

Project Name
House Construction

Group Number
5147

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Content:

SN.	Content	Page Number
1	Report Cover	1
2	Table of Content	4
3	Table of Tables	7
4	Table of Figures	8
5	Acknowledgements	9
6	Preface	10
7	Introduction	11
8	Recommendations	178
9	Summary	180
10	References	182

Table of Content:

SN.	Content	Page Number
1	Mission.	12
2	Company and Project Vision.	12
3	Develop and identify the objectives in a SMART model.	12
4	Develop and identify the performance measurement indicators, Lead or Lag.	14
5	Develop and prepare the project charter Model.	15
6	Develop an organizational structure for the teams and units of the project.	24
7	Identify the practical and scientific bases, which adopted in developing the structure.	25
8	Identify projects office model, most appropriate to manage the project, in addition to mentioning the reason.	28
9	Design a check compliance model before delivering the project outputs.	29
10	Develop Check List model for the three stages of the project (Start- Plan- Achieve- Close).	34
11	Develop a stakeholder register and form groups for them. (Competency 8).	39
12	Develop the two networks: (Strength/Interest) and (Influence/ Strength).	43
13	Logical diagrams for the register of the stakeholder.	46
14	Identify the culture of the organization.	47
15	Proposals of the organization values that can be adopted.	49
16	Three personal behaviors of the student that can influence the project.	52
17	Study such behaviors, identify their reasons, and how they can be eliminated.	54
18	Self-professional assessment by using SWOT model.	57
19	Three behaviors that contradict moral integrity.	63
20	Analyze the financial, social, and technical influence, if any, of such behaviors on the works of the project and the relationships.	64

21	Register of the stakeholder.	65
22	Personal communication and the effective communication.	66
23	The shapes, models, and channels of the personal communication.	67
24	The communication matrix.	68
25	Three wrong scenarios of communication.	69
26	Develop and prepare stakeholder assessment matrix.	70
27	Describe and identify the leadership model, which is preferred to the project leadership.	71
28	Reasons for which such model is preferred.	74
29	Five proposals for the motivation methods that are compatible with the nature of the project.	75
30	Design RACI model for 3 administrative measures of the project.	77
31	Identify the conflict and crisis.	80
32	Three expected scenarios of the conflict's events in the project.	83
33	The optimal strategies to deal with each conflict and specify the reason of preference.	84
34	Root Cause Analysis.	85
35	Distribute of the human resources on the functions.	85
36	Analyze the influence of conducting the Crashing and Fast-tracking process on the timetable, in addition to representing the table after achieving the two measures.	91
37	Develop general rules for the negotiation process.	101
38	Two negotiation plans.	101
39	To identify the Triple constraint of the project.	104
40	To set up a list of the project success factors.	104
41	To develop and identify work breakdown structure, in addition, to prepare a guide to illustrate it.	104
42	To identify Requirement traceability matrix.	105
43	To specify the methods used in requirement collection.	106
44	To develop the hierarchical structure of the objectives of the project connected to the strategy.	106
45	To develop, identify, and prepare the scope statement (Its limits- and objects that are not included).	106
46	To develop, identify, and explain the concepts: Scope creeps and giving examples.	108

47	To illustrate product analysis management.	110
48	To illustrate the transformation of the work packages in Work Breakdown Structure to activities.	111
49	To develop the functions list or the activities included in each work package in WBS.	112
50	To illustrate the relationships between the activities.	116
51	To develop the logical diagram of the project activities, and identify the critical path.	122
52	To prepare Gantt chart and Milestones model.	122
53	To clarify Deming's model for quality.	123
54	To develop the SIPOC model, and Ishikawa for one of the issues of the project outputs.	125
55	To establish Cost Breakdown Structure, and the project balance in accordance with WBS.	129
56	To calculate Earned Value Management of the project after ending of 20% of its period and completion of 50% of the outputs case-by-case basis.	132
57	To explain the concept of Resource Leveling and Smoothing.	136
58	To be trained on distributing the project resources of equipment and tools.	139
59	To develop the procurement execution process, and contractor selection.	140
60	To developing the supplier comparison model and the scoring model.	141
61	To prepare agenda- Invitation and virtual record of a virtual meeting.	143
62	To identify performance measurement course and submit reports, in addition to explaining the reason.	149
63	To develop Change Request model, including (impact analysis-alternatives analysis-recommendation).	157
64	To identify Risks (threats) and opportunities and giving examples.	163
65	To prepare Risk register.	164
66	Qualitative Risk Analysis.	170
67	To specify Risk response strategies.	172
68	To prepare a Stakeholder engagement assessment matrix.	176

Table of Tables:

