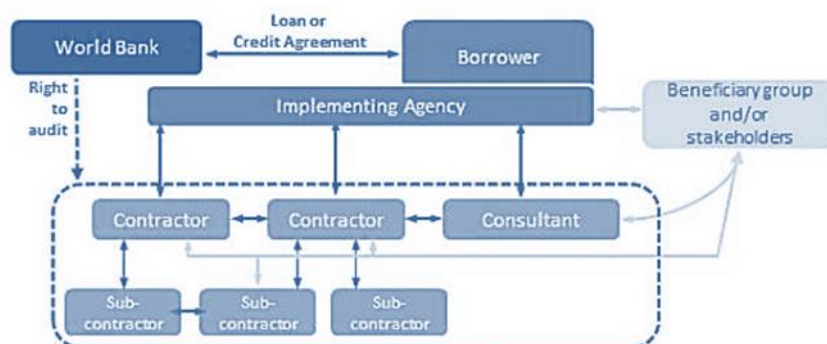


fig 3.4 relationship mapping

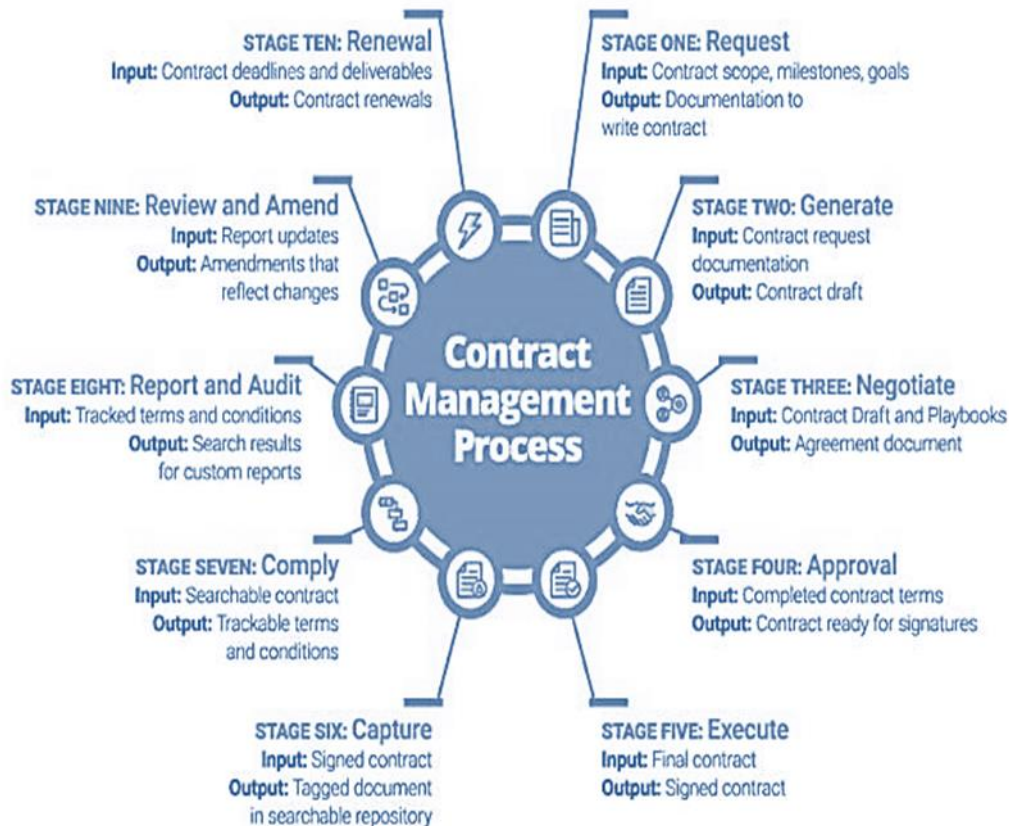


fig 3.5 contract management process map

3.9 CONTRACT MANAGEMENT IN PROCUREMENT

3.9.1 Cost-Reimbursable or Cost-Plus Contracts: When you haven't fully defined the scope of work, use this agreement to pay the vendor or service provider for expenses related to developing the goods or services.

3.9.2 Fixed-Price Contracts: This is an agreement to provide goods or services at a set price and delivery schedule.

3.9.3 Time and Materials Contracts: This is a contract you use on smaller projects with high uncertainty. It includes an agreement to pay an hourly rate for work, plus the cost of resources or materials and a percentage of the total cost.

3.10 Contract Management in Construction

3.10.1 Pre-Contract: Prepare tender documents, seek tenders, and conduct contract negotiations.

3.10.2 Contract Execution: Prepare the final contract documents for execution.

3.10.3 Post-Award: Measure performance against the terms and conditions of the contract, ensuring policy and regulatory compliance and timely payment.

3.11 HERE ARE THE MOST COMMON TYPES OF CONSTRUCTION CONTRACTS:

3.11.1 Cost Plus: This refers to payment of the actual costs or expenses that construction activity generates, plus a pre-negotiated amount that covers the contractor's profit or overhead, such as a fixed percentage or fee, or a guaranteed maximum price or bonus.

3.11.2 Lump Sum or Fixed Price: This is a contract with a fixed-price total for all construction work, which can include incentives for early completion.

3.11.3 Time and Materials: This establishes an hourly or daily rate for work, plus additional expenses that could come up during construction.

3.11.4 Unit Pricing: This is a predetermined price for specific materials or quantities that you set during the bidding process to avoid a cost increase during the construction process.

3.12 PREPARING A CONTRACT MANAGEMENT PLAN

3.12.1 Why plan

Planning how, when, where and by whom a contract will be implemented, monitored, managed and administered is an important step to ensure that what is procured will be delivered.

3.12.2 When to plan

The Borrower begins development of the CMP as early as possible in the procurement process. Preferably, the plan is expected to be completed when signing the contract.

3.12.3 How to plan

the scope, value, risk, complexity and duration of the contract.

1. contract management roles and responsibilities
2. list of key contacts
3. contract management system;
4. governance structure;
5. contract documents
6. key milestones
7. Key Performance Indicators
8. key contract deliverables
9. reporting requirements
10. payment procedures consistent with contractual provisions;
11. record keeping requirements and procedures;
12. audit or independent assurance requirements;
13. change management or contract variation procedures;

14. issues management and escalation;
15. key contractual remedies;
16. risk management plan
17. stakeholder engagement plan;
18. communication plan;
19. insurance coverage;
20. guarantees and/or securities, if applicable;
21. price adjustment formula and circumstances, if applicable;
22. interface management
23. contract closure procedures

3.13 CHANGE MANAGEMENT PROCEDURES

1. as early as possible during the contract execution phase, establish a formal and documented change management process
2. have appropriate forms and clear procedures for requesting a change proposal (or change order),
estimating the change (e.g. scope, costs, implications and risks), and approving the change proposal
3. clarify who is responsible for what during change management, and ensure that individuals have clear delegated authority to act,
4. familiarize those involved in contract change management (e.g. contract managers, consultants, contractors) with the procedures, documents, decision making process and record keeping requirements;
5. identify areas susceptible to change, evaluate risk, and proactively manage those areas;
6. ensure timely communication of change information to the relevant people;
7. monitor the change management process
8. ensure that changes are captured as level specified in the contract;
9. unless contractually justified and/or due to emergency situation, do not order or execute changes to a contract without the appropriate change documentation;
10. comply with the Bank's requirements for prior review to changes to a contract;
11. keep records of all change orders, including the reasons;
12. at contract close-out, evaluate the changes and their impact/s on the contract cost, schedule and performance for future use as lessons learned.

3.14 CONTRACT IMPLEMENTATION: MANAGING TIME, COST, QUALITY AND RISK

3.14.1 Time control

An essential part of contract management is identifying the critical path. Key factors in time control include:

1. developing a comprehensive, practical and realistic schedule of key activities (this may include key deliverables and milestones and projected contract completion date);
2. undertaking a quality assurance check of the schedule including identifying any flaws in logic or faulty assumptions;
3. ensuring that the Borrower/Contract Manager and the contractor are working to the same schedule;

4. implementing an effective tool or system to track and monitor progress against the schedule;
5. ensuring early intervention when a potential or actual delay is identified;
6. implementing appropriate action to mitigate or manage a delay and recording the decision/s.

3.14.2 Cost control

1. The Borrower's design has flaws.
2. The Borrower's design is not capable of being implemented or constructed.
3. Increased price of raw materials or products due to inflation, fluctuations in exchange rates, or changes in taxes, or duties.
4. Unforeseen conditions emerge, e.g. a significant difference in sub-surface ground conditions from what was expected.
5. Higher level of change orders/variations than expected (especially if they relate to high unit rates or prices).
6. Fraudulent practices by suppliers, contractors and consultants such as overbilling, double billing, timesheets for no show amongst other practices

3.14.3 Quality control

1. Flaws in the Borrower's design.
2. The deliverables do not meet the required specifications.
3. Poor quality assurance tests or inspections do not identify issues with the quality being delivered.
4. Fraud and corruption result in inferior materials being used and poor-quality outputs.



fig 3.6 contract implementation

3.15 POTENTIAL PITFALLS

Common causes of poor performance associated with inadequate fundamentals include:

1. insufficient planning prior to the transition from award of contract to the contract execution phase;
2. poor communication;
3. insufficient resources (capacity and/or capability);
4. inadequate governance and/or confusion of responsibilities;
5. poor decision making;

6. vulnerability to fraud and/or corruption;
7. ineffective risk identification and mitigation

Quadrant	Contract management (CM) approach	Contract arrangements
Tactical acquisition	• Brief CM plan • Minimum attention • Fixed price or formula • Look to rationalize	• One-off contract or purchase order • Framework Agreements • E-purchasing • Procurement Cards
Tactical profit	• Short CM plan • Drive VfM • Use leverage through bulk purchasing/volume	• Short-term contract • Ongoing active sourcing for competitive price
Strategic security	• Detailed CM plan • Ensure supply • Long term contracts • Contingency planning	• Build reserve of stocks (where appropriate) • Consider alternative products to minimize risk
Strategic critical	• Detailed CM plan • Closely manage supply • balancing the control of costs with managing risk	• Med/long-term contract • Contingency planning in event of failure

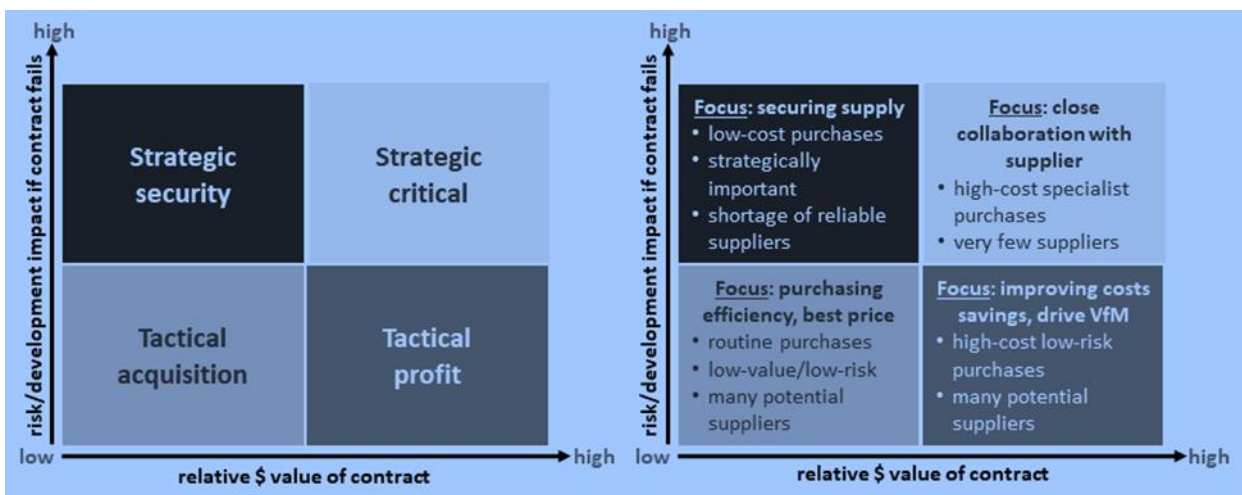


fig 3.7 contract management approach & arrangement

3.16 MANAGING CONTRACT RISKS

1. Has the contractor provided an update of the work program and has the Borrower reviewed this against the schedule for the release of land (to enable the contractor to proceed without delay)?
2. Has the Borrower provided the necessary permits that it is responsible for?
3. Has the Borrower provided the designs and drawings to contractors (when required by the contract) ?
4. Have any risks related to the process for making contractual payments been mitigated?
5. Is the process for responding to contractor's notices operating as envisaged?

3.17 CONTRACT MANAGER'S DOCUMENTS

The Contract Manager would need to have a set of desk control documents available for inspection. At a minimum, these may include:

1. measurement logs: for admeasurement contracts;

2. activity reports: daily, weekly, monthly showing in tabular format quantities of work done, number of staff and equipment involved, consumption of materials, testing and samples, ESHS reporting etc. The reports are expected to mention any specific events, incidents, weather conditions etc.;
3. issues log: which records all issues that have occurred during the execution of Works, with appropriate descriptions and the date, cause, remedial measures taken, responsible party, status of remediation etc.;
4. variation orders: all variation orders showing the justification for the changes in quantities, prices and times of completion;
5. communications: records of all relevant communications with the contractor and any third party;
6. inspection and control logbook: records of technical inspections, lab tests, etc. which are either conducted by or witnessed by the Engineer; inspections, audits and controls performed by any other relevant party (e.g. Employer, environmental agency, financial control, local authorities etc.).

3.18 WHO ARE STAKEHOLDERS?

“individuals and organizations who are actively involved in the project”

3.19 TYPES OF STAKEHOLDER ?

users, providers, influencers, governance.

3.20 MAJOR STAKEHOLDERS ?

design teams, clients, contractors and project managers



fig 3.8 stakeholders in the construction industry

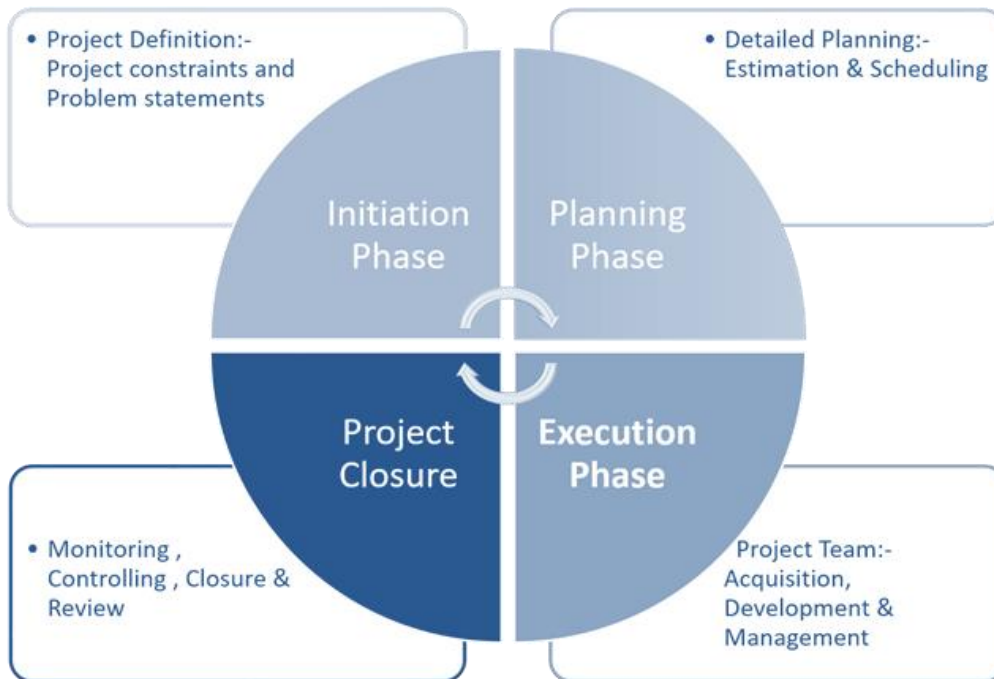
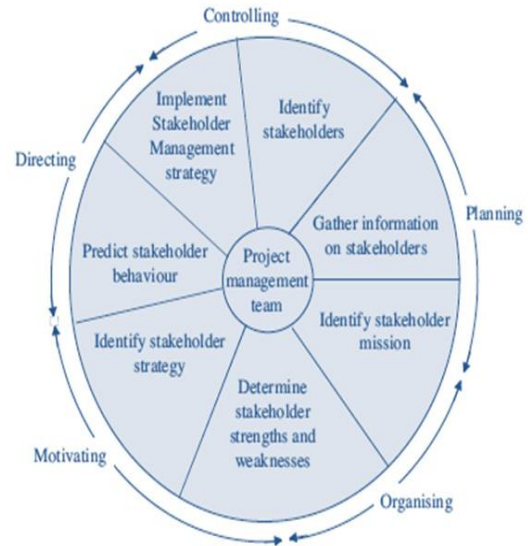


fig 3.9 project life cycle

3.21 STAKEHOLDERS CAN AFFECT MANY ASPECTS OF A PROJECT:

- ▶ Scope/requirements, by revealing the need to add, adjust, or remove elements of the scope and/or project requirements;
- ▶ Schedule, by offering ideas to accelerate delivery or by slowing down or stop delivery of key project activities;
- ▶ Cost, by helping to reduce or eliminate planned expenditures or by adding steps, requirements, or restrictions that increase cost or require additional resources;
- ▶ Project team, by restricting or enabling access to people with the skills, knowledge, and experience needed to deliver the intended outcomes, and promote a learning culture;
- ▶ Plans, by providing information for plans or by advocating for changes to agreed activities and work;
- ▶ Outcomes, by enabling or blocking work required for the desired outcomes;
- ▶ Culture, by establishing or influencing—or even defining—the level and character of engagement of the project team and broader organization;
- ▶ Benefits realization, by generating and identifying long-term goals so that the project delivers the intended identified value;
- ▶ Risk, by defining the risk thresholds of the project, as well as participating in subsequent risk management activities;
- ▶ Quality, by identifying and requiring quality requirements;
- ▶ Success, by defining success factors and participating in the evaluation of success