Table Number	Table Name	Page Number
1	General project information for the house construction project	15
2	Stages of the house construction project	17
3	Milestones of the house construction project	18
4	Deliverables of the house construction project	19
5	Stakeholder Identification	20
6	Project constraints	22
7	Project risks	22
8	Project Compliance Checklist	33
9	Checklist Model for the Project Stages	34
10	Matrix key stakeholders and their levels of importance or influence	40
11	SWOT analysis list	61
12	Team member	66
13	The communication matrix	69
14	RACI Matrix For construction house	79
15	Negotiation Plan A	102
16	Negotiation Plan B	103
17	Function List	112
18	Relationships between activities	116
19	Project milestones	122
20	Task Cost Overview	130
21	EM after 20% of Project Completion	132
22	VM after 50% of Deliverables Completion	133
23	Project resources of equipment and tools distributing	139
24	Factor rating System for evaluating suppliers	142
25	Supplier scoring and ranking	142
26	Agenda-Invitation	143
27	Change request approval	161
28	Risk Register	166
29	Examples of response strategies:	172
30	Stakeholder engagement assessment matrix	177

Table of Figures:

Figure Number	Figure Name	Page Number
1	Organization structures chart	21
2	Organizational Chart	25
3	Types of PMO	27
4	House construction compliance check model design	31
5	The Power/Interest Grid	44
6	Logical diagrams for the register of the stakeholder	46
7	Situation Analysis of SWOT	57
8	SWOT analysis main components	58
9	Stakeholders assessment matrix	71
10	RACI member	77
11	Distribute of the human resources	90
12	Work breakdown structure	104
13	Change Request	109
14	Project WBS	112
15	SIPOC	127
16	Cause-and-Effect Diagram	128
17	Project Budget	129
18	Earned Value	136
19	Project Change request Template	162
20	Likelihood vs. Impact	165
21	Probability – impact matrix	172
22	Risk area	175
23	Threats Risks (Negative Risks)	175
24	Opportunities Risks (Positive Risks)	176

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The Team

Preface:

Management of construction is a mix between science and art, something kind of hard to do. Hard because of the variables that the project contains and guessing the effects of each variable on the project.

Construction management is a process to manage construction projects. The distinction when comparing other types of projects, is mostly that Construction is based on the mission. In another meaning that the organization of this project ends by the end of the project

wider variety of constraints to consider that are specific to the design and build of construction projects. Construction project management can interact with a variety of different disciplines in the lifetime of a project as well, from architecture to engineering to public works to city planning.

House Construction is a process with a technique following certain requirements and procedures to reach the living requirements available today in the market.

Size, luxury, finishing, location, and other factors affect the cost of such kinds of these projects. Prices for mid-level families for such projects in Saudi Arabia vary between 1 to 2 Million SAR taking into consideration the city and district of the project that the building will be constructed in.

Introduction:

Construction Management is a professional management practice consisting of an array of services applied to construction projects and programs through the planning, design, construction and post construction phases for the purpose of achieving project objectives including the management of quality, cost, time and scope.” Construction Management Association of America "[Construction Management is the] Organizing, scheduling, mobilizing, and directing equipment, material, and personnel in performance of a construction contract."

Buildings and their construction have become increasingly complex. New innovations in methods, designs and materials mean that the management of construction projects requires professionals with the knowledge and skills to deliver on time and on budget in a demanding and rapidly changing industry.

Construction Management a combines a wide range of techniques and knowledge. Including: Budgets and cash flow, Construction law, Construction Planning, Procurement, Supply chain management and tendering Quality Management, Construction risk management, including Health and Safety

(Betts, M., and Ofori, G., (1992))

(Betts, M., and Ofori, G., (1994)

(Betts, M., Cher, L., Mathur, (1991)

(Jones, A., Troy, C., (2010))

1. Mission:

Our company aims to become the number one construction contractor in Saudi Arabia by providing the best possible workmanship, committing to sound work ethics, being honest to all stakeholders, achieving more than 80% customer satisfaction, paying attention to the newest industry trends, and prioritizing environmental preservation by reducing our carbon footprint by 3% each year in the coming three years and 15% by the end of 5 years.

Our project team's mission is to complete this house construction project on time, under budget constraints, make it a modern dwelling and achieve full customer satisfaction.

2. Company and Project Vision

Our Vision is to create better living for everyone by creating energy-efficient and modern dwellings.

Our project team's vision is to make this building 70% more energy-efficient as compared to the other similar buildings in the country and to obtain an Energy Star rating.

3. Develop and identify the objectives in a SMART model:

3.1. What is SMART:

SMART is a mechanism for setting goals to be specific, measurable, achievable, relevant, and time-bound. Setting and achieving goals is one of the essential skills for successful entrepreneurs and business leaders, with “goal” the main gateway to achieving the mission. The clearer and more explicit the goal, the greater the chance of achieving and reaching it.

This method facilitates achieving goals by helping to better define goals so that they can be tracked and achieved more easily. In order to do this, the SMART mechanism follows five main determinants that contribute to clarifying and detailing the goal clearly and clearly, and they are in English words bearing the first letters of the word as follows:

3.1.1. Specific:

The specific goal of this project is to construct a house within the time and budget constraints and as per the expectations of the project owner/customer. The stakeholders involved in this project are the project manager, contractor, house owner, and supplier. To achieve this goal, the Project manager will meet monthly with the project owner to discuss the progress of the project. He will meet with suppliers and contractors weekly and one meeting at least in 2 weeks will be a must.

3.1.2. Measurable:

The goal will be to complete this project within the budget of \$900,000 and before August 2023. This will be achieved by coordinated efforts of all project members. The project must meet Energy Star Rating.