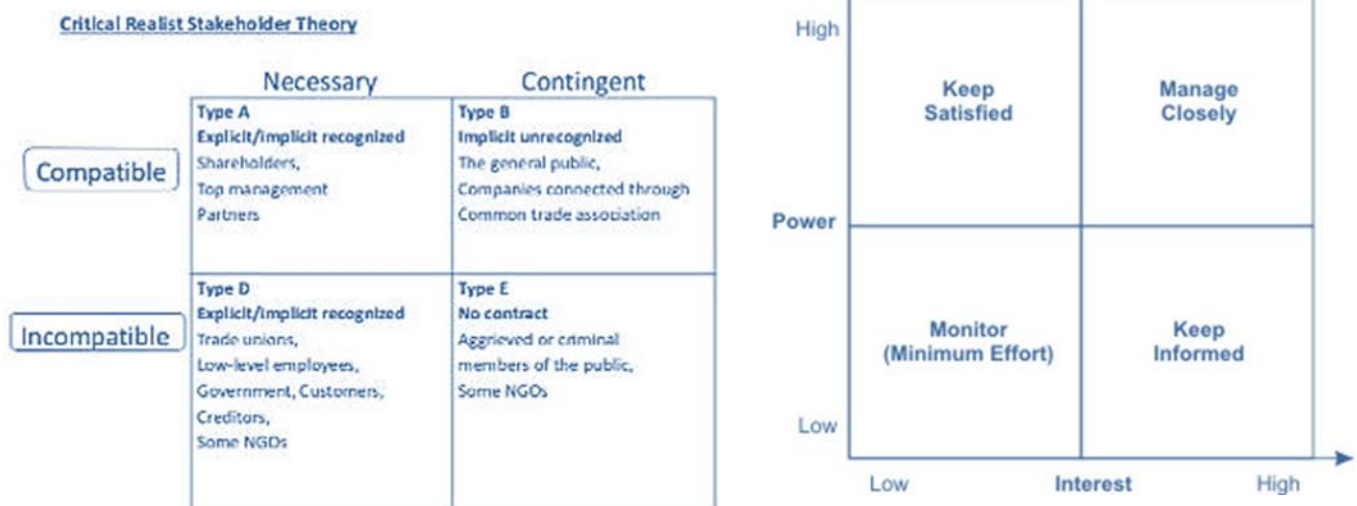


fig 3.10 stakeholder theory

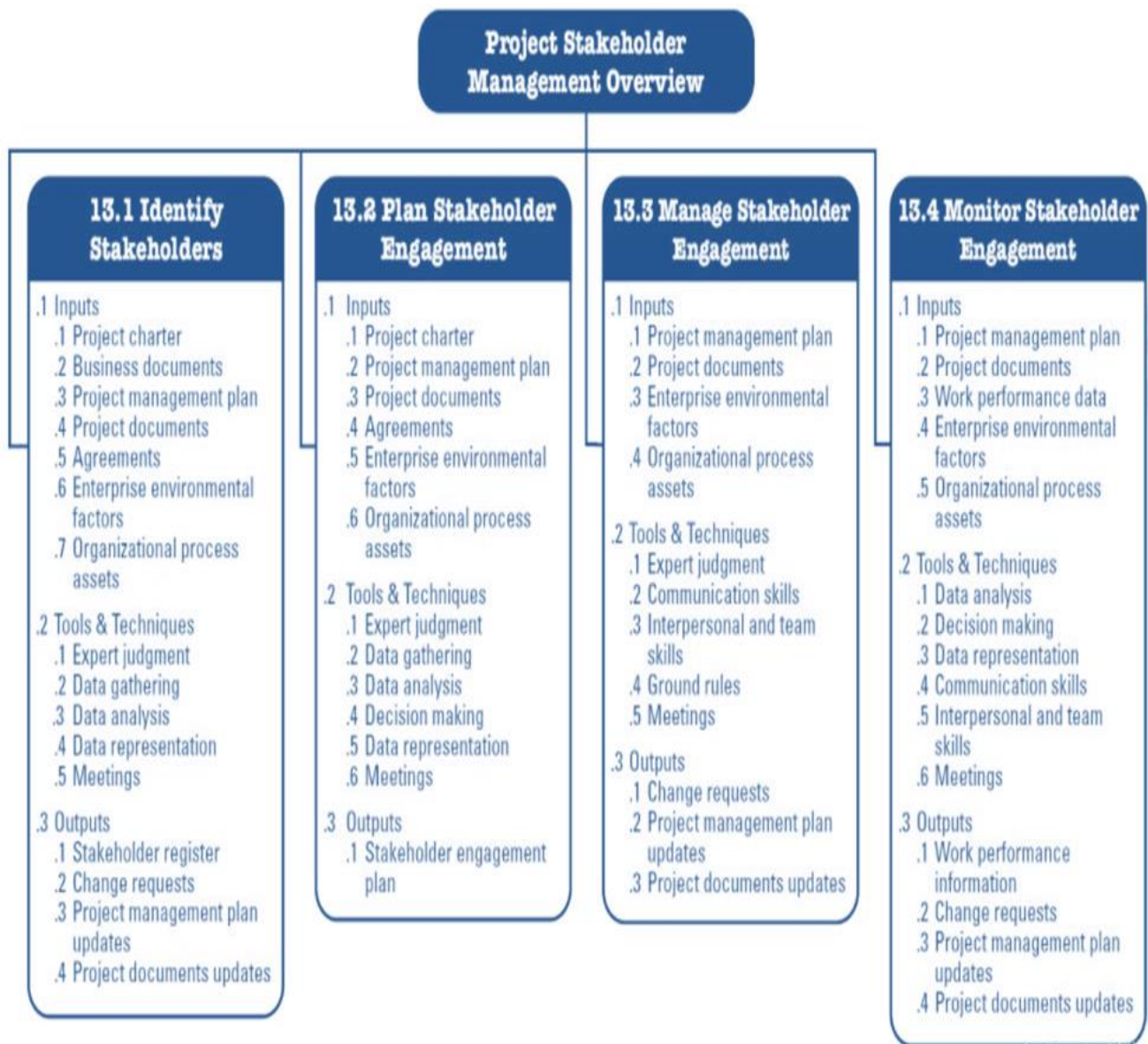


fig 3.11 project stakeholder management overview

CHAPTER 4

CASE STUDY

CASESTUDY4. 1: ITEM RATE CONTRACT - CELESTA RESIDENTIAL APARTMENT



4.1.1 AMENITIES

Amenities **Route Map**

AMENITIES

 Common Area Flooring Marble / Granite	 Air-conditioned Gymnasium	 Multipurpose Hall	 Table Tennis & Board Games	 CCTV (CCTV) Surveillance	 Covered Car Park	 Common Toilet for Servants / Drivers
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- Common Area Flooring - Marble / Granite.
- Inter-Lock Paving Blocks for driveways.
- Anti-Termite Treatment
- Common Toilet for Servants / Drivers.
- Covered Car Park
- 1 Johnson - 10 Passengers Lift with Automatic Rescue Device (ARD) in each block.
- Gymnasium
- Multipurpose Hall
- Table Tennis Rooms in Blocks B, C and D
- Board Game Rooms in Blocks A and E.
- 100% Power Back up for the Common Areas, Lifts and Water Pumps.
- Sewage Treatment Plant
- Water Treatment Plant
- Video Door Phone Security System with Access Cards.
- DTH Provision will be provided.
- Closed Circuit Television (CCTV) surveillance, one camera will be provided at entry gate, exit gate, facing the lobby entrance of each block, entrance of multipurpose hall and gymnasium.
- Intercom Connection to the security will be provided.
- Rainwater Harvesting as per CMWSSB Norms

YOUR WORLD OF CONVENIENCE

Strategic Position • Three side open area
• No common wall sharing

YOUR WORLD OF CONNECTIVITY

• Distance to Elcot SEZ - 4.3 kms
• Distance to Railway Station - 6.6 kms
• Distance to Airport - 12.6 kms



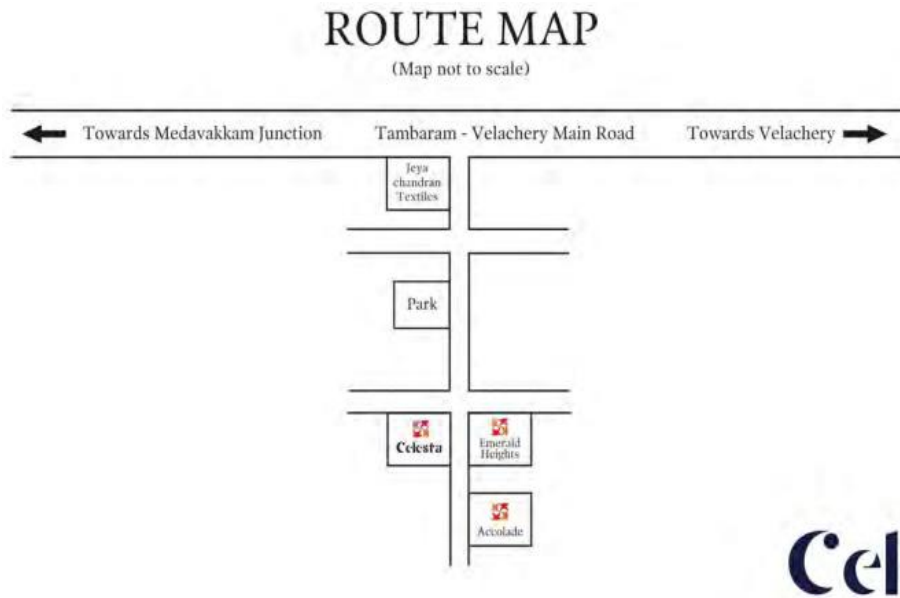
YOUR WORLD OF HAPPINESS

Video Door Phone • CCTV Surveillance

YOUR WORLD OF COMFORT

2 BHK : 1153 - 1157 sq.ft
Compact 3 BHK: 1318 - 1338 sq.ft
3 BHK : 1550 - 1560 sq.ft

fig 4.1 amenities



Celesta

fig 4.2 route map

4.1.2 STANDARD SPECIFICATION

Standard Specifications & Features	
 FOUNDATIONS - Footings shall be as per Structural Drawings. STRUCTURE - R.C.C Framed Structure with Columns, Beams and Slabs. WALLS - External Walls of burnt Clay Bricks / Cement Blocks with Cement Mortar. - Partition Walls in burnt Clay Bricks / Cement Blocks with Cement Mortar. PLASTERING - All Internal Walls plastered in Gypsum. - External Walls plastered in Cement Mortar.  FLOORING 2 X 2 Vitrified Tiles for Living, Dining, Bedrooms and Kitchen. Anti-Skid Tiles in Balcony.  PAINTING - Interiors: Emulsion Premium Paint with Two Coat Asian Putty. - Exteriors: Texture with Asian / Berger / Dulux all Weather Coat Paints. DOORS - Engineered Wooden Door Frame and Shutter with Teak Wood Laminate finish for Main Door. - Engineered Wooden Door Frame and shutter for all the internal doors with Laminate Finish. - Toilets: Water proof (inner side) and external with Laminate Finish flush doors.	 WINDOWS - Balcony: UPVC French doors with Sliding Glass. - Windows: UPVC Frames and Shutters with Openable Glass and MS Grill as per the Architect's Design. KITCHEN - Dado of 2' above Kitchen Platform in Ceramic Stone finish / Glazed tiles. - Provision for Water Purification System in Kitchen. - Provision for Washing Machine in Service Area.  BATHROOMS - Stone finish / glazed designer Ceramic / Porcelain Wall Tiles up to false ceiling height. - Matt finish Anti-Skid Ceramic / Porcelain Tile flooring. - Kohler wall mounted closets, Wash basins and CP Fittings for all the bathrooms - Provision for Geyser and Exhaust Fan.  ELECTRICAL - Three Phase Power Supply with independent E.B meters for each apartment. - All internal conduits with PVC India Tubes make. - Modular Switches will be provided. - Television / Telephone points in Living Room and Bed rooms. - Power Back up for each apartment. For 2 BHK and Compact 3 BHK - 1 KVA and 3 BHK - 1.5 KVA with one Fridge point in each apartment
	

fig 4.3 views







fig 4.4 floor plans

CLIENT	KRISHNA CONSTRUCTIONS.
ARCHITECTS	KHARCHE & ASSOCIATES
PROJECT MANAGERS & QUALITY SURVEYOR	BUILTEC ENGINEERS & CONSULTANTS
STRUCTURAL CONSULTANT	UNITED CONSULTANT
CIVIL CONTRACTOR	QUALTECH ENGINEERS PVT. LTD
MEP CONSULTANT	SUMANAM ENGINEERING SERVICES
PHE CONSULTANT	C.N PUNNIYA MOORTHY

TABLE 4.1 STAKEHOLDER LIST

KRISHNA CONSTRUCTIONS CONTRACT DOCUMENT OF CIVIL WORKS FOR RESIDENTIAL PROJECT "CELESTA' AT JAYACHANDRAN NAGAR" PALLIKARANAI, CHENNAI.	
EMPLOYERS / CONTRACTEE	33AAAER7348H12E M/S. KRISHNA CONSTRUCTIONS OLD #21, NEW #28, CATHEDRAL GARDEN ROAD, NUNGAMBAKKAM, CHENNAI - 600 034.
ARCHITECT	M/S. KHARCHE & ASSOCIATES 2/20, SHAFFEE MOHAMED ROAD, CHENNAI - 600 006.
PROJECT MANAGEMENT & QUANTITY SURVEYORS	M/S. BUILTEC ENGINEERS & CONSULTANTS NO.12, JAWAHARLAL NEHRU STREET, VGN NAGAR PHASE IV, MOGAPPAIR (W) MADURAVOYAL P.O., NOLAMBUR, CHENNAI - 600 095.
STRUCTURAL CONSULTANT	Mr. ALEX JACOB 41/A, BEACH ROAD, KALAKSHETRA COLONY BESANT NAGAR, CHENNAI - 600 090.
CIVIL CONTRACTOR	M/S. QUALTECH ENGINEERS PVT. LTD., 150, THILAK STREET, PANEER NAGAR, MUGAPPAIR WEST, CHENNAI 600 037.

PROPOSED RESIDENTIAL BUILDING FOR M/S. KRISHNA CONSTRUCTIONS AT PALLIKARANAI						
BILL OF QUANTITY (BOQ)						
MAIN ABSTRACT						
S.NO	DESCRIPTIONS	AMOUNT				
		BLOCK 1	BLOCK 2	BLOCK 3	BLOCK 4	BLOCK 5
1	EXCAVATION AND FILLING	9,81,467.90	7,69,389.83	8,67,439.49	7,69,389.83	9,81,467.90
2	PCC, RCC CONCRETE WORKS	1,00,07,812.67	83,58,842.40	92,34,794.46	83,58,842.40	1,00,08,415.37
3	REINFORCEMENT WORKS	67,87,587.60	56,18,411.60	61,79,847.60	56,18,411.60	67,87,587.60
4	MASONRY WORKS	53,60,133.85	43,12,867.93	49,67,498.27	43,12,867.93	53,60,133.85
5	PLASTERING WORKS	75,04,249.96	62,11,444.87	70,06,102.89	62,11,444.87	75,04,249.96
6	TILE AND GRANITE WORKS	40,46,251.23	32,29,128.12	34,48,712.52	32,29,128.12	40,46,251.23
7	PAINTING WORKS	17,34,125.17	13,41,164.36	15,40,181.39	13,41,164.36	17,34,125.17
8	MS WORKS	7,78,638.40	6,26,594.00	7,58,065.10	6,26,594.00	7,78,638.40
9	WATERPROOFING WORKS	8,48,507.20	7,94,230.60	7,95,505.20	7,94,230.60	8,48,507.20
10	ELEVATION WORKS	27,404.80	28,876.80	33,414.40	28,876.80	27,404.80
11	OVER HEAD TANK	3,90,327.20	3,57,924.17	3,08,127.14	3,57,924.17	3,90,327.20
12	MISCELLANEOUS WORKS	95,720.00	89,160.00	90,800.00	89,160.00	95,720.00
	TOTAL AMOUNT	3,85,62,225.98	3,17,38,034.68	3,52,30,488.46	3,17,38,034.68	3,85,62,225.98

	TOTAL AMOUNT - A (BLOCK 1, 2, 3, 4, 5 & MPH)	18,11,93,891.61
8	PART -B	
13	UG SUMP 120000 LTR CAPACITY	13,38,252.42
14	SEWAGE TREATMENT PLANT (STP)	42,50,229.43
15	SECURITY ROOMS	3,91,970.96
16	COMPOUND WALL	60,30,956.90
17	RAINWATER TRENCH	28,46,749.24
18	SITE EARTH FILLING & EXTERNAL PAVERS	1,03,50,510.57
	TOTAL AMOUNT - B	2,52,08,669.52
	TOTAL AMOUNT (A+B)	20,64,02,561.00
	GST -18%	3,71,52,461.00
	GRAND TOTAL	24,35,55,022.00

fig 4.5 contract document civil work boq

4.1.3 TENDER INVITATION

- 18 months completion
- Tender received 1.00pm on 8/2/20 after the due date rejected
- Validity of tender 90 days from date of the receipt
- Convassing with tender – strictly prohibited
- Bidder includes – tax & duties indicated the break up quoted
- Contractor should include material , unload from transport truck , sort out , store , safe guard , cover under insurance , pump, lead , lift , transportation to work place in the

item rates

- Resume of personal working, record of past experience , certificate(technical qualification)
- Registered power of attorney authorizing the sign of contractors .
- Firm should be itc (income tax clearance certificate) to be attached with the no due on pf , esi , professional tax .
- Information of plant & equipment , planned to deployed
- Detail of work
- Detail of current litigation
- Qa / qc procedure
- Data registered regarding subcontractor , suppliers , manufacturer , other technical information from the contractor .
- Master construction programme
- Tender submitted should be signed by all the partner of the firm
- Copy of joint venture agreement should be attached
- Fees & notice with bye laws & regulation like labour license .
- Insure , contractor , erection of equipment , material –liability , client – labour or third party insurance .
- Barchart submitted along with the contract prepared with the contract prepared within 10 days of issues of loi , chart should indicate financial figure of work to be excluded every month .
- If engineer & diploma engineer not deployed at the site the amount shall be deducted from the contractor from monthly ra bills.
- Indeminty bond should be signed from 10 days of loi in employer against third party claims , civil & criminal complaint , site mishop , accidents and disputes damages , loss or expenses due to negligence on of contractor only .
- Method statement for all item of works submitted at the time of tender submission
- Jit adopted in material procurement , emd , security deposit – 5% bank guarantee

Table 4.2 IMPORTANT CLAUSES OF THE TENDER

Sl.no	Description	Summary / important clause
1	Time of completion	18 months from date of award
2	Earnest money deposit	Nil
3	Security deposit	Nil
4	Retention amount	5 % recovered from 1 st ra bill 50% released upon virtual completion & 50% paid after defeat liability period
5	Defeat liability period	12 month from final bill
6	Secured mobilization	5% of contract value as bank guarantee
7	Validity of tender	90 days from submission date
8	Liquidated damages	0.5% of estimated cost, delay per week 5% overall
9	Bonus	0.5% of estimated cost, delay per week 3% overall
10	Submission of ra bills	1 bill every month , payment released within 15 days with supporting documents
11	Minimum value of each ra bills	5% value of the work
12	Submission of final bills	Final bill after handling over of fully completed building
13	Extra / nt items	Profit margin 10% & overhead 5% + gst
14	Free issue materials	No free issue
15	Escalation	No escalation till end of the project
16	Electricity	Contractor should supply power at one point at site on chargable basis of govt tariff , dg provision should maintained by the contractor , in case of not got approval prior from government , the

		penalty is on contractor .
17	Water	Contractor should arrange for thw water till the end of the construction with quality as per the is standards.
18	Applicable taxes , duties , levies etc.	Contractors scope
19	Car policy	Client scope
20	Labour cess	Client scope
21	Workmen compensation policy	Contractor scope
22	Third party insurance	Clent scope
23	Esi / pf	Client scope
24	Basic rate	Cement – 250/bag , steel – 40000/ton, m.sand 50/cft , rmc m10- 3100, m25 – 4000 , m30 – 4200 inclusive of gst .
25	Make of the material	Cement- coramandel / penna /dalmia /bharathi , steel – ars / viki /suryadev / jsw
26	Material advance	Shall not be given
27	Space for labour hutment	No space inside the site premises
28	Mandatory site requirement	Total station & compression testing machine should available till end of the project, safety equipment is mandatory for labours and engineers at site
29	Place of arbitration / jurisdiction	Chennai
30	Period of construction	As per mcp
31	External scaffoldings	1 month even after the external plaster is done is paid at the actual cost
32	External barricading	Contractor scope
33	Language of correspondence	English

3. APPENDIX – C: ORGANIZATION CHART OF CONTRACTOR

The Contractor shall furnish a Pyramid type Organization proposed for execution of the Project. This shall include all types like work execution, administrative, Accounts, Quality control, Plant Maintenance etc.

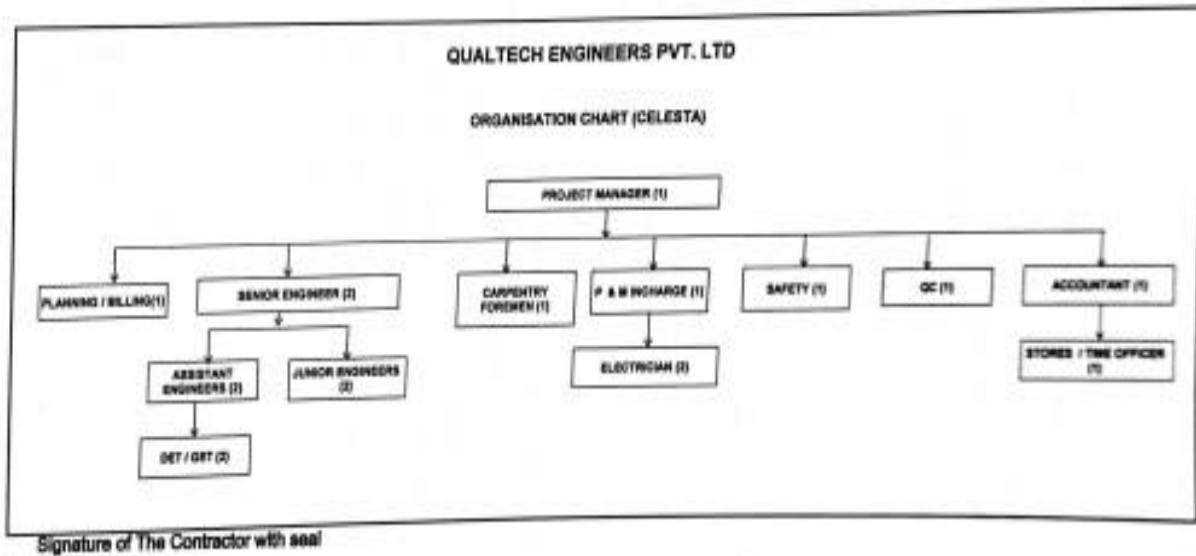


fig 4.6 appendix c : organisation chart

5. APPENDIX – E : EMPLOYER SUPPLIED MATERIALS- FREE ISSUE

Tiles will be supplied by the Employer free of Cost

The Contractor considered the following list of materials as free issues and quoted for the items / works without considering the cost of these free issue materials.

The Contractor included all the charges necessary to receive the materials, unload from transport trucks, sort-out, store, safe guard, cover under insurance, pump, lead, lift and transport to the work place in the item rates.

Sl. No.	Material	PROCUREMENT LEAD TIME	Maximum permissible wastage	
1	Vitrified/Ceramic Wall tiles	60 Working Days	5.00%	The wastage will be finalized at the time of execution
2	Vitrified/Ceramic Floor tiles	60 Working Days	3.00%	

fig 4.7 appendix d & e : basic price , free issue

4. APPENDIX – D: BASIC PRICES TO BE CONSIDERED BY CONTRACTOR FOR BIDDING

Basic Prices – The item rates quoted in the B.O.Q involves materials for which basic rates have been quoted. The list of such materials and such rates are furnished hereunder.

BASIC RATES

M.Sand	=	Rs.50/- CFT plus GST
Cement	=	Rs.250/- Bag plus GST
Steel	=	Rs.40000/- Ton plus GST
RMC M10	=	Rs.3100/- + GST
RMC M25	=	Rs.4000/- + GST
RMC M30	=	Rs.4200 /- +GST

Make of Materials

Cement – CORAMANDEL / PENNA / DALMIA /BHARATHI

Steel - ARS / VIKI / SURYADEV / JSW

Basic rates of materials include all taxes, charges and delivery at site.

Transportation and Lifting of materials - The rates quoted should include cost of transportation, carting, wastages and lifting, for all leads, night work etc.

Any increase in prices above the basic rate should be indicated to the PMC / Client in advance and their approval got before making the necessary purchase. The Client reserves the right to identify the vendors at the basic rate or purchase the same and give it to the Contractor.

Any increase will be paid by the Employer on producing necessary documents to prove the same, on the difference between actual cost and the basic price.

Similarly if the cost of materials reduces the Contractor is liable to pay the Employer the difference between the actual cost and the basic rate.

7. APPENDIX – G:

INDEMNITY BOND

(To be executed on Stamp Paper of Rs. 10/- Duly notarised)

KNOW all men by these presents that I/We _____ do Hereby execute Indemnity Bond in favour of KRISHNA CONSTRUCTIONS, Chennai. On this _____ day of WHEREAS KRISHNA CONSTRUCTIONS, Chennai have appointed us as the contractors for their PROJECT - PROPOSED RESIDENTIAL APARTMENTS AT PALLIKARANAI, CHENNAI.

THIS DEED WITNESS AT AS FOLLOWS:

I/We _____ hereby do Indemnify and save harmless KRISHNA CONSTRUCTIONS, Chennai against and from:

1. Any third party claims, civil or criminal complaints/liabilities, site mishaps and other accidents or disputes and/or damages occurring or arising out of any mishaps at the site due to faulty work negligence, faulty construction and/or for violating any law, rules and regulations in force, for the time being while executing/executed works by me/us

2. Any damages, loss or expenses due to or resulting from any negligence or breach of duty on the part of me/us or my sub-contractor's if any, servants or agents.

3. Any claim by an employee of mine/ours or of sub contractors if any, under the Workmen's Compensation Act, Liability Act, or any other law, rules and regulations in force for the time being and any Acts replacing and/or amending

The same or any of the same as may be in force at the time and under any law in respect of injuries to persons or property arising out of and in the course of the execution of the contract work and/or arising out of and in the course of employment of any workman/employee.

4. Any act or omission of mine/ours or sub-contractor/s if any, our/their servants or agents which may involve any loss, damage, liability, civil or criminal action

IN WITNESS WHERE OF THE _____

Has set his/their hand on this day of _____ 2020

SIGNED AND DELIVERED BY THE NAME AND ADDRESS.

AFORESAID _____ (contractor)

IN THE PRESENCE OF WITNESSES:

1. _____

2. _____

fig 4.8 appendix g: indemnity bond

4.2 CASESTUDY 2 : EPC CONTRACT - NEED FOR EPC CONTRACT IN CPWD

4.2.1 INTRODUCTION

- Conventional item-rate contracts are prone to time & cost overrun
- Considerable time is lost in processing of: Variation in quantity of items which are quite frequent, Introduction of Non Schedule items, Variation in contract price
- Measurements recording and preparation of Bills is laborious and time consuming
- Improved & modernized Project Execution Capabilities is required for Faster execution

Table 4.3 general scope of the contract

Scope of work	• Project scope needs to be specified very carefully and should be exhaustive. • Success of the whole contract depends on this • Ambiguity or uncertainty in the clauses might lead to conflicts and confusion in the future.
Technical Parameters	• Based on output/ functional specifications. • Only core requirements of Design, Construction and Operation that have a bearing on the Functional parameters, Quality and Safety of the project are to be specified • Framework focuses on the 'WHAT' rather than the 'HOW' in relation to the works to be delivered by the Contractor.
Contract Price	• Lump Sum / Area Basis Subject to adjustment on account of changes in the relevant price index ,changes in law or changes in the scope of the project (Contractor not expected to bear or manage the risks arising out of such changes)

4.2.2 OBJECTIVES OF EPC CONTRACT

- Implementation standards of project with to specified of a fair degree certainty relating to time & cost while transferring the construction risk to contractor.

- Responsibility for Investigations, Design and Construction lies with the contractor for a lump sum price determined through competitive bidding.
- Awarding contract for a lump sum price ensures predictability and financial discipline, both for the Contractor and the Authority
- Engagement of professionally managed agencies.
- To enable a transparent ,fair and competitive roll-out of projects
- Enough room for the Contractor to innovate and add value.
- Project risks such as Commercial and Technical risks relating to Design and Construction have been assigned to the Contractor.

4.2.3 REDEVELOPMENT OF GPRA COLONY AT MOHAMMADPUR BY CPWD



fig 4.9 site image

4.2.4 SCOPE OF WORK OF CONTRACTOR INCLUDES :

- Architectural design and Structural design as per the general parameters and proposed drawings given in the NIT
- Planning, designing and execution of all internal services such as Internal sanitary, Water supply, Drainage system etc. complete for the buildings planned including all its fittings, fixtures, testing etc. and External services like Water supply, Rain water harvesting systems, Sewerage, STP, Drainage system, Roads, Paths and all connected sub-structure and superstructure
- Obtaining Mandatory Approvals from local bodies/ authorities required for commencing the work such as:
- Execution of work & services and handing over the assets after making the campus habitable in all respect.
- The scope is inclusive of Topographic survey, Subsoil investigation , Traffic impact Assessment and all ancillary works
- Design of all Civil, Electrical & mechanical and Horticulture services, their integration, installation and commissioning
- Development of area, Boundary Wall, Gates, Internal roads, Street lighting, Parks, Cycle track and other amenities etc. required
- Overall Monitoring and Control of the project
- Day to day interaction with contractor to meet the time schedule and quality requirements- TPQA also appointed
- Assessment of monthly progress reports
- Review of all Designs and other Documents w.r.t their conformity to CPWD standards & specifications

TABLE 4.4 CO-ORDINATION IN GETTING APPROVALS REQUIRED TO START THE WORK

• Environment Clearance	• Airport Authority
• Fire Clearance	• Tree cutting

• Delhi Urban Arts Commission	• ASI
• DMRC	

4.2.5 ARCHITECTURAL CONTROL

- Work to be done as per specified area norms and specifications as laid down for GPRA Quarters in the agreement.
- To satisfy Local Body Building Bylaws, NBC requirements and all Statutory Bodies
- Approvals to be taken by Contractor but statutory fees reimbursed by CPWD

4.2.6 QUALITY CONTROL

- NCCBM engaged for TPQA by Engineer-in-charge to have a control on quality and methodology of execution.

4.2.7 STRUCTURAL DESIGN CONTROL

- IIT Delhi appointed for Vetting of all structural drawings given by Contractor.

Table 4.5 : TABLE OF MILESTONE – CONTROL OF PROGRESS

Sl. No.	Description of Mile stone	Time allowed in days (From date of start)	Amount to be withheld in case of Non-achievement of mile stone
1.	Submission and approval of architectural, structural & MEP drawings i/c approval of local bodies/authorities. Dismantling of all existing structure and removal of C&D waste to clear the site for new construction	180	In the event of not achieving the necessary progress as assessed from the running payment, 1% (of amount quoted in Part-A of financial bid) will be withheld for failure of each milestone subject to Maximum 5% of amount quoted in Part-A of financial bid for slippages of
2.	Completion of Civil works of	360	

	basement.		Milestones.
3.	Completion of Superstructure work of all Residential Towers.	660	
4.	Completion of residential units fit with all civil, electrical & mechanical services. Work of E&M services completed in Basements.	870	
5.	All civil, electrical & mechanical and horticulture work completed in all aspects in Residential & non- residential buildings with services, clearances from local body/ completion certificates etc. required to declare buildings and campus authorized for occupation.	960	

4.2.8 STAGE BASED PAYMENT

- Simple and rational method for estimating interim payments to the Contractor
- Ensures that payments are made for all works conforming to the Agreement and commensurate with the stages of completion of works.
- Each item of the project has been further sub-divided into stages, and payment will be made for each completed stage of work.



Table 4.6 PAYMENT BREAKUP SCHEDULE FOR DESIGNING & APPROVALS

S.No.	Activity	Break up of total % payable	% of total payable
A.	Investigation, planning, Designing and obtaining approvals for works under Item no 2,3&4 – (4% of total quoted rates against item No 2,3 & 4).		0.8%
	a) On approval of inception report & detailed survey and architectural drawings ready for submission for approval of local bodies-20% i. On submission of inception report, survey report and	0.3% 0.5%	

	soil testing report. ii. On preparation of submission drawing		
	b) On approval of structure design by Engineer-in-charge 20%		0.80%
	c) On approval of local body, EIA & TIA clearance, final Architectural drawing showing electrical and sanitary layout plan and details structural design and interior structural design and interior design/decoration-30% i. After all approvals obtained from local body/ authorities. ii. After obtaining EIA clearance. iii. After submission of all working drawings on pro rate basis.	0.4% 0.4% 0.4%	1.2%
	d) On completion of construction-30%		1.2%
	i. On completion of all sub-structure works. ii. On completion of 50% super structure works. iii. On completion of 100% super structure works. iv. On completion of 50% of	0.2% 0.2% 0.2% 0.2%	

	total value of work (Bid amount).	0.2%	
	v. On completion of 95% of total value of work (Bid amount).		
	vi. On declaring complete by competent authority.		
S.No.	Activity	Break up of total % payable	% of total payable
B.	Completion of Basement for Parking as per Item No.2.1- (96% of Quoted Rates)		-
	a) Excavation @ Sqm.		2.0%
	b) Footing / Raft @ Sqm.		20.0%
	c) Completion of lower/Intermediate Basement		
	i) Completion of Retaining wall/column/Lift well @ Sqm. on pro rate basis.	2.0%	8.0%
		2.0%	
		2.0%	
	i. Retaining walls – 20% of total length	2.0%	
	ii. Retaining walls – 50% of total length		
	iii. Retaining walls – 75% of total length		
	iv. Retaining walls- 90% of total length and		

	100% of columns and lifts well		
	ii) Roof Slab @ Sqm.		13.0%
	iii) Completion of Partition walls with AAC Blocks, lift area, walk ways, ramps, staircases and stone cladding on lift walls/ lobby @ Sqm. i. On completion of partition walls ii. On completion of ramps, staircases iii. On completion of walk ways, stone cladding. iv. Completion of lobby and complete finishing	0.5% 2.5% 5.0% 0.5%	4.0%
	d) Completion of upper most Basement		
	i) Completion of Retaining wall/column/Lift well @ Sqm. on pro rate basis i. Retaining walls – 20% of total length ii. Retaining walls – 50% of total length iii. Retaining walls – 75% of total length iv. Retaining walls- 90% of total length and	2.0% 2.0% 2.0% 2.0%	8%

	100% of columns and lifts well		
	ii) Roof Slab @ Sqm.		13.0%
	iii) Completion of Partition walls with AAC Blocks, lift area, walk ways, ramps, staircases and stone cladding on lift walls/ lobby @ Sqm. i. On completion of partition walls ii. On completion of ramps, staircases iii. On completion of walk ways, stone cladding. iv. Completion of lobby and complete finishing	0.5% 2.5% 5.0% 0.5%	4%
e) Internal finish and painting work (@.50% per floor)			1.0%
f) Internal Flooring i/c skirting (1.0% @per floor)			
	g) Water proofing treatment of walls and terrace @3.00% per floor on pro rate basis i. Waterproofing of base and walls on pro rate basis ii. Waterproofing of terrace	3.0% 3.0%	6%

	and Mumty etc. on pro rate basis		
	h) Internal Electrical installations		1.0%
	i) Lift Nos.		1.0%
	j) Complete Fire Fighting System		3.0%
	k) Ventilation System @ Sqm.	5.0%	7.0%
	i. On installation	2.0%	
	ii. On commissioning		
	l) After Completion of Super Structure		3.0%

C.	On completion of Stilt portion above Basement Complete as per Item No. 2.2 – (96% of Quoted Rates)		
	a) Completion of stilt Floor		
	i) Column/Shear Wall @ Sqm.		25.0%
	ii) Slab @ Sqm.		35.0%

	iii) Partition walls, entrance lobby, Lift Lobby and flooring etc. @ Sqm. 1. Completion of Partition walls on pro rate basis 2. Completion of Flooring on pro rate basis 3. Completion of entrance lobby and lift lobby on pro rate basis	2.0% 2.0% 6.0%	10%
	b) Internal Finishing and painting @ Sqm. 1. Surface finishing with synthetic mortar 2. Painting work	1.5% 1.5%	3%
	c) External Finishing @ Sqm.		3.0%
	d) Internal Electric Installation @ Sqm.		2.0%
	e) Lift @ Nos.		5.0%
	f) Fire Fighting System @ Nos.		2.0%
	g) Fire Alarm System		1.0%
	h) Sprinkler System		5.0%
	i) After Completion of Super Structure		5.0%
S.No.	Activity	Break up of total % payable	% of total payable

D.	On completion of Super structure complete in all respect as per scope of work under Item No. 2.3 - (96% of Quoted Rates)		
	a) On completion of civil structural work @ Sqm		25.0%
	b) On completion of		
	i) AAC Block/Partition walls @ Sqm		3.0%
	ii) Internal finish and painting @ Sqm		3.0%
	iii) False ceiling in toilets @ Sqm		1.0%
	iv) Flooring and skirting @ Sqm		10.0%
	v) External finish and painting @ Sqm		6.0%
	vi) Finishing of doors and windows including, Wood work of wardrobe all fittings and paintings etc @ Sqm.		8.0%
	vii) OH tanks, installation of water supply lines, drain pipes, china ware and sanitary fittings including testing etc. Complete toilet works @ Sqm. 1. Water supply lines 2. OH Tank 3. Fixing of Sanitary Fitting & China Wares	4% 4% 3% 2%	13.0%

	4. Testing of all system		
	viii) Wood work of OH storage and under platform storage including sink etc. Completion kitchen work @ Sqm.		7.0%
	c) On completion of Electrical installation @		
	i) Electrical Installation @Sqm		8.0%
	ii) Installation of lifts @ Nos.		4.0%
	iii) Fire Fighting System @ Nos.		3.0%
	d) On declaring complete by competent authority		5.0%
E.	Community Centre & Convenient Shopping Centre as per Item No. 3- (96% of Quoted Rates)		
	a) On Completion up to plinth @ Sqm.		20%
	b) On Completion of civil structural work @ Sqm.		25%
	c) On Completion of		
	i) Partition Work @ Sqm.		1.0%
	ii) Internal Finish and painting@ Sqm.		2.0%
	iii) False ceiling in toilets @ Sqm.		1.0%
	iv) Flooring and skirting/dado @		5.0%

	Sqm.		
	v) External Finish and painting@ Sqm.		3.0%
	vi) Finishing of Doors and Windows including all fittings and painting etc. @ Sqm.		6.0%
	vii) OH tanks, installation of water supply lines, drain pipes, china ware and sanitary fittings including testing etc. Complete toilet works @ sqm 1. Water supply lines 2. OH Tank 3. Fixing of Sanitary Fitting & China Wares 4. Testing of all system	1% 1% 2% 1%	5.0%
	viii) Finishing of community hall including kitchen and other allied works@ Sqm		8.0%
	d) On Completion of Electrical works @sqm		
	i) Electrical Installation including Split ACs in community hall @ prorate basis		8.0%
	ii) Installation of Lifts @ Nos.		4.0%
	iii) Fire Fighting System @ Nos.		3.0%
	e) On declaring complete by competent authority		5%
F.	Infrastructure Development as per		

	Item No.4 - (96% of Quoted Rates)		
	1. Boundary Wall, Guard Room	4%	15.0%
	i) RCC work @per metre on prorate basis	1%	
		6%	
	ii) Plastering and painting @per metre on prorate basis	4%	
	iii) MS grill fixing and painting @per metre on prorate basis		
	iv) Guard Rooms, finishing and painting complete		
	2. Completion of Sewerage system and part thereof on prorate basis		11.0%
	3. Completion of water supply system/grid and part thereof on prorate basis		10%
	4. Completion of Drainage SW and part thereof on prorate basis		5.0%
	5. Completion of Service Ducts for Electrical and Non-Electrical wiring, Water supply etc. and part thereof on prorate basis		6.0%
	6. Completion of Paving for surface parking & underground water reservoir and part thereof on prorate basis		18.0%
	7. Completion of Road & signage and part thereof on prorate basis		5.0%

	8. All Electrical Works including Sub-Station, D.G Set, Boom barrier, CCTV etc. complete as per scope of work/requirement		11.0%
	9. Completion of land Scaping & other horticulture work such as grassing, tree plantation etc. complete and part thereof on prorated basis		2.0%
	10. Road marking, painting of curb stone, berm cleaning, connection of entry points with external road network complete in all respect.		3.0%
	11. On declaring complete by competent authority		10.0%
	Activity	Break up of total % payable	% of total payable
	a) First year (from 1st day to 365th day) after completion of the project	-	
	After every three months @ 22%	88%	
	b) Second year (from 366th day to 730th day) after completion of the project	-	
	After every three months @ 22%	88%	

	After 730 days on handing over the assets and maintenance works 24% of Total Amount quoted under Item No 1 (a) & (b)	24%	
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4.2.9 ISSUES IN EPC CONTRACTS

- Competence among Contractors and Consultants in India is not yet fully developed for these type of Contracts in the Buildings Sector
- Minimum scope of Deviation from agreement so Tender document should define clearly what works are expressly covered under the agreement and what works are expressly excluded. Careful attention needed in formulating the agreement document
- The Agreement should be drafted with utmost precision, having clarity and delineating the scope of the work. We have used plinth area rates for bidding/ quoting. In case of Lump Sum Contracts, even more detailed drawings and specifications may be needed to prevent ambiguity.
- Extra Care needs to be taken to get the work executed as per the Agreement

4.3 CASESTUDY 3 : LUMP SUM CONTRACT

4.3.1 INTRODUCTION

It's a multi storey building which is located in Chennai . The claim is raised between contractor and client . It is a private project happened in lump sum based contract .

4.3.2 FACTS FROM BOTH PARTIES ON CONTRACT

- Name of the project
- Estimated tender : 8 crores
- Duration : 24 months
- Payment bill dates were decided
- Client took the security deposit on mutual concern
- Security deposit return date mentioned in contract
- In case of dispute , resolution practice to be used is mentioned in contract .
- In case of liquidated damage the reimbursement

amount was to be deducted is mentioned in contract

4.3.3 REASONS FOR DISPUTE :

- Change in design allocated
- Additional work payment

4.3.4 CLAIMS BY CLAIMANT ON RESPONDENT :

- Extra payment for excavation
- Extra payment for pavement area excavation
- Extra transportation charges
- Shuttering materials were used for longer time
- More cost on maintenance of equipment
- Foundation redesigning
- Extra charges for non scheduled items.