3.1.3. Achievable:

The team has developed a clear schedule for the successful completion of this project, and we believe that the goals of this project are attainable. The project team will have no other projects running in parallel at the execution time of this calendar and will focus all their energies on this project.

3.1.4. Relevant:

If the project completes in time and under budget constraints, the project team will receive a bonus. It will not only benefit our company but the project owner as well because he will be able to save on house rents.

3.1.5. Time-Bound:

The project needs to be completed before August 22 and the project will be termed a failure if it does not complete in time. The project cost is directly linked to the time the resources spend on the project. So, definitely the project cost will exceed budget constraints.

4. Develop and identify the performance measurement indicators, Lead or Lag:

Tracking and carefully evaluating a variety of key performance indicators (KPIs) assists a construction business in developing long-term resilience while reaching short-term financial objectives (Versteeg et.al, 2019). Key indicators of performance (KPIs) are variables that evaluate the success of a company in reaching its goals.

Leading Indicators

Inputs to a project are sometimes regarded as leading indicators. They describe what activities are required to obtain quantifiable results for your goals. The important leading indicators for our business are described below:

An important leading indicator for our business and this project is Gross Profit. Specialized software will be used for tracking the progress of the project and timely communication will be made to all stakeholders. So, the leading indicator will be the use of specialized software like Project Professional to make an anticipated project schedule. Another leading indicator would be the identification of project deliverables that can be sped up. Using Earned Value Management, a future projection of the project would be possible.

Time spent with project stakeholders and especially the project owner would serve as another leading indicator.

Among high-risk businesses, the construction industry has one of the highest incidence rates. A safer construction site has lower risks and long-term expenses. If issues arise, they may cause our project to be delayed in both time and money. Aside from that, safety issues might result in increased insurance rates. As a result, knowing and understanding our safety rating is critical to lowering expenses and keeping your employees productive. So, the safety meetings will be a good leading indicator for our business.

Lagging Indicators

A lagging indicator monitors current output and results. The important lagging indicators for our business and this project in particular are:

How much money is being spent on each project deliverable will be a lagging indicator. The project team will use Microsoft Project Professional to make a project cost schedule. A baseline cost schedule will be made, and progress will be compared to this baseline to indicate if the project is on track or off track as per the monetary terms.

Another lagging indicator would be the project owner's satisfaction with each deliverable. Project team satisfaction would be measured through surveys and would be a good lagging indicator.

Accidents would serve as a lagging indicator.

Other lagging indicators are net profit and turnover.

In conjunction with leading indicators, lagging indicators are best utilized for determining trends and if targets have been attained. This may be made easier with the proper technological infrastructure that compares and provides insight into leading and trailing indicators.

5. Develop and prepare the project charter Model

This Project Charter describes the purpose, scope, objectives, estimated cost, milestones, duration, risk and constraints, approach and organization of house construction (s): (Norman E.S. and et al, 2008), (Jones, A., and et al, 2010), (Landis, T.,2008)).

5.1.General Project Information:

Table 1: General project information for the house construction project

Name of project	House Construction Project
Project Manager	XXXXX
Project Manager Address	ESU
Estimated Start date	July 1, 2022
Estimated Cost	SAR 900,000
Project Number	XXXX
Project Sponsor	Smart Company
Project manager phone No.	+966 5 XXX XXX XXX
Project manager Email	manager@smartcompany.com
Expected completion date	MMM DD YYYY
Expected saving	SAR XXX,XXX,XX

5.2.Project Description:

This project is being undertaken to create a new house for the customer and his family. The new house will be a free-standing, single-family dwelling built on a three-acre lot (lot #1) located at Olya, Riyadh.

The project is to commence on September 1, 2021, and will complete no later than September 30, 2024.

This home is being constructed to take benefit of the latest building materials and codes and will employ emerging technology to diminish energy consumption.

Construction will be overseen and managed by Smart Company, the prime contractor who may subcontract components of the construction effort.

5.3.Project Purpose:

The purpose of this project is to establish a new primary residence for the customer and his family. The project will carry out all phases from acquiring the land, getting permits and approvals for all essential documents, building the house, electrical, plumbing, finishing landscaping, internal designing, and decoration outside and inside on time and under budget constraints.

The new house is planned for completion on December 30, 2024; thus the customer will be ready to furnish it and move in during the first weeks of Jan 2024.

5.4.Project Objective:

Developing house building by using high technology to minimize energy consumption

5.5.Business Reasons for the Project:

1. Community service and environmental preservation.
2. Construction and maintenance of buildings.
3. Social services.
4. environmental protection.
5. local economic development.
6. public security.
7. Service of public decoration.

8. infrastructure and public services.

5.6. Project Scope:

The project scope includes a basement foundation, landscaping, entryway, two-story home with 4 bedrooms and an office area, 2-car garage, and deck/patio within the budget of SAR 900,000.

This is a Fixed-Price Contract Contractor commitment estimate is SAR 900,000.