4.3.5 DISPUTE AND CONSTRAINTS HAPPENED AT DIFFERENT STAGES :

- All these constraint and dispute happened due to poor knowledge on contract document from client side , constraints occurred during construction and pre construction stages .
- Suspension of work by client
- Lack of details in drawings
- Late changes in design by client
- Time extension
- Change order
- Lack of communication and co ordination
- Poor contract document
- Design errors
- Late approval of designs documents

4.3.6 DISPUTE ANALYSIS BASED ON CLAIM AWARED :

As it is a lump sum based contract the amount raised due to the additional work in the project cant be given to the contractor during the construction period , so for that the claimed amount have been raised after the construction of the project have been done .most of the delay where from the client side , he is not allowed to cut the retention money and also not allowed to raise any compensation on the liquidated damages . Here are the claims raised and which was awarded through mediation procedure to the claimant .

1. **Change in allocation** : delay caused by authority – according to the clause 8.5 extension of time and fund is to be allocated accordingly .
2. **Design changes** : as per the change in client requirement there have been continuous changes in design – redesigning - (20 – 30 days) delay happened which have to be taken in care by the client and should provide extension of time for the same .
3. **Additional work payment** : new requirement added – separate service room for that extra 4-5 months delayed . They could have avoided this delay by consulting with client & engineer at the designing stage under clause 49 – interim payments
4. **Extra work material cost** : change in material requirement – 1 month delayed . Cost

reduced for flooring material – as change in from granite to marble .

Table 4.7 ANALYSIS ON TIME AND COST THAT CAN BE REDUCED :

s.no	Activity	Original value	Actual value	Remark
	Contract cost	8 crore	9 crore	1 crore increased
	Claim raised	Claimed amount	awarded	
1	Changes in allocation	16,45,250	...	2-3 month delay client responsibility
2	Design changes	19,93,350	...	Column size change , etc.
3	Additional work payment	10,50,700	...	Certified but not paid during construction stages
4	Extra work material cost	38,47,120	...	Cant recover construction stage – lump sum contract
	Total amount	85,36,420		

Activity-claim raised	Claimed amount	Time taken	Responsible person	Reason
Extra excavation payment	12,12,790	Dc – 1.5 months	Client	Additional work not mentioned in contract

Extra payment for pavement area	1,03,850	Dc – 20 days	Client	Additional work not mentioned in contract
Extra transportation charges	2,37,125	Dc- at each stage of work	Client	Due to extra work added not mentioned in contract
Shuttering material for longer time	7,10,100	Dc- 3 months	client	Due to fund issues the project got hold for 4 month
Cost maintenance of equipment – more than contract time	5,14,320	Ac- 10 months	Client / contractor	Work in pause change in order
Redesigning for foundation	3.07,945	Dc- starting stage	Architect	Design error due to improper site investigation
Amount non scheduled items	2,10,820	Ac-2 months	Client	Client issues

Ac – after construction

Dc – during construction

4.3.7 REMARK :

- Most of the claims raised during the construction phase
- Lump sum contract – no claim can be raised as not mentioned in clauses of the contract .
- No mention of type of dispute resolution process
- So negotiation for extension of time

- Mediation process have been undertaken for cost extension .

4.3.8 OBSERVATION :

- The extra work added the additional time was given by negotiation during construction time
- Extra fund claim was raised and resolved by using mediation process
- Lump sum contract extra amount occurred due to additional requirement was to be recorded during the construction period.

4.3.9 INFERENCE :

- To avoid the dispute related to the extra work payment , he should have got approved with the client on a bond
- A clause should be added in contract , in case of the extra work added the BOQ of extra materials should be verified and passes on .
- Contractor should get approved for the extra cost for additional work during the construction period itself , so as to stop the dispute arising due to that

CHAPTER 5

CASE STUDY ANALYSIS

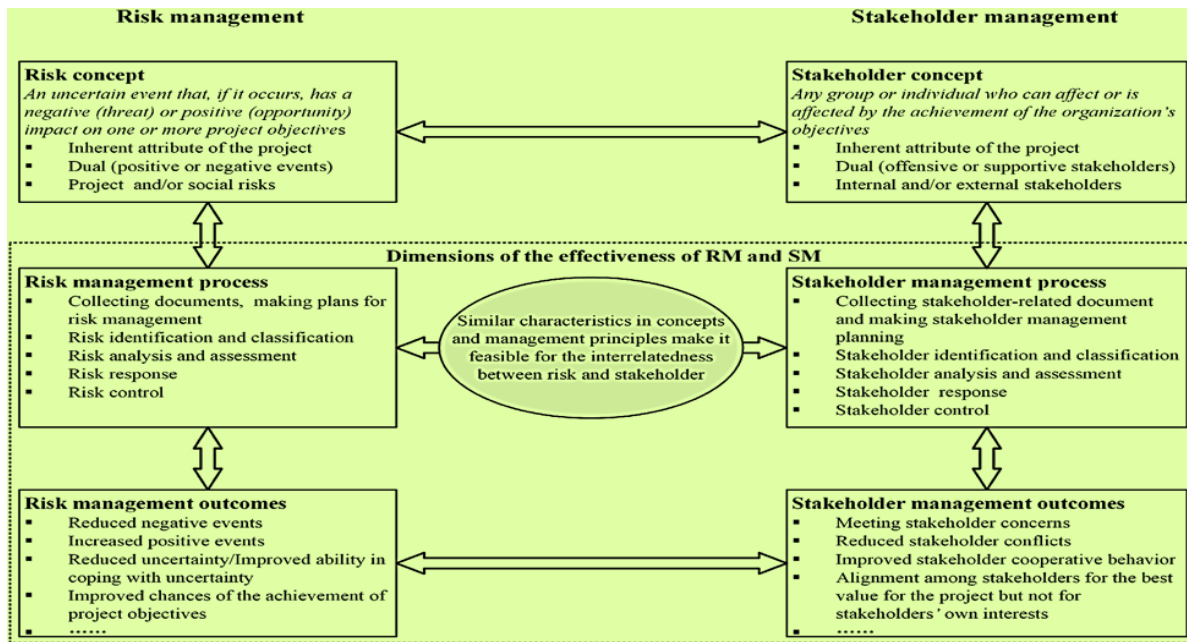


fig 5.1 conceptual framework: similarities between risk and stakeholder concepts, management processes, and outcomes.

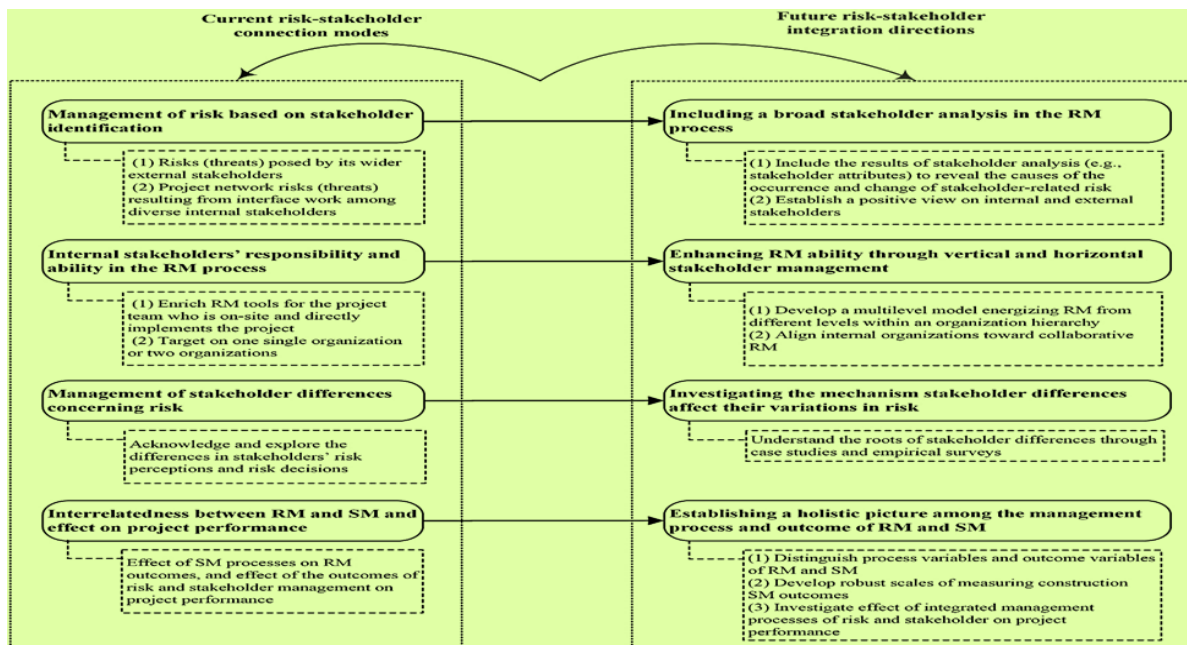


fig 5.2 conceptual framework: similarities between risk and stakeholder concepts, management processes, and outcomes.

5.1 FIVE LIST OF STAKEHOLDER ENGAGEMENT STRATEGY

- Survey Your Stakeholders.
- Prioritize Stakeholders by Interest and Influence.
- Map Stakeholders to Measure ROI of Stakeholder Engagement.
- Communicate Company Activity Regularly.

Log Meetings to Maintain Institutional Knowledge

Based on a substantial amount of theory, the researcher proposed the following relationship and hypothetical model of stakeholder influence on project success

- Stakeholder impact influenced on project success
- Stakeholder engagement influenced on project success
- Stakeholder psychological empowerment influenced on project success.

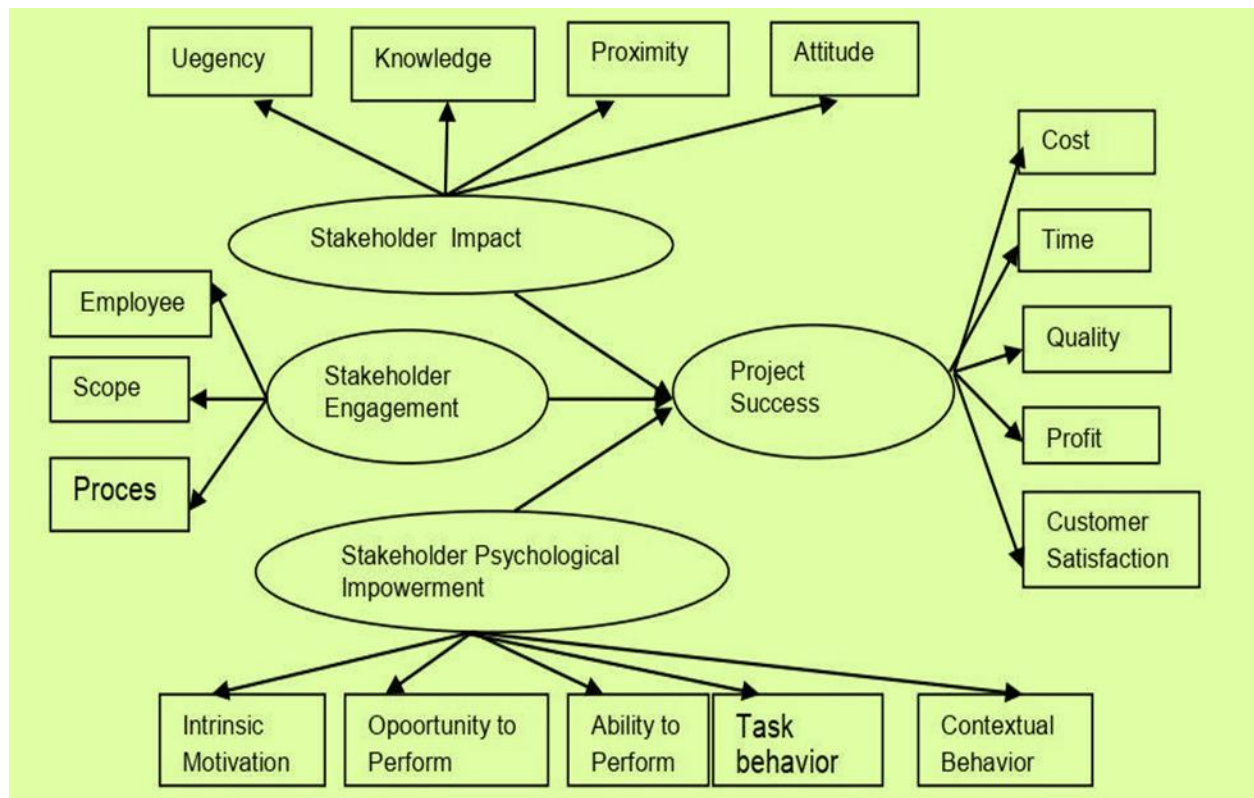


fig 5.3 conceptual framework for the determination of selection criteria.

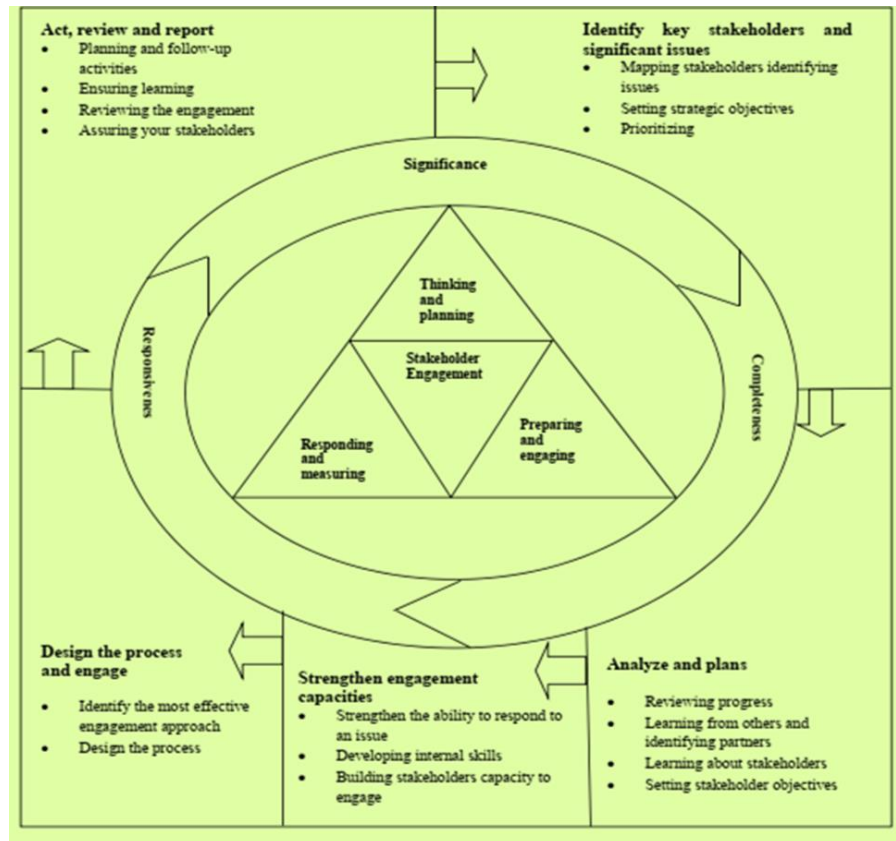


fig 5.4 five-stages stakeholder engagement model

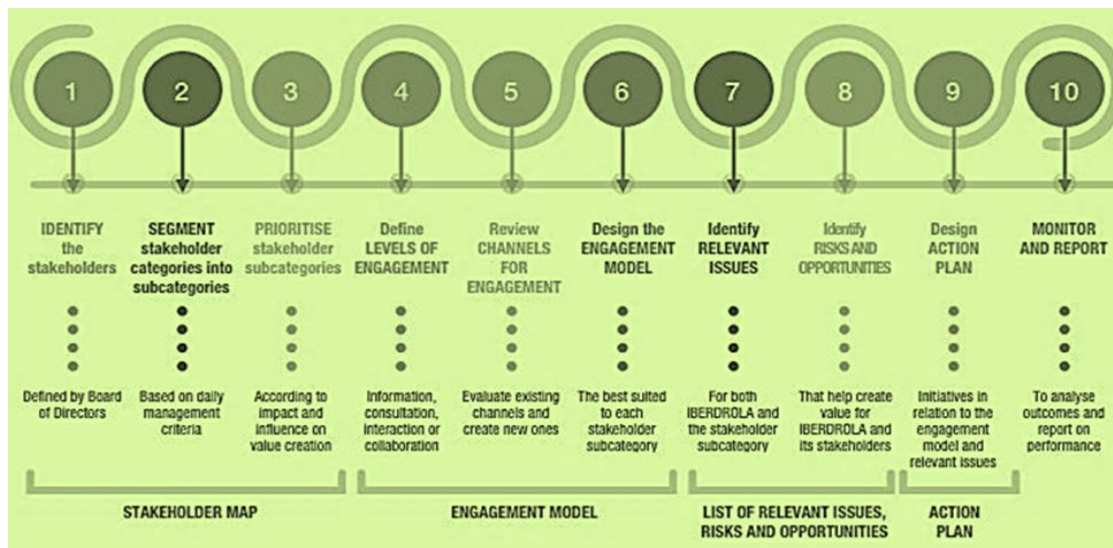


fig 5.5 stakeholders engagement model

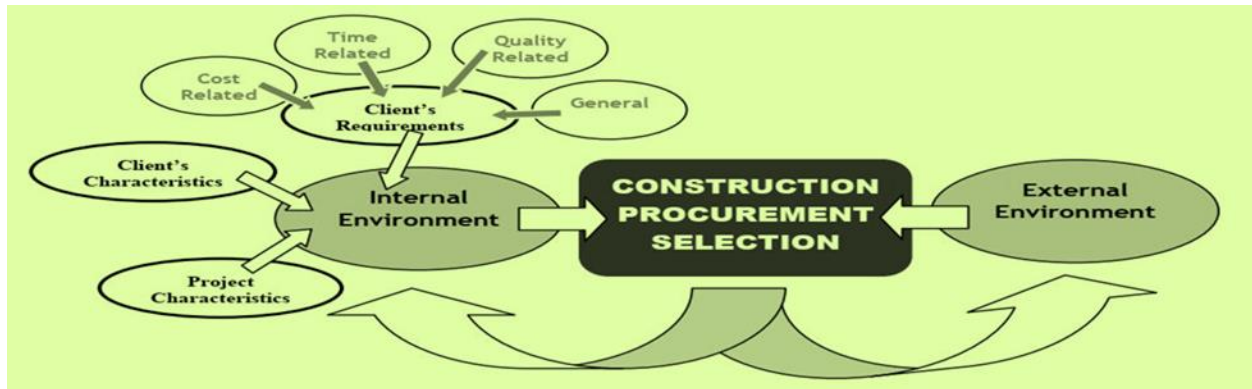


fig 5.6 construction procurement selection

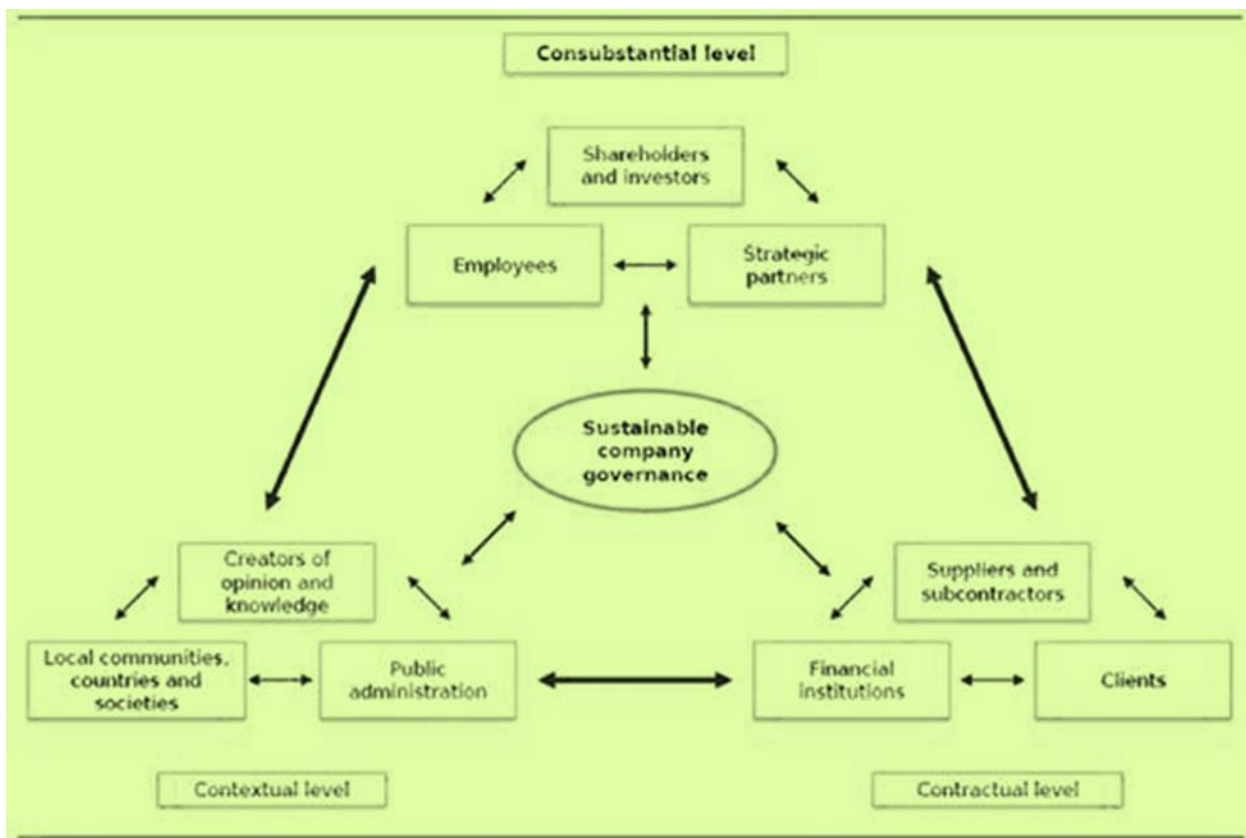


fig 5.7 classification of stakeholders.

Indicators	Formula
Gross Profit Margin	$\frac{\text{revenue} - \text{direct cost of work}}{\text{revenue}}$
Net Profit Margin	$\frac{\text{gross profit} - \text{indirect costs}}{\text{revenue}}$
Cash Flow	$\text{income} - \text{expenditures}$
Liquidity	$\frac{\text{current assets}}{\text{current liabilities}}$
Leverage	$\frac{\text{total liabilities}}{\text{current assets}}$
Working Capital Turnover	$\frac{\text{revenue}}{\text{current assets} - \text{current liabilities}}$
Firm Size	Large companies—companies with >99 employees Medium companies—employees ranging from 50 to 99 Small companies—with <49 employees

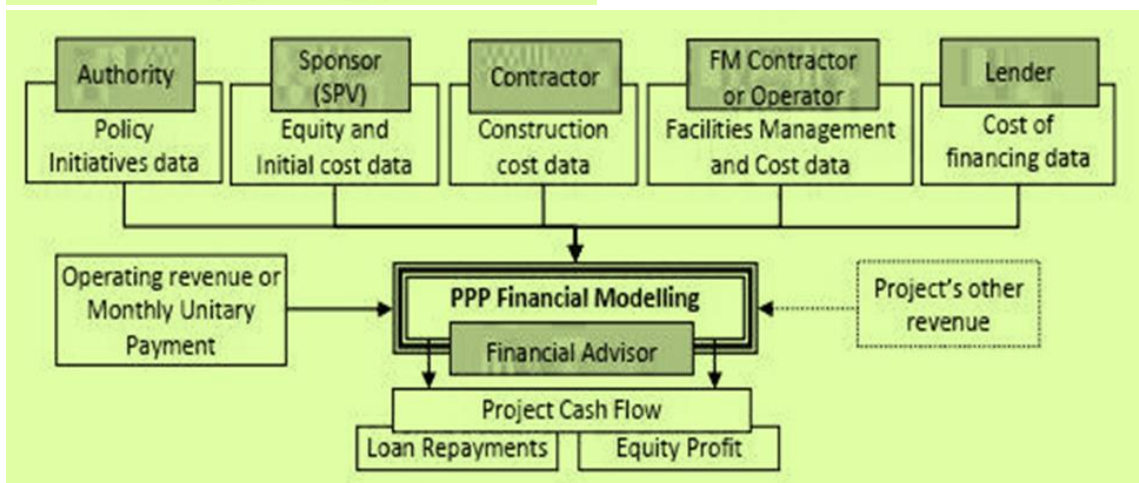


fig 5.8 funding sources and current use of ppp financial modelling

TABLE 5.1 CASE STUDY COMPARISON

General condition	Casestudy 1	Casestudy 2	Casestudy 3
Project type	Residential apartment	Redevelopment of colony	Multi storey housing
Client	Krishna construction	Cpwd	Abc ltd
Contract type	Item rate contract	Epc contract	Lump sum based contract
Completion time	18 months	960 days	24 months
Retention amount	5 %	5 %	5%
Defect liability period	12 months after completion	12 months after completion	12 months after completion
Delays • Due to client • Due to contractor	• Cost of remedying a defect • Transaction issue • Pirate license	• Infrastructural upgrade • Poor supply Chain management • Project manager not competent	• Additional work payment • Misconsumption of material delivery • Design changes
Claim raised	Contractor	Contractor	Contractor
Dispute resolution	Termination of work	lack of procurement scheduling	Additional work payment
Key stakeholder	Client , pmc, contractor	Government contractor .	Client , contractor

TABLE 5.2 CONSTRAINT ANALYSIS ON CASESTUDY

List of analysed constraints in contract management with the stakeholders	Case study	Execution issues	Impact/cause	Key contact	Remedy	Cost	Time	Quality
Cost of remedying a defect	1	Error in bidding document	Low quality material installed	Contractor , client	Change of material	Double charges for removal of low quality material and installation of new material	Delayed time process on approval of new material and installation and removal of low quality material	No compromise
Additional work payment	3	No progress in second wing even after 12 months of 18 months .	Delayed progress in termination because of no cause mentioned on contract regarding	Mep contractor , client	Termination process	Termination cost	Delayed termination progress	No compromise

			g					
Transaction issue	1	Suspension of work due to delay in contractual payments	Termination of work as mentioned in contract favours the client side	Labour contractor, client	Delayed payment	Delayed payment causes the issue	Termination and new labour work force indulging made delay	No compromise
Infrastructure upgrade	2	Client wants to work on land acquisition and procurement process simultaneously which made delay even after awarding	After awarding the land problem is not fully resolved	Client, consultant, contractor	Site acquisition, resettlement, environment permits, government clearance need to be addressed prior	Waste of the cost spending on procurement process when its not going to happen on scheduled time	Time delay due to simultaneous process	Critical path need to be addressed first, no progress
Poor supply chain management	2	Supplier sent the indoor transformer where the yard is not completed	Transformer was kept outdoor for 6 month which made repair in	Client, contractor, supplier	Supply chain management need to be addressed	Cost of the transformer plus repaired charges has increased from	Timeline schedule need to be assigned	Quality of the material damaged due to non

		ely constru cted so the material as no wareho use facility causes the constrai nt	the instrume nt		prior	margin		sched uled suppl y chain
Misconsu mption of material delivery	3	Miscons upion of material delivery place mention ed in the contract that within 180 of deivery	Delayed delivery time due to uncount ed timing for shipping	Suppli er , contra ctor , client	Contra ct docum entatio n on interna tional and nation al shippin g time need to be calcula ted with the deliver y time schedu ling	No cost loss ,	Delaye d time for shippin g and delivery time extente d	No qualit y issue
Pirate license	1	Purchas ed laptops	License nsed software	Client , supplie r	Bill purcha se	Extra payment for	Delaye d process	No compr omise

		and desktops, including licensed software for office which was fake	was not mentioned on the purchase bill so extra paid for the software separately		details with specification need to be addressed	software license	to get the licensed software	
Project manager not competent	2	Appointed a project manager to lead a mis system without any training	Delayed evaluation process on the procurement stage	Client ,pmc	He should have recruited a ic manager or trained person to handle the software evaluation	No cost loss ,	Delayed time evaluation process	No compromise
Design changes	3	2 – 3 month delay process in design	Made delay in the construction duration	Client , architect	Should have executed on time reviews on scheduled manne	Double charges for same work	time delay	No compromise

					r to avoid constr aints , can use ve to reduce waste upto 25% atleast			
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TABLE 5.3 STAKEHOLDER RISK MANAGEMENT

Stakeholders risk management							
Event	Risk	Impact	Risk rating	Risk mitigation action	Time line	Responsibl e	Remar k
Installing material	Cost of remedying a defect	Low quality material installed	4	Change material of	15 days	Contractor , client	contra ctor neglig ence
Paveme nt working	Additional work payment	Delayed progress in termination	3	Termination process	2 mont hs	Mep contractor , client	Contra ctor neglig ence
Financia l settleme nt	Transactio n issue	Terination of work as	5	Delayed payment	3 mont hs	Labour contractor , client	Client contra ctor neglig ence
Land crisis	Infrastruct ural upgrade	After awarding the land problem is	4	Site acquisition , resettlement, environment permits ,	18 mont hs	Client, consultant, contractor	Client neglig ence

		not fully resolved		government clearance need to be addressed prior			
Material mishandling	Poor supply chain management	Transformer was kept outdoor for 6 month which made repair t	3	Supply chain management need to addressed prior	6 months	Client ,contractor, supplier	Contractor negligence
Delayed delivery scheduling	Misconsumption of material delivery	Delayed delivery time due to shipping	3	Contract documentation on international and national shipping time need to be calculated with the delivery time scheduling	15 days	Supplier , contractor , client	Client contractor negligence
Software provision	Pirate license	Licensed software was not mentioned on the purchase bill	2	Bill purchase details with specification need to be addressed	6 months	Client supplier ,	Client negligence
Pm negligence	Project manager not competent	Delayed evaluation process on the procurement stage	2	He should have recruited a ict manager or trained person to handle the software evaluation	1 month	Client ,pmc	pmc negligence
Drawing and finalizing	Design changes	Made delay in the construction	4	Should haveexecuted on time reviews on scheduled manner to avoid	2-3 months	Client architect ,	client negligence

		duration		constraints , can use ve to reduce waste upto 25% atleast			
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Table 5.4 ISSUES ESCALATION PROCEDURE

Issues escalation procedure					
Nature of issue	Level of review	Responsible body	Response time	Type of issue	Escalation required status
Low or routine	-		7 days	minor mistake can be negligible	Yes / no
Medium	closed / finalize	client	15 days	transaction issue	Yes / no
High	work in progress / consideration	contractor ,pmc	30 days	additional work payment	Yes / no
Critical	open / immediate	consultant ,pmc	15 days	cost remedying of a defect	Yes / no

Table 5.5 COMMUNICATION PROCEDURES

Communication procedures					
Communication type	Objective	Format	Frequency	Audience	Owner
kick off meeting	introduce project , review objectives and goals	in person / face to face	once	project team , internal stakeholders	yes
project team meetings	review status of the project	face to face / conference call	weekly	project team	may be yes /no
Technical and	Discusss	In person /	As	Technical ,	May be yes

design meetings	technical issues and problems review	face to face	needed	creative team	/no
Monthly project meetings	Update leadership on project status	Face to face / conference call	Monthly	Project manager , internal stakeholders	Yes
Project status report / milestone report	Detailed report on cost , time and quality , problems	Email	Monthly	Project manager , internal stakeholders	Yes

Table 5.6 KEY CONTRACTUAL PROVISIONS

KEY CONTRACTUAL PROVISIONS					
No.	Description	Contract stakeholder reference	Responsible	Scope	Risks
1	Care and Supply of Documents	Client , pmc , contractor	2 copies issued to contractor	Client scope	low
2	Delayed Drawings or Instructions	Architect , engineers	Time extension cost compensation	architect scope	moderate
3	Right of Access to the Site	Pmc consultants ,	Give right of access within time stated in data sheet.	pmc consultants scope	moderate
4	changes in the scope	pmc consultant ,	proper information need to communicated	consultant scope	severe
5	Monthly review and billing meeting	Client ,pmc , consultant	Changes and backlogs need to be addressed along with the financial settlement	Pmc contractor scope	severe
6	Project milestone	Client , pmc , consultant	Milestone need to be prioritised along with	Pmc contractor ,	Catastrophic

	report		DPR	scope	
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Table 5.7 CONTRACTUAL MILESTONES AND DELIVERABLES

CONTRACTUAL MILESTONES AND DELIVERABLES					
Activity / Milestone	Responsible	Reference Contract	Start date	End date	Remark
Submit work schedule	Client , pmc , contractor	tender invitation	-	-	if any changes in time
Foundation work for section	Pmc Contractor	Critical path	-	-	if any changes in the time and cost
Complete structure	Pmc ,Contractor	DPR	-	-	if any changes in the time and cost
Completion of mep	pmc contractor ,	Specification scope ,	-	-	if any changes in the time and cost
Closure procedure	Client , pmc , contractor	Documentation closure procedure			-

Table 5.8 CONTRACT MOBILIZATION PLAN

CONTRACT MOBILIZATION PLAN				
Mobilization	Action	Contractual Clause	Timeline (period)	Responsible party/person
Commercial	• Ensure that all relevant parties have copies of the Contract	clause no		pmc , client
	• Establish contract information management system	clause no		client , legal team
	• Establish a system to monitor expenditures and timelines for the Contract	clause no		pmc

	Obtain evidence of insurance and policies, advance payment and performance securities in accordance with the Contract	clause no		client consultants ,
	Ensure that advance payment is made in accordance with the Contract	clause no		client consultants ,
	Deliver to the contractor reasonable evidence of the Employer's financial arrangements	clause no		client consultants ,
	Agree on contractor's Representative (if already not named in the Contract)	clause no		consultants
	Obtain planning, zoning and other permissions as required by the Contract	clause no		technical team
	Give right of access to and possession of the Site as required by the Contract	clause no		client
ESHS	Evidence of induction/ training of contractor's and Contract Manager's Personnel on ESHS.	clause no		client , pmc
	Ensure health and safety risk assessments have been completed for the mobilization activities and necessary safety measures are in place.	clause no		pmc
Operational/ Technical	Ensure that the Engineer is in place and the contractor is notified (if not already notified in the Contract)	clause no		pmc
	Establish key performance indicators (KPIs) for the Contract	clause no		pmc consultants ,
	Check compliance with Employer's Requirements	clause no		pmc

	• Establish schedule for regular meetings, field visits, inspections, reviews and audits	clause no		pmc, financial head
	• Ensure that the contractor has instituted a quality assurance system relevant to mobilization	clause no		Pmc
	• Dispute Board appointed in accordance with the Contract	clause no		pmc
	• Notice of the intended date of the commencement of each sub-contractor's work, and of the commencement of such work on the Site	clause no		pmc , consultant
Contractual Relationship	• Establish reporting modalities	clause no		pmc , technical head
	• Notify the contractor on the Employer's Personnel i.e. the Engineer and of the Employer; and any other personnel relevant to the Contract	clause no		pmc, client consultant
	• Establish roles and responsibilities	clause no		client , pmc
	• Establish modalities of communication	clause no		client , pmc

Table 5.9 CHANGE MANAGEMENT PROCESS

CHANGE MANAGEMENT PROCESS							
N o.	Change initiated by	Type of change	Responsible	Required Action	Review/ Approval Processes	Contract Amendment Requirement	Status

1	CLIENT	Change in authority of the internal stakeholders	Client / pmc	Inform pmc of any change	30 days	needed if any changes	yes/ no
2	PMC	Change in scope of work	Pmc / consultants	Inform consultant / contract or of any change	15 days	needed if any change	yes / no
3	CONSULTANT / CONTRACTOR	change in the material / machinery supply	contract or / consultants	Inform suppliers / labors of any change	15 days	needed if any changes	yes / no

TABLE 5.10 MEASURING ITEMS OF STAKEHOLDERS MANAGEMENT

Measuring items of success stakeholders management	Measuring items of owner performance	Measuring items of consultant performance	Measuring items of contractor performance
	1) Supporting MC	1) Integration performance	1) Specification performance
1) The overall project success	PMC was motivated by the owner to treat contractor fairly.	PMC coordinated the sub objectives of the project well.	PMCs claims was actual and in line with contract items.
2) The relationship among 3 Main stakeholders of the project; contractor, MC,	All changes to project were approved by PMC.	The head of MC was more Generalist than technical specialist.	PMC acted based on contract administration system.

and owner.			
3) Cost performance of projects.	PMC was independent in professional performance of	PMC was the only responsible entity of the project.	PMC acted well based on the common PM of the projects administration practices.
4) Schedule performance Of the Projects	PMC was authorized by the owner to certify the works Performed by contractor.	There was a Main Supervising-Engineer Responsibility System.	PMC acted well according to technical specification.
5) Quality performance of the Projects	PMC was authorized by the owner to intervene in all Construction affairs		
	2) Procurement	2) Human performance	2) Human performance
	The bidding resulted in a contract with appropriate price.	PMC persuaded other project stakeholders to develop a good team externally.	Project manager encouraged well his/her subordinators and treaded them fairly
	The appropriate contractor was selected through bidding.	PMC made a good team for the project internally?	Project manager's subordinators had sufficient authority.
Measuring items of success stakeholders management	Measuring items of owner performance	Measuring items of consultant performance	Measuring items of contractor performance

	All tenderers were satisfied with the biddings.	Coordination and communication was the main duty of PMC in project.	Project manager coordinated and communicated the well.
	The bidding was performed	PMC didn't limit his responsibility to the technical aspects.	PC made a good team for the project internally.
		3) Organizing performance	3) Organizing performance
		PMC made a good coordination among contractors of the project.	PMC had a good cooperation with other contractors of the project.
		PMC had a well-established management system.	PMC allocated appropriate and enough resources to the project.
		PMC had a good cooperation with other relevant third parties.	Project manager had authority enough to make decision on the projects.
		PMC led well the different parties toward project objective.	PMC had a good cooperation With other stakeholders of the projects
		4) Technical performance	4) Technical performance
		PMC administrated project contract well.	PMC administrated project contract well.
		PMC controlled well project cost.	PMC controlled well project cost.

		PMC controlled well project time.	PMC controlled well project time.
		PMC acted well in civil activities.	PMC acted well in civil activities.