5.7. Project Stages:

Table 2: Stages of the house construction project

Stage	Description
Initiation	Developed Project Charter
Planning	Get a land Obtain permits Arrange hydro, gas, water, etc. system
Design	Architectural sketches (exterior and interior) complete and approved. Completion of excavation Landscaping Utilities
Execution	Construction Exterior Construction Foundation Timber frame Walls Roofs Driveway & Landscaping Doors & Windows Roofs Interior Construction Plumbing Wiring system Interior decorating
Control	
Closure	Completed

5.8.Milestone Dates:

The construction of the house should be completed before the deadline of September 30, 2024. Progress milestones associated with the project are illustrated in Table 3.

Table 3: Milestones of the house construction project

Milestones	Due	Deadline
Architectural drawings complete and approved		
2. Building permit approved		
3. Lot preparation and clearing complete		
4. Foundation excavation complete		
5. Footings poured and set		
6. Foundation poured, block construction complete, foundation set		
7. Home and garage exterior closed to weather		
8. Driveway and landscape complete		
9. Interior wiring complete		
10. Exterior wiring complete		
12. Interior plumbing complete		
13. Exterior plumbing complete		
14. Interior finish complete		
15. Exterior finish complete		
16. Walkthrough complete		
17. Certificate of Occupancy granted		
18. Interior and exterior punch list approved		
19. Interior and exterior punch list complete		
20. Acceptance review and key turnover complete		

5.9.Project Deliverables:

Projects deliverables, which are the output or results of the project or the processes in the house construction, are illustrated in table 4.

Table 4: Deliverables of the house construction project

No.	Name	Key performance indicators (KPI)
	The target deliverable is completed construction house on time	50% of the building should be completed within six months 100% of construction should be finished before August 2023
1	Prepare project plan	First week
2	Building permits	Second week
3	Site plan	Third week
4	Design drawings	By end of the first month
5	Design documents	Every month
6	The engineering reports	Every three months
7	Product quality enhancement	90% compliance with standard
8	Construction	10% finished by the end of the first second month 30% finished by the end of the third month 50% of the building should be completed within six months 70% of construction should be completed by the end of the third quarter The building should be completed 100% at the 18 th month.
9	Plumbing	70% completed by the third quarter of the year
10	Electrical	70% completed by the third quarter of the year
11	Technology	90% after 10 months
12	Landscape	50% at the beginning second quarter of the year
13	A completed house	End of the year

5.10. Communication Management:

Communication strategies have been implemented to encourage the effective communication.

The project Manager will present project status on a biweekly basis.

The stakeholders will be notified via e-mail or telephone of all urgent issues.

5.11. Resource Management:

The Prime Contractor will yield a Resource Management Plan that will document the following:

5.11.1. All materials and services to be delivered as part of the project along with cost estimates and quality information

5.11.2. Materials and services will be attained from sources outside the Prime Contractor's organization.

5.12. Stakeholders:

A stakeholder is defined as an "individual or group that has an interest in any decision or activity of the project. Table 5, presents the stakeholders who affect or are affected by our project.

Table 5: Stakeholder Identification

	Name	Contact information
Internal stakeholders		
Project manager	-	0966554120000 / xxx@gmail.com
Finance manager	-	0966554120000 / xxx@gmail.com
Human resource manager	-	0966554120000 / xxx@gmail.com
QI manager	-	0966554120000 / xxx@gmail.com
facilities manager	-	0966554120000 / xxx@gmail.com
Teamwork:	-	
Designers (Architects)	-	0966554120000 / xxx@gmail.com
Structural Engineer	-	0966554120000 / xxx@gmail.com
Engineer 1	-	0966554120000 / xxx@gmail.com

Engineer 2	-	0966554120000 / xxx@gmail.com
External stakeholders:		
Contractors		0966554120000 / xxx@gmail.com
Vendors	-	0966554120000 / xxx@gmail.com
Client		
Subcontractors	-	0966554120000 / xxx@gmail.com
Utilities	-	0966554120000 / xxx@gmail.com
Government Authorities	-	0966554120000 / xxx@gmail.com
Suppliers	-	0966554120000 / xxx@gmail.com
Consultants	-	0966554120000 / xxx@gmail.com

5.13. Project Organization:

Project organizational structures are defined as an organizational form, based on temporary teams that are created to perform particular tasks and disappear after achieving the established goals, (San Cristóbal, J.R. and Fernández, E., 2018)

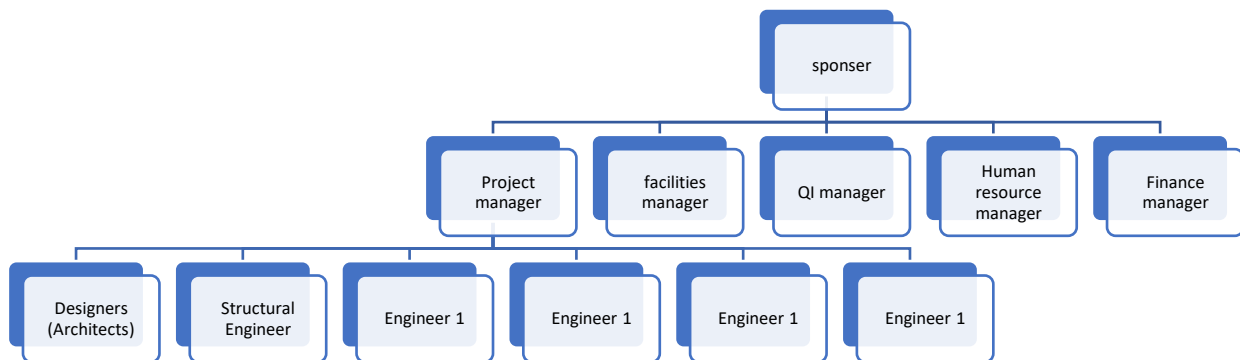


Figure1: Organization structures chart

5.14. Constrains:

Project constraints are limiting factors. for that, it can disturb quality, delivery, and overall project success. Table 6 shows the house construction constraints.

Table 6: Project constraints

Constraints	Remark
Scope	85- 90% of a house must be done before April 2024 and 100% of completion before the sign-off date by March 30, 2023.
Time	completion: within one year before July 30, 2023.
Cost	Only SAR 900,000 maximum budget
Resource	availability is based on the working
Schedule	Sunday – Thursday: 8.30am – 5pm Saturday: (if necessary) 10am – 4pm
Weather	Exterior construction depends on whether condition (Temp > 45)

5.15. Risks:

Project risks are uncertain factors, either internal or external to a project, that, if it occurs, may cause the project to fail to meet one or more of its objectives, Table 7 shows the suspected risks

Table 7: Project risks

Description	Probability	Impact	Mitigation Strategies
Time overruns: The team may be not meet deadlines due to added specification features and new technology.	Low	High	
budget: The team may be run out of budget due to unexpected increases in material costs	Low	High	
loss of important suppliers	Low	High	Assurance
damage by fire, flood, or other natural disasters	Low	High	Assurance
injuries to workers	Medium	High	Assurance

5.16. Project Approach:

Prime contract's responsibilities are as followed:

1. Keep track of all project documents and schedule
2. Take duty for all subcontract oversight, deliverables, and management. Agrees for the fixed-price contact and schedules.
3. Perform responsibility of completing tasks with contractor's employees, verifying all subcontractor and own employees.
4. Hold a meeting in order to solve problems as well as tracking the progress by daily or weekly or monthly.

5.17. Project Schedule:

Review part of purpose and project approach. The prime contractor will provide a detailed schedule prior to the start of the project.

5.18. Requirement for Approval:

Any modifications to the scope of the project must be approved by the sponsor/owner of the project. The home must be certified ENERGY STAR by the independent ENERGY STAR partner. This agreement recognizes the evaluation of the project charter and authorizes and finances the project. In case of any modifications, the signatories will continue to approve this proposed charter.

Project Sponsor:	_____	_____
	<Name, Title>	<Date>
Project Stakeholders:	_____	_____
	<Name, Title>	<Date>
Project Manager:	_____	_____
	<Name, Title>	<Date>
Document prepared by:	_____	_____
	<Name, Title>	<Date>
Document date:	_____	
	<Date>	
Approver(s)	_____	_____
	<Name, Title>	<Date>
	_____	_____
	<Name, Title>	<Date>
	_____	_____
	<Name, Title>	<Date>

6. Develop an organizational structure for the teams and units of the project.

A company's organizational structure is a visual diagram that outlines what people perform, who they report to, and how decisions are made within the firm. In business, the types of organizational structures are equally as significant as the company's goods, marketing approach, and long-term strategy. Businesses often select one of four organizational structures. Each comes with its own set of benefits and drawbacks (Devaney, 2021).

The organizational structure for our project is shown below. The project is led by Mohammed Alsati who acts as a project manager and represents our company. The project team is divided into 5 offices. Each office has a manager or supervisor who is responsible for all the activities relevant to that office. The first office on our project is led by Chief Architect. Structural engineer, safety officer, quantity surveyor, and draftsmen report to the Chief Architect. Sustainability Expert oversees Quality Control Engineer. One of the main offices in this project is the office of the Construction Manager. The construction manager oversees the activities of a civil engineer, electrical engineer, mechanical engineer, local authority, logistics, and sub-contractors manager. The Planning Engineer oversees all project planning, scheduling, and budgeting activities. The last office in our project is the administration office. It includes accounting, payroll, and HR.