5.2 MACRO LEVEL FACTORS AFFECTING THE SELECTION OF PROCUREMENT SYSTEM

5.2.1 PROJECT CHARACTERISTICS
• Project type • Project size • Project cost • Degree of flexibility • Degree of complexity • Time constrains • Payment method • Integration of design and construction • Project funding method • Project site location • Site risk factors • Construction method • Degree of innovative technology involvement
5.2.2 EXTERNAL ENVIRONMENT
• Market's competitiveness • Government as a policy maker • Government as a major client • Regulatory feasibility • Technological feasibility • Source of finance for the project • Experienced contractor availability • Education of builders • Economic condition of the country • Availability of material • Information Technology • Influence of Intuitional bodies

Natural disaster • Industrial actions • Socio cultural differences • Goodwill of the contractor • Environmental issues • Civil war condition • Objections from neighbors / public
5.2.3 GENERAL NEEDS
• Allocation of responsibility • Professional team performance • Parties involvements • Accountability • Transparency • Safety requirements • Corporation and motivation • Existing building operation • Familiarity (Client's awareness of construction procurement system) • Tender evaluation criteria • Clear express of end user's requirements • Flexibility • Consultants' attitude towards clients • Types of client
5.2.4 CLIENTS' REQUIREMENTS
Cost Related Factors • Capital cost • Maintenance cost • Prequalification and tendering cost • Financial risk • Price competition • Completion within the budget
5.2.5 TIME RELATED FACTORS
• Planning and designing time • Tendering and evaluation time • Construction time

• The early start of the project • Speed of construction • Time overruns • Quick response to clients new requirements (extra work and variations) • Maximizing of activities interfacing • Stage completion
5.2.6 QUALITY RELATED FACTORS
• Design reliability • Aesthetic appearance of the building • Workmanship • Functionality (suitability for the intended users) • Design innovation

Table 5.11 KEY STAKEHOLDERS STRATEGIC ANALYSIS

stakeholder	issue occurred	cause of the issue	key challenges/ expectation	
client	design problems	changes in requirements	better quality	
	quality requirements	participation of third parties (inspection, engineering firms, etc)	higher profits	
	communication problems	insufficient communication	more competitiveness	
	contracts problems		cost reduction	
suppliers	not conforming to agreed delivery time	lack of planning of own company	cost factor	
	non conformance with quality requirements	lack of planning by suppliers	quality	
	lack of adequate communication	lack of control by suppliers	timing	

	lack of suppliers' capacity or availability	insufficient communication	service
		and lack of training	
		competence of suppliers' personnel	
		Design changes were also mentioned	
management	differences in objectives and goals ,lack of management skills	not conforming to agreed delivery time of material	better quality
	inadequate organizational structure	non conformance with quality requirements	better productivity
	the inability of management to consider long-range benefits.	lack of adequate communication	cost reduction
		lack of management people's capacity or availability	lower inventories

5.3 RACI MATRIX :RESPONSIBLE , ACCOUNTABLE , CONSULTED , INFORMED

	Client	Pmc	Contractors	Consultants	Suppliers	Labors
Design	A,I	R,A,C,I	I,C	I,C	I	I
Build&management,	I	C,I	I C	I,C	I,C	I
Tenderingor bidding	R,I	R,C,I	R,C,I,A	R,C,I,A	R,I,A	-
supplychain management	C,I	R,C,I	A,C,I	A,C,I	R,A	R,I
Operation management	I	R,A,C,I	R,A,C,I	R,A,C,I	I,C	I
Transportation	I	R, A,C,I	R,I	R,I	R,A	R,I

Project Activity / Deliverable	Project Manager	Consultant	Architect	Contractor	Client
Define functional and aesthetic needs	I	I	C	I	R
Assess risk	A	R	I	C	I
Define performance requirements	A	R	I	I	I
Create design	A	C	R	I	C
Execute construction	A	C	C	R	I
Approve construction work	I	I	C	C	R

1.client
2.Pmc
3.architect
4.stuructural contractors
5.mep consultant
6.material suppliers
7.equipment/ machinery suppliers
8.labours
9.promotion agency
10.end costumer

LEVEL OF
POWER

KEEP SATISFIED

{1,3,2,10}

KEY PLAYERS

{2,3,4,5,6,7,8}

MINIMAL EFFORT

{1,9,7,10}

KEEP INFORMED

{1,2,4,5,6,7}

fig 5.9 stakeholder matrix

Project Deliverable (or Activity) \ Role	GM Project Leadership						Project Team Members							Energy Performance Contractor			
							Global Facilities				SiteTeam						
	Program Manager	Finance Manager	Legal	Technical Accounting	Treasury Office	Treasury Office and Tax Staff	Project Engineer (s)	Overall Project Manager	Project Energy Engineer (S)	Site Energy Engineer	Site Facility Manager	Site Facility manager or Representative	Site Project Lead	Program Manager	Project Engineer	Safety Manager	Project Manager
Initiate Phase Activities																	
Develop Base Project	R	A/C					A/C	I	A/C	A/C	A/C	C	I				
Submit Project Request	R	A/C	A/C	A/C	A/C	A/C	I	I	I	I	A/C	I	I				
Bid Process	R	I					C	I	C	C	C	C	C				
Final Legal Review And Approval	R		A/C					I			I	I	I	R			
Submit PR for Base Project	A/C	A						I			A	I	R				
Engineering Phase																	
Engineering/Submittals	I						A	C	C	C	C	A	C	A	R	C	
- Create Schedule	A							A		C	C	C	C	A	I	I	R
Create Safety Plan	I							C			C	C	C	A	C	R	C
Create M&V and Financial Reporting Plan	A							I						A	R		I
SCHED A Firm Fixed Price	A	I					A	I	C	C	I	I	I	A	R		I
Construction PR (POA)	A/C	A						I			A	I	R				
Execute Phase Activities																	
Build Deliverables	I						C	C	C	C	C/A	C/A	r / C	I	C	R	R
Create Status Reports	I	I	I	I			I	I	I	I	I	I	I	I	I	R	R
Owner Alternate Work	A/C	A/C					C	A/C	C	C	A/C	C	R	A/C	C	I	C
FINAL Sched A	A	A					I	I	C	C	I	I	I	A/C	R		
Submit Follow on POA (TRUE UP)	A/C	A						I			A	I	R				
Performance Phase Activities																	
Create Project Closure Report/Documents	C/A	C/A	C	C			C/A	C/A	C	C	C/A	C	C/A	C	R/A	C	R
M&V Phase										C	C	C	R/A				R

TABLE 5.12 RACI MATRIX :RESPONSIBLE , ACCOUNTABLE , CONSULTED , INFORMED

STAKEHOLDERS	Unaware	Resistant	Neutral	Supportive	Leading
client				D	C
pmc				C	D
architect		C		D	
structural contractors			C		D
mep consultant			C		D
material suppliers			C	D	
equipment/ machinery suppliers			C	D	
labors	C	D			
promotion agency				D,C	
end costumer		C	D		
The desired level ("D") of engagement					
The observed current level ("C") of engagement					

STAKEHOLDERS	client	pmc	architect	structural contractors	mep consultant	material suppliers	equipment/ machinery suppliers	labors	promotion agency	end costumer
client		X	X						X	X
pmc	X		X	X	X				X	
architect		X								
stuructural		X				X	X	X		

contractors										
mep consultant		X				X	X	X		
material suppliers				X	X			X		
equipment/ machinery suppliers				X	X			X		
labours				X	X					
promotion agency	X	X								
end costumer	X									

Table 5.13 STAKEHOLDER MATRIX

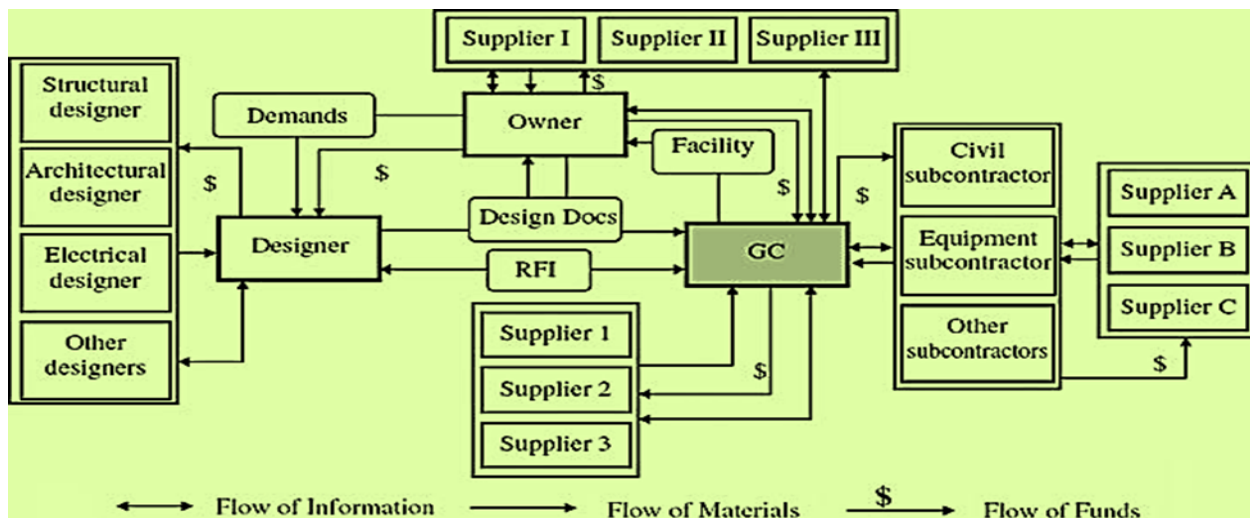
Categories		Likelihood		Impact
		1 (rare)-5 (very frequent)		1 (very low)-5 (very high)
Design risks				
D1	Design errors and omissions	4	5	
D2	Design process takes longer than anticipated	3	4	
D3	Stakeholders request late changes	3	3	
D4	Failure to carry out the works in accordance with the contract	3	3	
External risks				

Ex1	New stakeholders emerge and request changes	2	4
Ex2	Public objections	1	3
Ex3	Laws and local standards change	1	3
Ex4	Tax change	1	4
Environmental risks			
En1	Environmental analysis incomplete	2	4
En2	New alternatives required to avoid, mitigate or minimize environmental impact	2	4
Organizational risks			
O1	Inexperienced workforce and staff turnover	3	3
O2	Delayed deliveries	3	3
O3	Lack of protection on a construction site	2	4
Project management risks			
PM1	Failure to comply with contractual quality requirements	3	4
PM2	Scheduling errors, contractor delays	4	4
PM3	Project team conflicts	3	3
Right of way risks			
R1	Expired temporary construction permits	1	4
R2	Contradictions in the	2	3

		construction documents			
Construction risks					
C1		Construction cost overruns	4	4	
C2		Technology changes	2	4	
Very high					
High				Pm2,c1	d1
Medium			D3,d4,o1,o2,pm3	D2,pm1	
Low			r2	En1,en2,ex1,o3,c2	
Very low			Ex2,ex3	Ex4,r1	
	rare	occasional	Somewhat frequent	frequent	Very frequent

Table 5.14 RISK MAPPING

Coordination	Material management	Quality management	Execution issues	Delay cause	Communication	Maintenance
Design , size , location	Material procurement, ordering	Inspection , checklist	Storage issues	Delay in delivery of design	Clients side	Quality requirements
Work methodology ,timeline sheet	Transportation	Specification	Lack of communication	Delay of communication on critical activity	Supplier side	Participation of third party
Work flow	Storage of material , equipment machinery	Tests , guarantee	Lack of training , design changes		Management side	Immediate response



Strengths

- Stakeholder coordination
- Decision making at right time
- Consistent flow chart of stakeholders
- Lean management techniques
- Strong customer

Weakness

- slow decision making
- Low inventory turns
- Long procure to pay
- Lack of visibility
- Uncoordinated workers
- Undeveloped integration with subcontractors

Opportunities

- Market size
- Growing demand
- Favorable financing method
- Quality
- timing
- service
- cost factor

Threats

- Supplier fire
- Customer bankruptcy
- Intense competition
- Wages and payment system
- Lack of storage area / warehouse insufficient

fig 5.10 swot analysis

Table 5.15 CONTRACT ANALYSIS IN IMPACT AND VALUE MATRIX METHOD

Type of Procurement								
Type of Contract	Goods	Works	Plant	Info. Systems	Non Consulting Services	Text Books	Consult ants	Mana geme nt Servi ces
Design and Build Contract		✓	✓	✓				
Engineering, Procurement and Construction		✓	✓	✓				
Performance Based Contracts		✓	✓	✓	✓		✓	
Contract based on Unit Prices	✓	✓		✓	✓	✓		
Time-based Contracts					✓		✓	
Reimbursable-cost Contracts					✓		✓	✓
Lump-Sum Contracts							✓	

TABLE 5.16 STAKEHOLDER ANALYSIS IN IMPACT AND VALUE MATRIX METHOD

STAKEHOLDERS	causes of constraints	interest	rights	impact	key contact
client	lack of defected design	delivery time , cost , quality	to request and receive timely information , periodic reports , making decision on project advancement	catastrophic	pmc
	not coordinated with design in mep , structure				
	rushed bidding				
	delay payment to the contractors				
	design changes				
	unqualified selection of management				
pmc	unqualified selection of contractors	complete engagement from bidding till closure process	to request and receive timely information , to respond to complains and claims	severe	client , contractor , architect , consultants
	change in management ways				
	undocumented change orders				
	poor communication between the office and other contractors				
architect	delay in delivery of drawing	design satisfactory	to receive proper documentation on surveying	moderate	pmc
	later identification of errors in				

	design				
structural contractors	delay in material and equipment	timely delivery with profit resourcing factor	complying with and guaranteeing work environment , respect to code of ethics	severe	consultants , pmc
	lack of training				
	lack of labours				
	unplanned or failure model				
	lack of resource management				
mep consultant	lack of training	effective results in quality and recognition	performing normative followup inspecting according to the approved	severe	pmc
	lack of labours				
	unplanned or failure model				
	lack of resource management				
material suppliers	not conforming to agreed delivery time	timely delivery with profit resourcing factor	complying with legal conditions as agreed upon , mutual respect of the code of ethics	moderate	contractors
	non conformance with quality requirements				
	lack of adequate communication				
	lack of suppliers' capacity or availability				
equipment/ machinery suppliers	delayed delivery time	timely delivery with profit resourcing factor	complying with legal conditions as agreed upon , mutual respect of the code of ethics	moderate	contractors
	lack of communication				
	lack of availability				

labours	poor workmanship	beneficial schemes	complying with the site environment with basic norms as per the contract	moderate	contractors , consultants
	unplanned leave				
promotion agency	poor promotion	profit margin of agency should satisfy	complying with the positive note of the sector to develop in return of investment	minor	client , pmc
	delayed in advertising				
	mislead approach				
end costumer	late payment	needs to be in best quality , cost timely delivery	to receive a timely delivery with best quality	severe	client
	delay in maintance				

Category	Values	Details
Catastrophic	5	A risk whose materialization directly influences on the fulfilling of the mission, patrimonial loss or total image decay, additionally to leaving fully out of order or for an important period of time programs or services delivered to institutions.
Severe	4	A risk whose materialization would damage patrimony, image or the achievement of social objectives significantly. Besides, an important amount of time would be required from upper management to investigate and correct damages.
Moderate	3	A risk whose materialization would cause in important loss of patrimony or significant image deterioration. Besides, an important amount of time would be required from upper management to investigate and correct damages.
Minor	2	A risk that causes damage to patrimony and image. It can be righted in the short term and does not affect the fulfillment of strategic objectives.
Insignificant	1	A risk with small or null effect on the organization.

fig 5.11 impact assessment scale

TABLE 5.17 STAKEHOLDER RISK ALLOCATION

RISK ALLOCATION	RISK DESCRIPTION
Contractor	Labour and Equipment Productivity Quality of work Labour, Equipment, and Material Availability

	Safety Defective Material Contractor Competence Inflation Actual Quantities of Work Labour Disputes
Owner	Differing Site Conditions Defective Design Site Access/right of way permits and ordinances Changes in Government Regulations Delay payment of contract Changes in Work
Shared	Financial Failure – any party Change-order negotiations Contract-delay resolution
Undecided	Acts of God Third-party delays Defensive Engineering

TABLE 5.18 TYPICAL ALLOCATION OF RISK IN A CONSTRUCTION PROJECT

Risk category	Risk management strategies	Possible ways
Financial and economic (inflation, changes, fluctuation of currency exchange rates, changes of	Risk transfer Risk transfer/allocation	- contract provisions governing changes in prices - change of prices in offer - financing of the project by a reputable customer
interest rates, suppliers and subcontractors' insolvency)	Risk avoidance	- purchase of equipment and materials by the owner - checking the general situation and supplier pre-approval process

		- forward and hedging
Project (faulty design, errors and oversights, insufficient detail, changing project conditions)	Risk transfer Risk avoidance	- changes in contractual provisions - the contractor's participation in design - accepting Design/Construction solutions - changes in the original design
Political and environmental (changes in law and regulations, war and social unrest, property seizure, embargo, pollution, lack of security)	Insurance Risk transfer Loss reduction and prevention	- insurance from big international organizations - planning ahead (forecasting) - contractual provisions (extra charge) - clear stipulations in contracts - safety and security program
Connected with execution stage (weather, strikes and industrial disputes, different execution conditions, stoppages, equipment failures and theft, accidents and serious injuries)	Risk retention Loss reduction and prevention Insurance	- including technical aspects in the offer - insurance against accidents - contract provisions (execution time), extension of execution time in case of delays - safety and security program - planning ahead for purchasing - special training programs
Technical (damages in a facility construction, damages of materials and equipment in transit, serious injuries, damages due to fire)	Risk transfer Loss reduction and prevention Insurance	- insurance against construction risks - introduction of additional supervision - contract provisions for unforeseen circumstances - occupational safety and hygiene program - planning ahead (forecasting)
Force Majeure (flood, earthquake, fire, land collapses and landslides)	Insurance Risk transfer	- insurance borne by the owner - contract provision for unforeseen accidents (taking into consideration mutual settlements) - planning ahead (forecasting)

Risk management strategies in the construction industr

CHAPTER 6

QUANTITATIVE ANALYSIS & CONCLUSION

6.1 SURVEY CONSOLIDATE



Visited

137



Started

100



Avg. Time to Complete

2m 42s



Completed

100



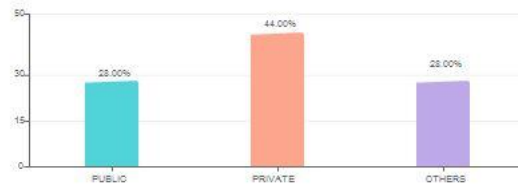
Completion Rate

100.00%

QUESTION 02 | MULTIPLE CHOICE

IN WHICH CONSTRUCTION SECTOR DO YOU WORK

Answered: 100 Skipped: 0



ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
PUBLIC	28	28.00%
PRIVATE	44	44.00%
OTHERS	28	28.00%

QUESTION 83 | MULTIPLE CHOICE
ROLE IN THE PROJECT

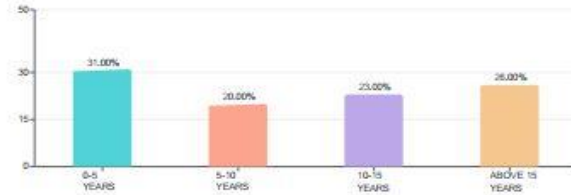
Answered: 180 Skipped: 0



ANSWER CHOICES	RESPONSES	RESPONSE PERCENT AGE
OWNER	11	11.00%
CONSULTANT	11	11.00%
CONTRACTOR	20	20.00%
SUPPLIER	12	12.00%
LABOUR	9	9.00%
CLIENT	12	12.00%
ARCHITECT	16	16.00%
ENGINEER	9	9.00%

QUESTION 84 | MULTIPLE CHOICE
WORK EXPERIENCE IN THE INDUSTRY

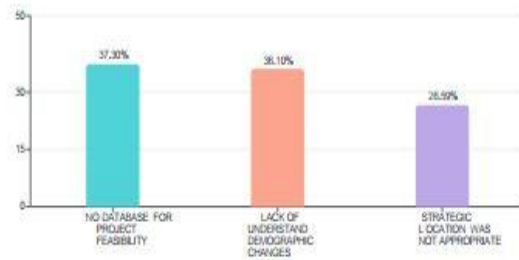
Answered: 180 Skipped: 0



ANSWER CHOICES	RESPONSES	RESPONSE PERCENT AGE
0-5 YEARS	31	31.00%
5-10 YEARS	20	20.00%
10-15 YE	23	23.00%
ABOVE 15	26	26.00%

QUESTION 85 | RANK ORDER
INITIAL STAGE CONSTRAINTS

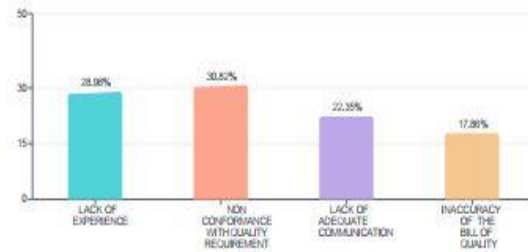
Answered: 37 Skipped: 1



ANSWER CHOICES	AVERAGE	RESPONSE PERCENT AGE
NO DATABASE FOR PROJECT FEASIBILITY	72.37	37.30%
LACK OF UNDERSTANDING DEMOGRAPHIC CHANGES	70.04	38.10%
STRATEGIC LOCATION WAS NOT APPROPRIATE	51.59	26.59%

QUESTION 86 | RANK ORDER
PLANNING STAGE CONSTRAINTS

Answered: 38 Skipped: 1

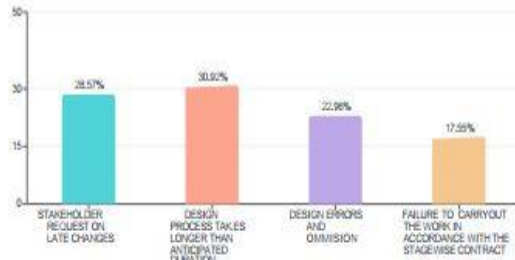


ANSWER CHOICES	AVERAGE	RESPONSE PERCENT AGE
LACK OF EXPERIENCE	71.00	28.98%
NON CONFORMANCE WITH QUALITY REQUIREMENT	75.50	30.52%
LACK OF ADEQUATE COMMUNICATION	54.75	22.35%
INACCURACY OF THE BILL OF QUALITY	43.75	17.86%