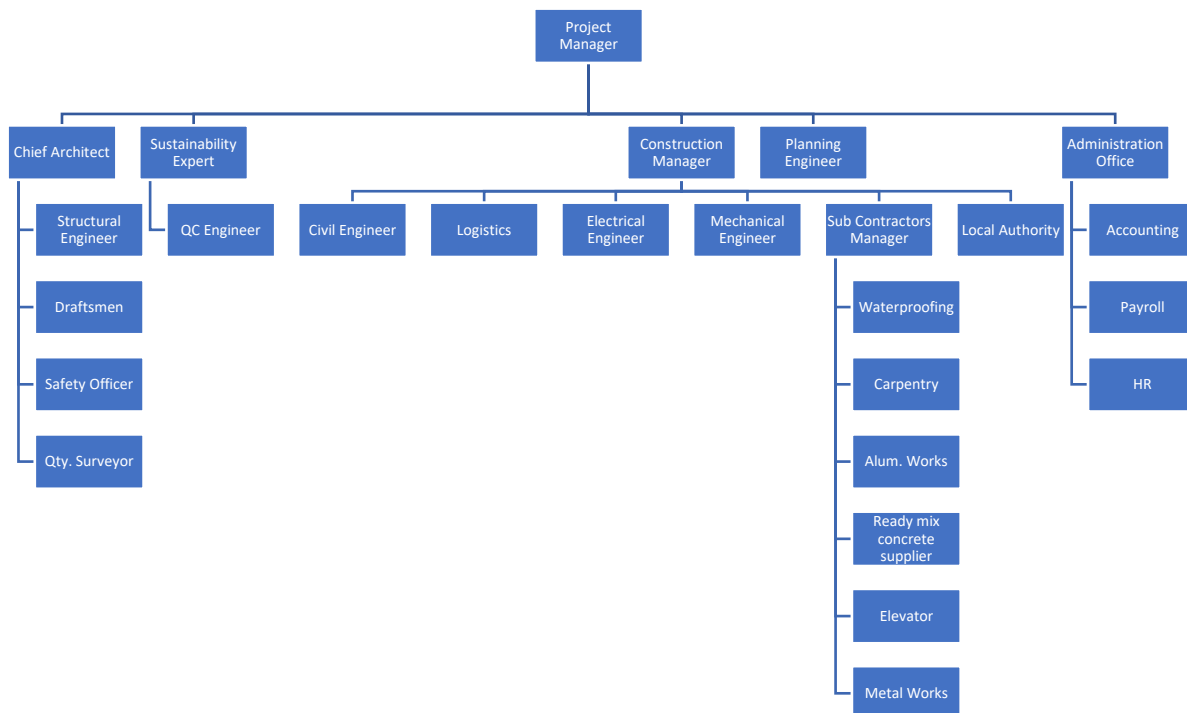


Figure 2: Organizational Chart

7. Identify the practical and scientific bases, which adopted in developing the structure.

Choosing the proper one for your company is critical since inadequate organizational structure leads to employee confusion, bad decision-making among management, and, eventually, only little business results. The most conventional method is a functional structure. It advocates grouping together employees who perform similar jobs depending on their area of expertise. People in a divisional structure are grouped together based on the product or service they deliver, rather than the labor they undertake. A matrix structure is a cross between a functional and a divisional structure. Employees may report to various managers based on their present position. The flat structure eliminates the traditional functional organization's hierarchy, decentralizing management and eliminating the necessity for middle manager supervisors (Devaney, 2021).

Our project has a limited duration, its organization differs from that of an operational corporation. Employees on the project team are drawn from a company's regular labor

force and will return after the project is completed. Salaries, benefits, and disciplinary issues are handled by the corporate structure, whereas work-related choices are handled by the project organizational structure, which is comprised of functional units and work teams that report to the project manager.

Hierarchical system:

Our project's management activities are structured in a hierarchical framework to promote operational efficiency. A hierarchical structure allows the project manager complete control over schedule and pricing details for low-risk projects like this one. An organization in which everyone reports to the project manager through their own intermediate supervisors is efficient and has clear lines of command. The hierarchical organization is very successful for small projects since it has a basic structure and distinct duties for each person. Its biggest downside is its rigidity, which limits its utility for projects requiring fast choices at the work level.

Reason:

Members of functional departments may be used to a single reporting line in a hierarchical system in a matrix structure, but the project manager supervises the work of team members chosen from functional departments. Within the matrix organization, the functional structure is in charge of project implementation prioritization, coordination, and final decisions. As a result, there may be tensions between functional divisions and project teams (Cheng, et.al, 2003). The project manager must be given the power and duty to handle diverse issues so that the defined project policy and quality requirements are not threatened

8. Identify projects office model, most appropriate to manage the project, in addition to mentioning the reason

Types of project management offices according to the standards of the PMI

There are several types of project management offices that vary in the degree of control and influence over projects in the organization, and their role varies from providing project support to direct management of the projects themselves. Choosing the most appropriate one for your organization depends on its size, nature of business, and the existing culture.

8.1.Types of Project Management Offices (PMOs):

There are several classifications of project management offices (PMOs), and in these lines, there are three well-known types that researchers and project experts have agreed upon and dealt with in much detail:

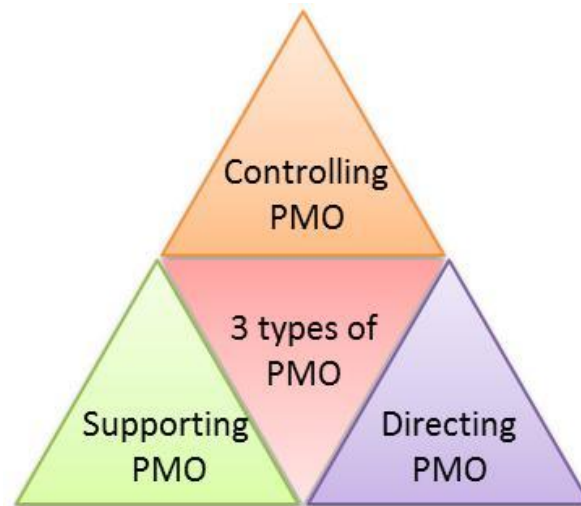


Figure 3: types of PMO

8.1.1. Supportive PMO (low control):

This type of office provides support in the form of on-demand advice and provides forms, information, technical support, and training to the project team without imposing control or control over the projects and their activities.