QUESTION 87 | RANK ORDER

DESIGN STAGE CONSTRAINTS

Answered: 98 Skipped: 1

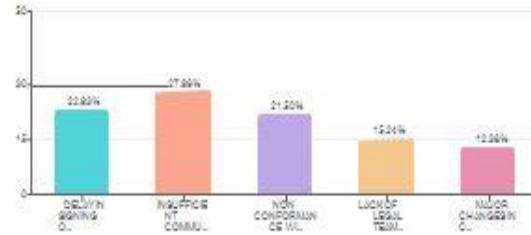


ANSWER CHOICES	AVERAGE	RESPONSE PERCENTAGE
STAKEHOLDER REQUEST ON LATE CHANGES	70.00	28.57%
DESIGN PROCESS TAKES LONGER THAN ANTICIPATED DURATION	75.75	30.92%
DESIGN ERRORS AND OMISSION	56.25	22.98%
FAILURE TO CARRYOUT THE WORK IN ACCORDANCE WITH THE STAGEWISE CONTRACT	43.00	17.55%

QUESTION 88 | RANK ORDER

CONTRACT STAGE CONSTRAINTS

Answered: 98 Skipped: 1

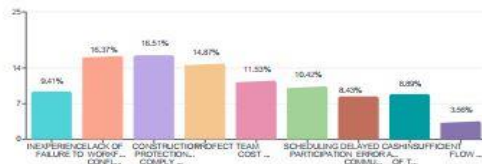


ANSWER CHOICES	AVERAGE	RESPONSE PERCENTAGE
DELAY IN SIGNING OF THE CONTRACT	67.40	22.92%
INSUFFICIENT COMMUNICATION KNOWLEDGE ON DATABASE IN BIDDING AND CONTRACTING	52.20	27.98%
NON CONFORMANCE WITH THE QUALITY AND DELIVERY TIME	63.20	21.50%
LACK OF LEGAL TEAM CAPACITY OR AVAILABILITY	44.80	18.24%
MAJOR CHANGES IN CONTRACTOR BIDDING OR PLANNING ESTIMATION	36.40	12.35%

QUESTION 89 | RANK ORDER

EXECUTING AND MONITORING STAGE CONSTRAINTS

Answered: 98 Skipped: 0

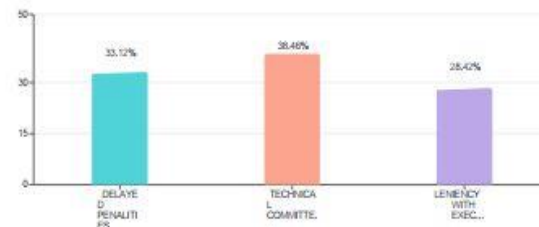


ANSWER CHOICES	AVERAGE	RESPONSE PERCENTAGE
INEXPERIENCE WORKFORCE AND STAFF TURNOVERS	46.57	9.41%
LACK OF PROTECTION ON CONSTRUCTION SITE	81.01	16.37%
CONSTRUCTION COST OVER RUN	81.71	16.51%
PROJECT TEAM CONFLICTS	73.82	14.87%
FAILURE TO COMPLY WITH THE CONTRACTUAL QUALITY REQUIREMENT	57.08	11.53%
SCHEDULING ERROR AND CONTRACTORS DELAY	51.59	10.42%
DELAYED CASH FLOW FOR CONTRACTOR	41.75	8.43%
INSUFFICIENT COMMUNICATION	44.03	8.89%
PARTICIPATION OF THE THIRD PARTY	17.64	3.56%

QUESTION 90 | RANK ORDER

CLOSURE STAGE CONSTRAINTS

Answered: 98 Skipped: 1

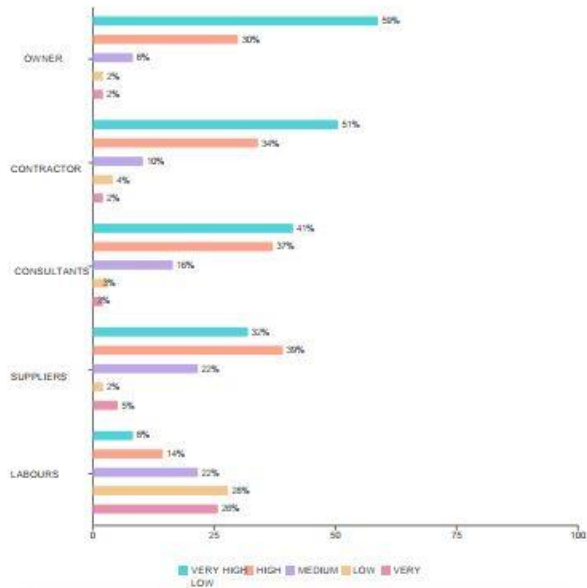


ANSWER CHOICES	AVERAGE	RESPONSE PERCENTAGE
DELAYED PENALTIES	64.82	33.12%
TECHNICAL COMMITTEES SLOW PROGRESS	75.38	38.46%
LENIENCY WITH EXECUTING COMPANY / LACK OF DEFECT DIAGNOSING	55.70	28.42%

QUESTION 11 | MATRIX

WHICH STAKEHOLDERS HOLDS THE MAJOR RISK

Answered: 37 Skipped: 2



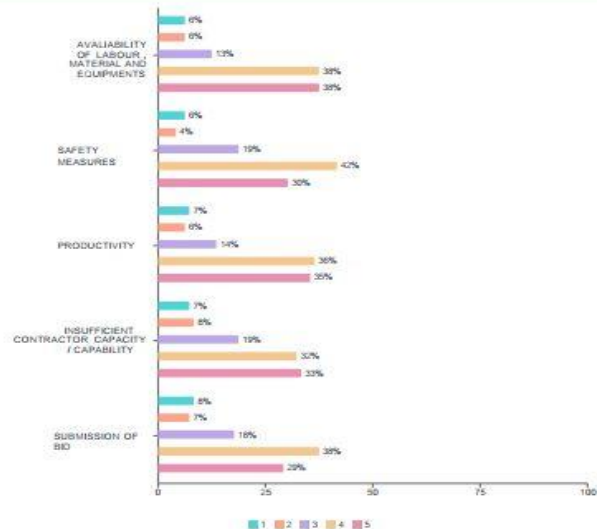
	VERY HIGH	HIGH	MEDIUM
OWNER	57 (55.76%)	29 (28.90%)	8 (8.25%)

	VERY HIGH	HIGH	MEDIUM
CONTRACTOR	49 (50.52%)	33 (34.02%)	10 (10.31%)
CONSULTANTS	40 (41.24%)	36 (37.11%)	16 (16.49%)
SUPPLIERS	31 (31.96%)	38 (39.18%)	21 (21.65%)
LABOURS	8 (8.25%)	14 (14.43%)	21 (21.65%)
Total	185 (38.14%)	150 (30.93%)	76 (15.67%)

	LOW	VERY LOW
OWNER	2 (2.06%)	2 (2.06%)
CONTRACTOR	4 (4.12%)	2 (2.06%)
CONSULTANTS	3 (3.09%)	2 (2.06%)
SUPPLIERS	2 (2.06%)	5 (5.19%)
LABOURS	27 (27.84%)	25 (25.77%)
Total	38 (7.84%)	36 (7.42%)

QUESTION 13 | MATRIX
RISK WHICH CONTRACTOR SHOULD BEAR

Answered: 95 Skipped: 2

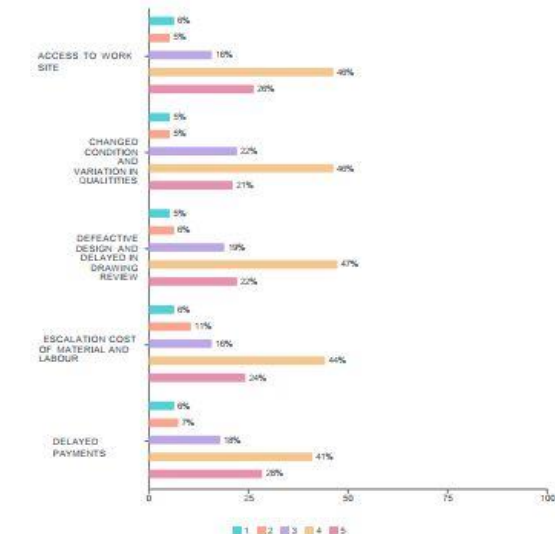


	1	2	3
AVAILABILITY OF LABOUR, MATERIAL AND EQUIPMENTS	6 (6.25%)	6 (6.25%)	12 (12.50%)

	1	2	3
CHANGED CONDITION AND VARIATION IN QUALITIES	5 (5.26%)	5 (5.26%)	21 (22.11%)
DEFEACTIVE DESIGN AND DELAYED IN DRAWING REVIEW	5 (5.26%)	6 (6.32%)	18 (18.89%)
ESCALATION COST OF MATERIAL AND LABOUR	6 (6.32%)	10 (10.53%)	15 (15.79%)
DELAYED PAYMENTS	6 (6.32%)	7 (7.37%)	17 (17.89%)
Total	28 (5.89%)	33 (8.95%)	86 (18.11%)
	4	5	
ACCESS TO WORK SITE	44 (46.32%)	25 (26.32%)	
CHANGED CONDITION AND VARIATION IN QUALITIES	44 (46.32%)	20 (21.05%)	
DEFEACTIVE DESIGN AND DELAYED IN DRAWING REVIEW	45 (47.37%)	21 (22.11%)	
ESCALATION COST OF MATERIAL AND LABOUR	42 (44.21%)	23 (24.21%)	
DELAYED PAYMENTS	39 (41.05%)	27 (28.42%)	
Total	214 (45.05%)	116 (24.42%)	

QUESTION 12 | MATRIX
RISK WHICH OWNER SHOULD BEAR

Answered: 95 Skipped: 3



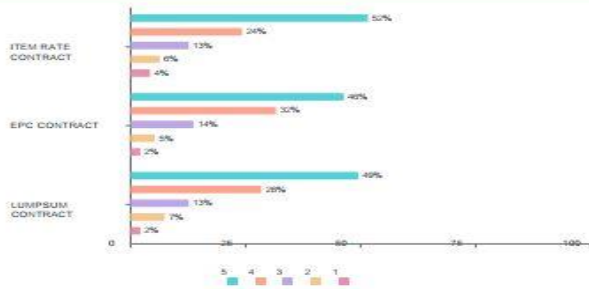
	1	2	3
ACCESS TO WORK SITE	6 (6.32%)	5 (5.26%)	15 (15.79%)

	1	2	3
SAFETY MEASURES	6 (6.25%)	4 (4.17%)	18 (18.75%)
PRODUCTIVITY	7 (7.29%)	6 (6.25%)	13 (13.54%)
INSUFFICIENT CONTRACTOR CAPACITY / CAPABILITY	7 (7.29%)	8 (8.33%)	18 (18.75%)
SUBMISSION OF BID	8 (8.33%)	7 (7.29%)	17 (17.71%)
Total	34 (7.08%)	31 (6.46%)	78 (16.25%)
	4	5	
AVAILABILITY OF LABOUR, MATERIAL AND EQUIPMENTS	36 (37.50%)	36 (37.50%)	
SAFETY MEASURES	40 (41.67%)	29 (30.21%)	
PRODUCTIVITY	35 (36.46%)	34 (35.42%)	
INSUFFICIENT CONTRACTOR CAPACITY / CAPABILITY	31 (32.29%)	32 (33.33%)	
SUBMISSION OF BID	38 (37.50%)	28 (29.17%)	
Total	178 (37.08%)	159 (33.13%)	

QUESTION 16 | MATRIX

WHICH OF THE CONTRACTS HAVE MORE RISK FACTOR

Answered: 95 Skipped: 4



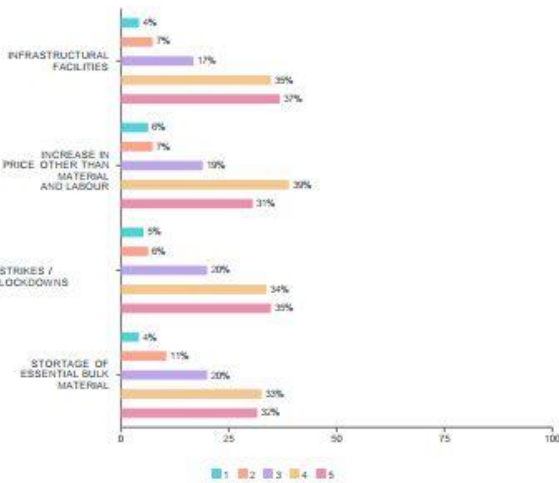
	5	4	3
ITEM RATE CONTRACT	49 (51.58%)	23 (24.21%)	12 (12.63%)
EPC CONTRACT	44 (46.32%)	30 (31.58%)	13 (13.68%)
LUMP SUM CONTRACT	47 (49.47%)	27 (28.42%)	12 (12.63%)
Total	140 (49.12%)	80 (28.07%)	37 (12.98%)
	2	1	
ITEM RATE CONTRACT	6 (6.32%)	4 (4.21%)	
EPC CONTRACT	5 (5.26%)	2 (2.11%)	
LUMP SUM CONTRACT	7 (7.37%)	2 (2.11%)	
Total	18 (6.32%)	8 (2.81%)	

	1	2	3
STORAGE OF ESSENTIAL BULK MATERIAL	4 (4.21%)	10 (10.53%)	19 (20.00%)
Total	19 (5.00%)	30 (7.89%)	72 (18.95%)
INFRASTRUCTURAL FACILITIES	4	5	
	33 (34.74%)	35 (36.84%)	
INCREASE IN PRICE OTHER THAN MATERIAL AND LABOUR	37 (38.95%)	29 (30.53%)	
STRIKES / LOCKDOWNS	32 (33.68%)	33 (34.74%)	
STORAGE OF ESSENTIAL BULK MATERIAL	31 (32.63%)	30 (31.58%)	
Total	133 (35.00%)	127 (33.42%)	

QUESTION 14 | MATRIX

RISK TO BE SHARED BY OWNER AND CONTRACTOR

Answered: 95 Skipped: 4

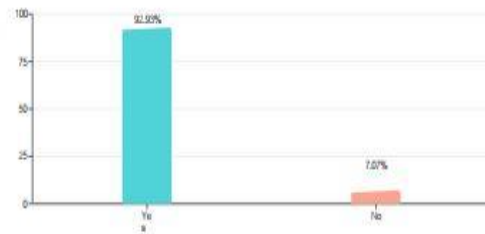


	1	2	3
INFRASTRUCTURAL FACILITIES	4 (4.21%)	7 (7.37%)	16 (16.84%)
INCREASE IN PRICE OTHER THAN MATERIAL AND LABOUR	6 (6.32%)	7 (7.37%)	18 (18.95%)
STRIKES / LOCKDOWNS	5 (5.26%)	8 (8.32%)	19 (20.00%)

QUESTION 17 | YES OR NO

CONTRACTOR SHOULD HAVE THE CLEAR KNOWLEDGE ON THE CONTRACT FORMULATION AND BIDDING PROCESS

Answered: 95 Skipped: 0



ANSWER CHOICES	RESPONSES	RESPONSE PERCENT AGE
Yes	92	92.93%
No	7	7.07%

QUESTION 20 | MULTIPLE CHOICE

WHICH OF THE STAKEHOLDERS HOLDS ON
DECISION MAKING IN CHANGE ORDER
MANAGEMENT

Answered: 97 Skipped: 2

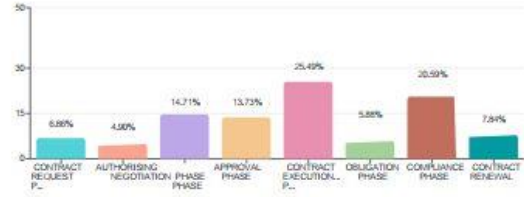


ANSWER CHOICES	RESPONSES	RESPONSE PERCENT AGE
OWNER	46	46.52%
PMC	20	20.41%
CONTRACTOR	20	20.59%
SUPPLIER	5	5.08%

QUESTION 19 | DROP DOWN

WHICH PHASE OF THE CONTRACT HOLDS MORE RISK

Answered: 97 Skipped: 2

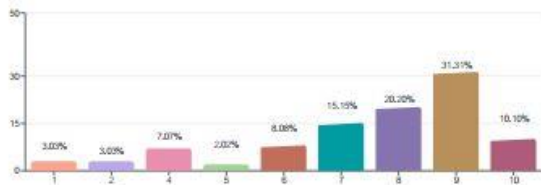


ANSWER CHOICES	RESPONSES	RESPONSE PERCENT AGE
CONTRACT REQUEST PHASE	7	6.86%
AUTHORISING PHASE	5	4.90%
NEGOTIATION PHASE	15	14.71%
APPROVAL PHASE	14	13.73%
CONTRACT EXECUTION PHASE	26	25.49%
OBLIGATION PHASE	6	5.88%
COMPLIANCE PHASE	21	20.59%
CONTRACT RENEWAL PHASE	8	7.84%

QUESTION 18 | OPINION SCALE

MOST OF THE PROJECT FAILURE ACQUIRE DUE TO
THE LACK OF QUALITY ASSURANCE PLAN ON
DETAILED WORK CONTRACT (BARCHARTS , PERT ,
CPM CHARATS AND NETWORK DIAGRAMS)

Answered: 99 Skipped: 0



ANSWER CHOICES	RESPONSES	RESPONSE PERCENT AGE
1	3	3.03%
2	3	3.03%
4	7	7.07%
5	2	2.02%
6	8	8.08%
7	15	15.15%
8	20	20.20%
9	31	31.31%
10	10	10.10%

QUESTION 21 | MATRIX

STAKEHOLDER ENGAGEMENT - WORK FLOW
METHODOLOGY - TOOL AND TECHNIQUES RATING

Answered: 96 Skipped: 1

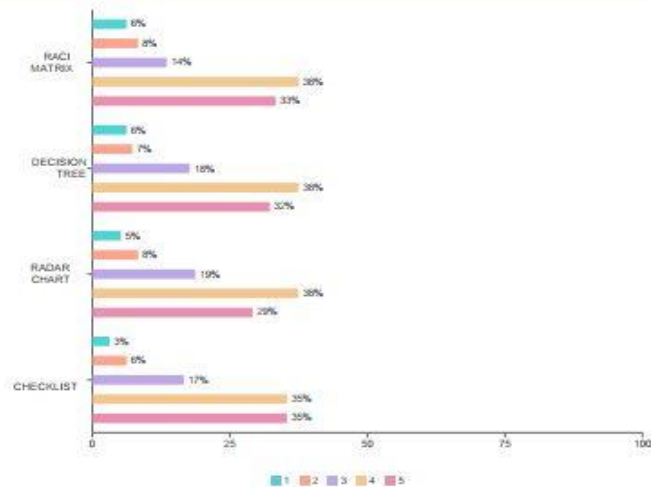


	1	2	3
STAKEHOLDER MATRIX	6 (6.25%)	7 (7.29%)	13 (13.54%)
RISK MAPPING	5 (5.21%)	7 (7.29%)	16 (16.67%)
SWOT ANALYSIS	4 (4.17%)	9 (9.38%)	15 (15.63%)
POCA CYCLE	6 (6.25%)	5 (5.21%)	16 (16.67%)

	1	2	3
Total	21 (5.47%)	28 (7.29%)	68 (15.63%)
	4	5	
STAKEHOLDER MATRIX	48 (50.00%)	22 (22.92%)	
RISK MAPPING	46 (47.92%)	22 (22.92%)	
SWOT ANALYSIS	45 (46.88%)	22 (22.92%)	
POCA CYCLE	42 (43.75%)	28 (29.17%)	
Total	181 (47.14%)	94 (24.48%)	

QUESTION 22 : MATRIX STAKEHOLDER ENGAGEMENT - COORDINATION - TOOL AND TECHNIQUES RATING

Answered: 95 Skipped: 1



	1	2	3
RACI MATRIX	6 (6.25%)	8 (8.33%)	13 (13.54%)
DECISION TREE	6 (6.25%)	7 (7.29%)	17 (17.71%)
RADAR CHART	5 (5.21%)	8 (8.33%)	18 (18.75%)
CHECKLIST	3 (3.13%)	6 (6.25%)	16 (16.67%)