This type of office is suitable for organizations that are successful in most of their projects and just need something like an information center. This type is characterized by a low level of control and control over projects and their teams, in addition to the presence of unified standards that are followed in all projects.

8.1.2. Controlling PMO (moderate control):

This type of office provides a unified framework for the organization, which necessitates modification and modification in the methodologies used as well as the forms and applications. It imposes a medium level of control and control over projects and their activities.

This model is used in organizations that wish to have control over activities, processes, and procedures.

8.1.3. (Directive PMO):

This type is characterized by a great level of control over the projects, and even managing them completely with the provision of the necessary support and resources. As soon as the institution contracts on the project, the office identifies managers for it. This type is also characterized by providing high professionalism in project management, as each manager writes periodic reports for the office, which ensures a very high level of consistency in work at the level of all projects. This type is very suitable for large organizations that need technical support in many and varied places.

Other classifications of project management office types:

8.2.PMI classifies Project Management Offices (PMOs) into 5 types:

1. Departmental: It supports specific business units or departments.
2. Project-specific: It oversees the success of a specific project.
3. Strategic: He oversees a major organizational change process.
4. Project-support: Handles administrative tasks to expedite project completion.
5. Center of Excellence: It is concerned with training and development for project managers.

8.3.Project Management Offices (PMOs) from an institutional Point of view:

From an **institutional point of view**, Project Management Offices (PMOs) can be classified into one of the following types:

1. Enterprise Project Management Office (PMO).
2. Section Project Management Office (PMO).
3. Private Project Management Office (PMO).

8.4.House Construction Projects:

The most appropriate office for him is the Office of Special Projects Management, specifically for specific projects, and it oversees the success of a specific project.

9. Design a check compliance model before delivering the project outputs.

Companies create process models to explain their business activities precisely. At the same time, company activities and business processes must meet several kinds of conformity standards. Compliance requirements are not static and change over time. Because legislation changes and new policies are adopted, new obligations may arise (Nguyen, T. H., & Kim, J. L., 2011). Various entities that have different purposes behind these criteria offer or apply compliance requirements. Finally, conformity standards may influence many elements of business operations, such as the flow of control and data flow. It is therefore impossible to examine tools for hard-code compliance. Instead, a repeatable procedure is necessary to model compliance standards and validate them automatically for business operations. A compliance framework/model is a systematic collection of Guidelines for aggregating, coordinating, and integrating all of the organizational compliance needs.

It is essential to have an effective compliance testing program to manage the compliance risks of our organization and to ensure that our compliance management systems are in good health (Awad, A, 2010). We need to recall that we test a rule against, a regulation or a law, or a statute, meaning that all finding is a breach of law or a statute. To mitigate the compliance risk faced by our company, it is important to identify violations of requirements (e.g., regulatory or internal policy) and to quickly remedy the fundamental cause.

Our company has outlined these steps for Effective Compliance Testing Process:

1. Build the Requirements Library
2. Perform the Compliance Risk Assessment
3. Develop the Compliance Testing Methodology
4. Build the Testing Schedule
5. Perform Testing
6. Issues Management Process
7. Validate Remediation
8. Monitor Sustainability

Building industry standards and guidelines are used to harmonize and ensure the technological requirements for structural stability, dependability, material quality, and,

at least, the safety of the user. Therefore, throughout the implementation of a building project, the compliance check of the design plan concerning the rules and regulations is an essential procedure. The planning consultant, from which a very high degree of knowledge, experience, and attention is required appropriately, has to consider several rules and laws because of its many disciplines and subject areas in the construction business.

One of the most significant concerns in the planning of a building project is continuous high-quality design planning. Thus, the correctness and compliance with the appropriate regulations and guidelines must be continually verified over the length of the project. This verification procedure nowadays is tedious, and fault-prone, since the responsible planning consultant generally performs iterating on a manual basis based on two-dimensional planning. Several techniques recently tried, using digital technologies like Building Information Modeling (Preidel and Borrmann, 2015), to automate this very significant procedure in order to minimize working hours while simultaneously increasing the quality of the schedule.

The continuous development of new technologies in recent years has transformed the construction business, which has started with the technique of information building modeling, in particular (BIM) (Awad, A, 2010). New practices and fields of research developed with a number of new techniques to make building processes more efficient by the use of new digital technologies and the quick cross-linking of increasingly powerful computers. The construction sector has therefore obtained the required resources in terms of effort, time, and costs to automate and optimize control processes. All information is saved during the BIM planning phase in a single digital building model, which offers all the up-to-date information for all project participants throughout the whole building life cycle.