	1	2	3
Total	20 (5.21%)	29 (7.55%)	64 (16.67%)
	4	5	
RACI MATRIX	36 (37.50%)	32 (33.33%)	
DECISION TREE	36 (37.50%)	31 (32.29%)	
RADAR CHART	36 (37.50%)	28 (29.17%)	
CHECKLIST	34 (35.42%)	34 (35.42%)	
Total	142 (36.98%)	125 (32.55%)	

QUESTION 23 | MATRIX
STAKEHOLDER ENGAGEMENT - QUALITY
MANAGEMENT - TOOL AND TECHNIQUES RATING

Answered: 97 Skipped: 0

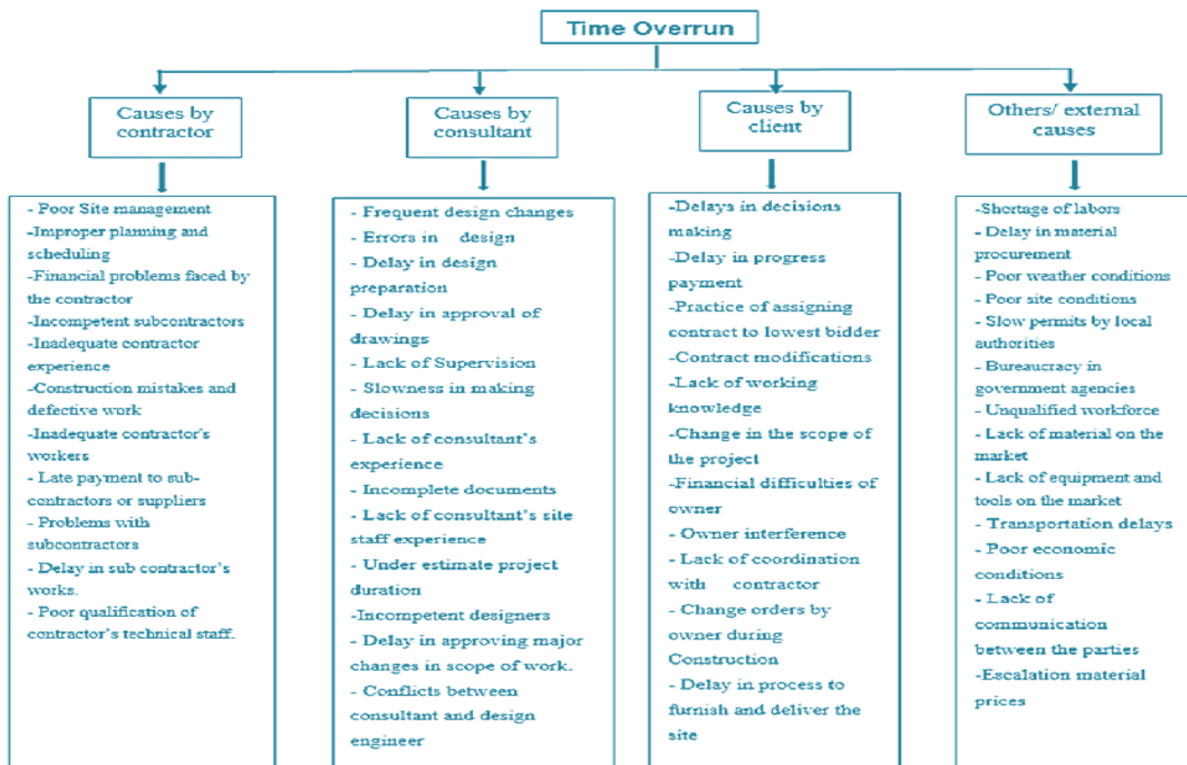
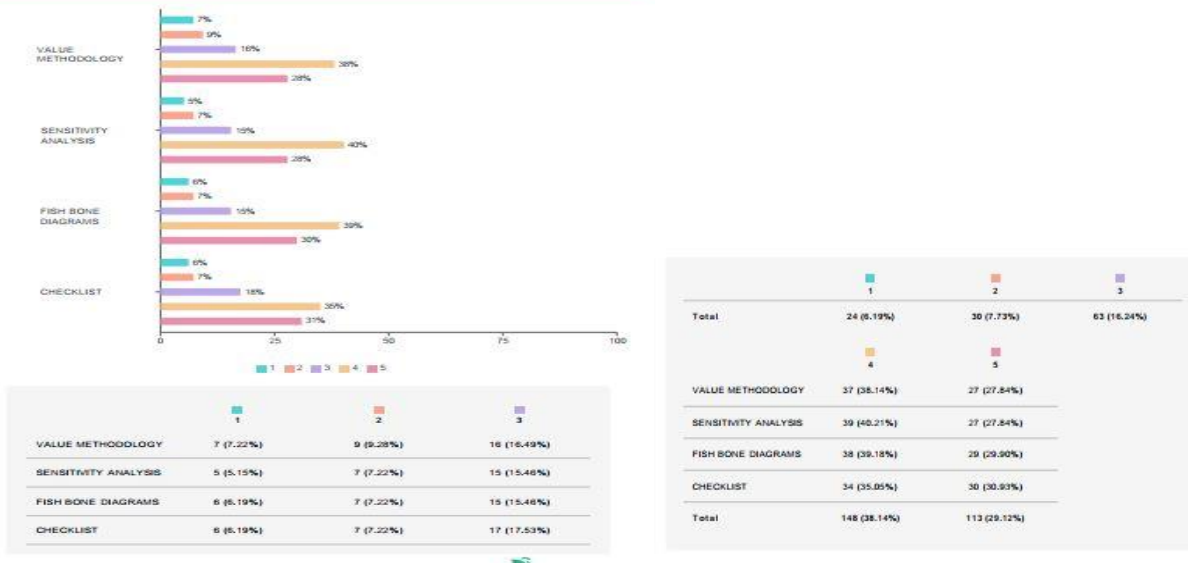


fig 6.1 theoretical framework of time overrun on stakeholders perspective on the contract constraints

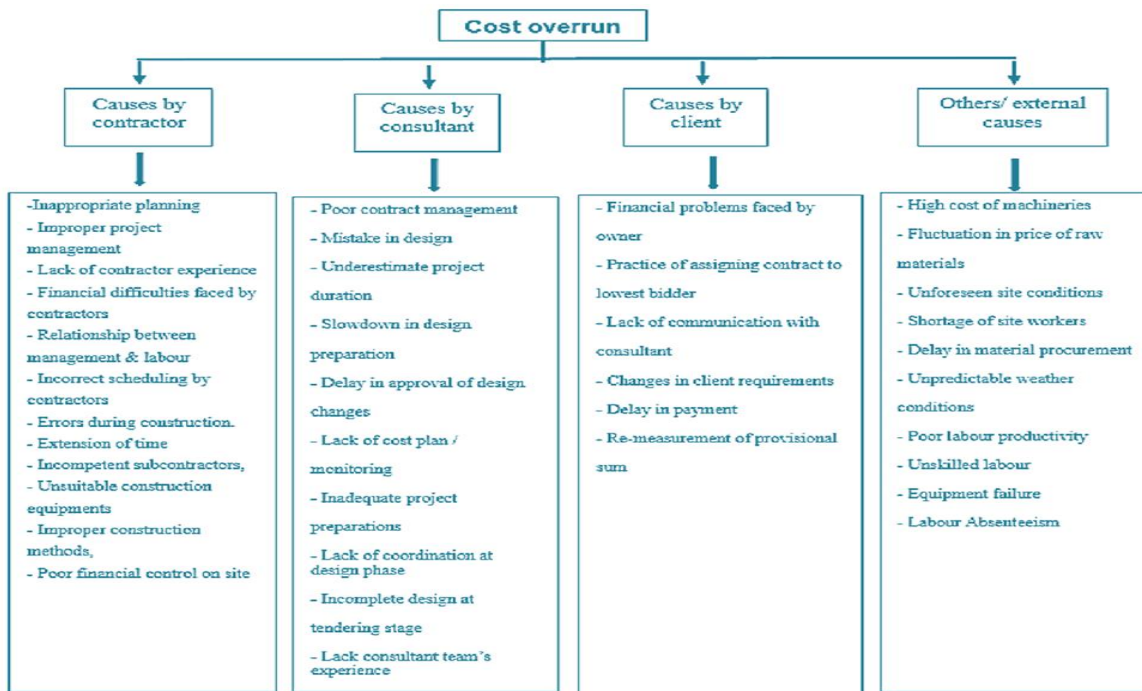


fig 6.2 theoretical framework of cost overrun on stakeholders perspective on the contract constraints

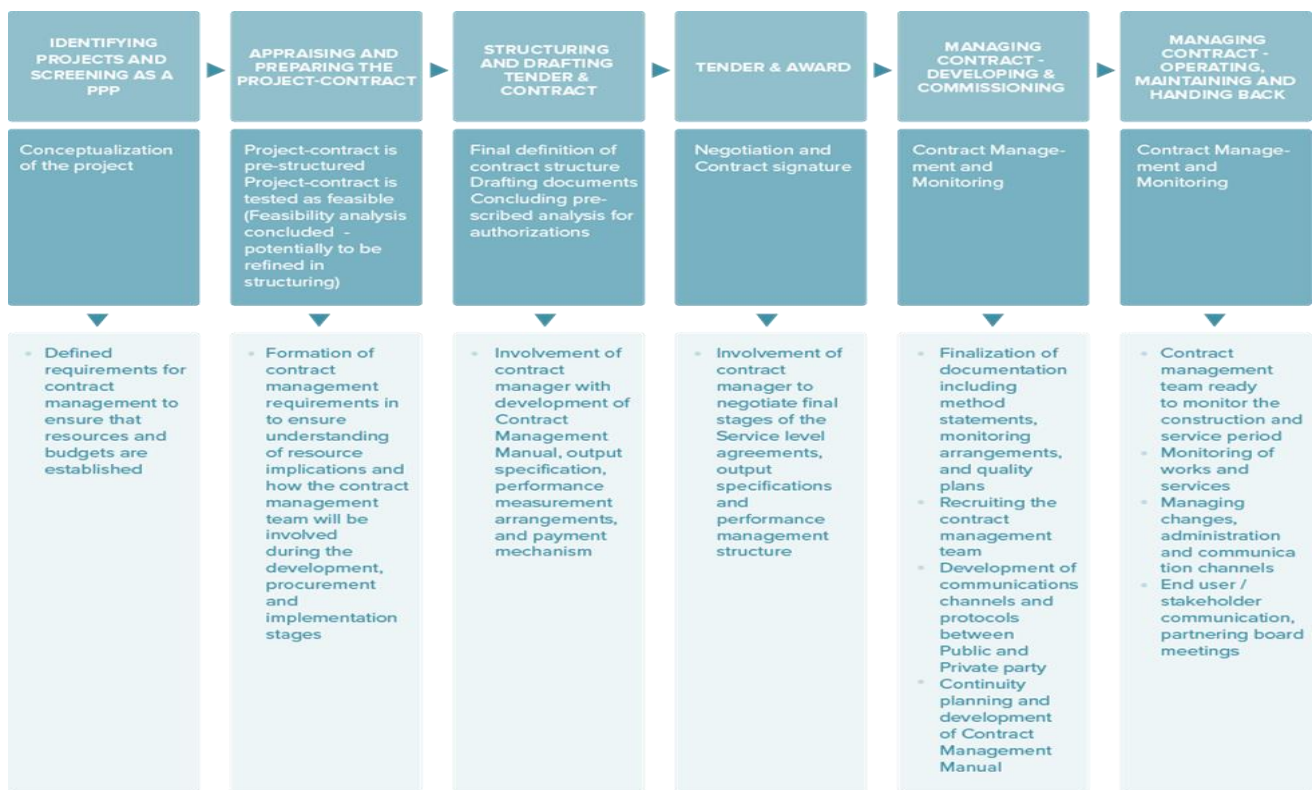


fig 6.3 theoretical framework of contract management

6.2 GENERAL LIST OF WHAT CONSTRUCTION CONTRACT SHOULD INCLUDE

- Contractor and homeowner names and contact information
- Property description from the deed in the county clerk's office
- Cost of the project
- List of attachments (i.e., blueprints or other specifications)
- Description of the work
- Completion date
- How to terminate the contract if the homeowner fails to obtain financing
- Stop work clause
- Breach of contract remedies
- Right to withhold payment
- Stipulations for licenses, insurance, and permits
- Change orders
- Inspections and access to the property
- Unforeseen events and act of god
- Warranties
- Lien waivers
- Disposal of materials upon completion of the project
- Amount of damages

Limitation of liability

- Date and signature of both parties

6.3 CONSTRUCTION CONTRACT CHECKLIST: 10 AREAS TO REVIEW

1. Project description
2. Scope of work
3. Project schedule
4. Contract amount
5. Owner's responsibilities
6. Indemnification
7. Insurance
8. Method of compensation
9. Dispute resolution
10. Termination of contract

1. project description:

- Project title, goals, and objectives
- Project overview and justification
- Project location and site aspects
- Stakeholders
- Client intent and requirements
- Site surveys and environmental reports
- Project team - designers, architects, and other professional consultants
- Construction and project budget
- Schedule - Phase milestones, cost commitments, permit submittal timelines, etc.
- Method of construction delivery
- Evaluating and monitoring benchmark methods

4.Contract Amount

- When reviewing this portion of the contract, ensure that the contract amount is the same amount as the proposal, as well as any change orders that were negotiated.

6. Indemnification

- You understand the difference between a Commercial General Liability (CGL) policy and a Project Loss Insurance (PLI) policy, and what is insured under each type of policy.
- The parties that are being indemnified are clearly defined.
- The indemnification is tied to your negligence in a proportionate manner.
- The indemnification is applied only to claims by third parties.
- To delete “defend” from the indemnity clause and reject the need to give a defense for a party before a finding of fault.

8: Method of Compensation

- Will invoices be sent monthly, or will payment be expected promptly at the time of service? Are any bonuses or incentives included? And what about any benefits?

2. scope of work

- Overview
- Scope
- Deliverables
- Schedule
- Management

3.Project Schedule

- Submit necessary documents for approval
- Order equipment and supplies
- Have supplies delivered before the work starts

5. Owners responsibilities

- Program
- Objectives
- Schedule
- Budget
- Naming a representative who is authorized to make decisions on behalf of the owner
- Creating and editing the project budget, including any necessary contingencies
- Giving approval and making decisions in a timely manner
- Providing insurance and assurance of financial funding and resources
- Providing services of design and other consultants contracted by the owner himself
- Providing legal and accounting services

7.Insurance

- Commercial General Liability (CGL)
- Professional Liability
- Pollution Liability
- Automobile Liability
- Umbrella Liability
- Workers’ Compensation
- The GC should be named as additional insured on these policies (excluding professional liability and workers’ compensation).
- The subcontractor’s indemnification duties should apply to you as the GC, just as your indemnification obligations apply to the owner.

9: Dispute Resolution

- Suggest a “meet and confer” session as the first step in resolution.
- If this “meet and confer” session is unsuccessful, the next best step would be formal mediation.
- When formal mediation is not successful, the contract may stipulate arbitration or litigation.

10: Termination of Contract

- Non-payment
- The owner’s failure to meet contractual duties
- Performance failure by the contractor or subcontractor
- Timeline commitments not met
- Poor communication

6.4 CONCLUSIONS

- From the above three case study on different contract analysis and quantitative analysis on stakeholders perspective on contract management , it can be concluded that the item rate contract is more suitable , as it is mostly recommended in construction industry
- as it's an item rate contract the claim has been raise with the proper proof of the amount spend in each and every item.
- In lump sum contract the dispute occurrence is more as the claims are raised for the fund issues and also for the extension of time which was resolved by using negotiation as well as mediation.
- EPC contract is also used in construction industry whether it is for government or private projects the disputes have been resolved by using arbitration process only

From the above collected data and case study it is analyzed that arbitration is most commonly used and suitable resolution process for both government as well as private projects .

6.5 SUCCESSFUL STAKEHOLDER MANAGEMENT IN CONSTRUCTION PROJECT MANAGEMENT

- Manage project collaboration workflow
- Perform robust construction project management
- Reduce your project schedule by collaborating more effectively with your project team
- Manage multiple projects in one database
- Generate summary reports and queries across all projects
- Globally view all company projects to find trends & identify problems early.
- Make critical decisions quickly using accurate corporate information
- Do more with less and make your existing staffs more efficient
- Standardize your project data & organization business processes across all projects
- audit projects for deficiencies & risk exposure
- Track key performance indicator (kpi) to monitor all levels of company profitability , efficiency & performance .
- Improve document control by streamlining the review process , tracking revisions & storing master files , including email records in central project database .
- Increase productivity with efficient data modification tools
- Optimize company performance by standardizing project database & project management processes across your entire organization
- Increase visibility into your business by managing multiple project in one database , allowing summary reporting & querying across projects .
- Reduce paper works & review cycle on all project related documents including rfi's, change order , submittals , meeting minutes , drawing packages , contracts , and important emails and more .

- Increase staff productivity by automating repetitive processes & time consuming tasks.
- Keep project cost on target with real time cost management & budget tracking .
- Reduce risk & claims litigation by incorporating audit trails & preventing lost project information .
- Track KPI to monitor all levels of company profitability, efficiency & performance .
- Improve communication & collaboration across geographically dispersed project teams & external vendors.
- Improve field level performance with centralized job tracking system
- Share your project data with other critical business applications by integrating to accounting systems , scheduling applications Microsoft applications & more

6.6 FIVE EASY WAY TO EASE DAILY WORK ON CONSTRUCTION SITE TO HELP STAKEHOLDER ENGAGEMENT .

- Minimize manual work with electronic controls
- Minimize the amount of paper with a mobile induction form ,
- Document site activities effectively with an electronic site diary
- Ease work hour reporting for payroll with electronic access control
- Improve occupational safety , work quality , and efficiency with digitalization .

TABLE 6.1 ISSUE WITH TOOL ANALYSIS

Category	Issues	Tools and techniques
Work flow methodology	• Change order may occur during executing • Delay cash flow • Insufficient communication and software knowledge • Late major changes in bidding and planners estimation • Non conformance in quality , agreed delivery time • Design errors and omission	• Stakeholders matrix • Risk mapping • Swot analysis • Pdca cycle
Coordination	• Lack of communication • Changes in client requirement • Lack of experience • No proper database • Major stakeholders not involved in planning • Frequent changes in decision making	• Raci matrix • Decision tree • Radar chart • Checklists
Quality management	• no feasibility study • Non conformance in quality and timely delivery • Change in procured material • Late analysis of faulty approach and rescheduling	• Value methodology • Sensitivity analysis • Fishbone diagram • Checklist

TABLE 6.2 FUTURE RECOMMENDATION :

Category	Recommendation
Work flow planning and methodology	• Stakeholders matrix • Risk mapping • Swot analysis • Pdca cycle
Coordination	• Raci matrix • Decision tree • Radar chart • Checklists
Quality management	• Value methodology • Sensitivity analysis • Fishbone diagram • Checklist
Data storage and software	• Cloud based storage • Bim
Technology innovation	• Precast adaptive casting • Robotics • Automated production • Drone surveying
Transportation tracking ,scheduling , equipment planning	• RFID/ barcoding • Gps tracking • Mobile apps on tracking • tracking plotter • A3 design planning • Jit system • FMEA (failure mode &effect analysis) • Location based scheduling • Software equipment
Waste reduction	• Lean tools and techniques • Evaluation tool • Fault diagnosis tool

6.7 RECOMMENDATION FOR CONTRACTOR :

- The duty of the contractor to validate the drawings given by client at the time of bidding the tender to reduce the future consequences
- Contractor must also analyze all factor which may lead to delay from government bodies , change in rules and regulations .
- Contractor should also be financially stable to digest the cost overrun leading to delays

6.8 RECOMMENDATION FOR CLIENT :

- The client should have proper of planning before awarding the work .
- The design and drawing should be ready before hand to avoid any delay in work
- The site should be completely handed over instead of piece meal
- Risk analysis of all factor which may lead to delay in work from their end should be taken care

TABLE 6.3 FUTURE STUDY :

s.no	Topics	Study area
1	Risk analysis in procurement planning	• Procurement planning analysis • monitor, control and minimize or overcome the impact.
2	Equipment and warehouse planning and scheduling	• Study on equipment and storage space knowledge • Planning and scheduling software
3	Lean management technique in supply chain management	• Lean tools analysis
4	Dispute resolution process in contract types	• Arbitration process
	Coordination and communication pattern in stage wise manner	• Communication tools • Coordination techniques

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