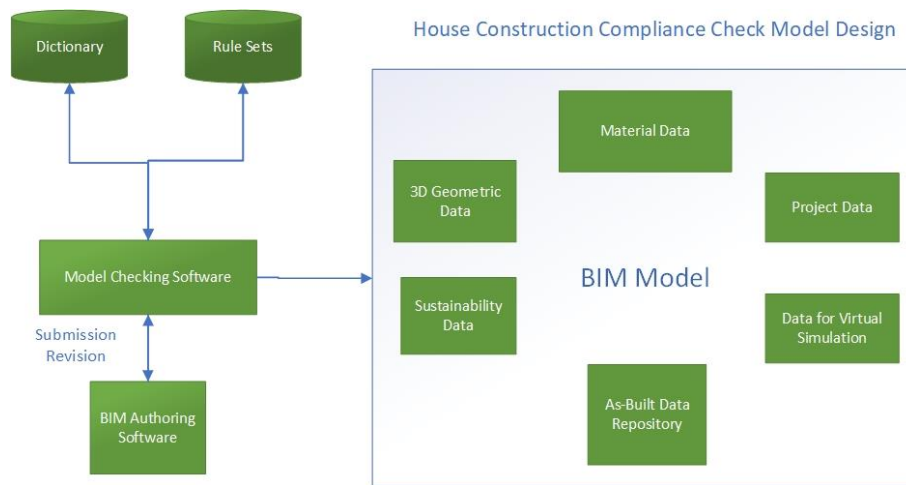


Figure 4: House construction compliance check model design

Our company's compliance check model based on BIM is outlined in the figure above. Dictionary contains a set of existing compliance requirements in the construction industry. It is a database that would be updated when new compliance requirements arise. The Rule Sets contains rules for updating the data in the Dictionary. Model Checking Software will read rules from Rule Sets and submit them to BIM Authoring Software. The approved rules will be then updated in the Dictionary as well as forwarded to the BIM Model where this data will be saved in one of the six categories in the BIM Model. BIM consists of six databases and each of them stores different types of data. The BIM Model will contain material data, 3D geometric data, sustainability data, project data, data for virtual simulation, and as-built repository data. The project data will contain information about the project stakeholders, communication channels and frequency of information, names of vendors and suppliers, operational and financial data. The sustainability data will consist of sustainable development practices, a list of green technologies, and the energy-efficient mechanisms for reducing the carbon footprint of the project and making the building energy efficient. This data will be really helpful in getting the Energy Star Rating for this building. The As-Built Repository data will collect data directly from the supply chain when the products like doors, windows, and the other pre-built products are purchased, this data will be compared against building design requirements set by the architects. In this way, we will be able to check if an installed door meets the design requirements. BIM Model will be able to auto-generate 3D drawings for the building, provide a virtual simulation of the final product, provide a list of materials that have been consumed and left after project completion, provide a sustainability checklist for the project, and

provide in-depth details of the project. This BIM model will also contain data of similar projects in the past and therefore provide us with a mechanism of comparing two or more similar projects. It will contain inputs from the project owner for this particular project and provide a means to compare owner expectations against the generated output. The final output in this project is a house building, the requirements for which are already provided in the project charter. Those requirements are listed again for reference:

1. Landscaping.
2. Basement.
3. Driveway – concrete with a brick.
4. Utilities (hydro, gas, water, etc.).
5. 3 floors – 4800 square feet.
6. Two-car Garage – 1500 square feet.
7. Deck / Patio.

The BIM Compliance Check Model has this information and the other specific requirements i.e., the color of the building, door types and dimensions, vendors information, and the quality of materials all stored in the appropriate databases. The BIM model will provide a means to compare project outputs with these requirements.

Automated compliance control of building designs with the use of model checking software is a feasible possibility with the development of Building Information Modeling (BIM). BIMs will likely become essential digital assets in the near future, which will not only communicate with design but will also be key tools for getting permission from statutory authorities. The manual control of building designs to comply with national regulations is complicated and susceptible to human mistakes with substantial economic effects. Auto mechanized conformity checks are said to be useful not just to designers but also to building certifiers, consultants, building code authorities, design authors, and constructors.

9.1.Project Compliance Checklist:

The project Compliance review process is illustrated in table 8.

Table 8: Project Compliance Checklist

House Construction Project			
Parameters	Indicators	Compliance	Remarks
- Project Performance	Cost performance		
	Schedule performance		
	Quality performance		
	Safety performance		
	Reworks		
	Change Orders		
- Customer Satisfaction	Customer expectations met		
	Customer satisfied with the quality		
	Schedule satisfaction		
- Project Success	Timely completion		
	Completed within budget		
	Meets quality requirements		
	Meets design requirements		
	Satisfaction of all involved stakeholders		

10. Develop Check List model for the three stages of the project (Start- Plan- Achieve- Close)

Checklist Model for the Project Stages:

Table 9: Checklist Model for the Project Stages

Checklist Name	Description	Status
Project Initiation Checklist	Is the scope of the project clear?	Closed
	Is the project funding approved?	Closed
	Have all the stakeholders been identified?	Under Review
	Has a sponsor been identified?	Closed
	Does the project contain 3rd Party or external resources?	Open
	Have you confirmed in writing the project delivery expectations (time and scope) with all the stakeholders?	Open
	Have all the project benefits been captured and are reasonable?	Open
	Are you aware of the process of getting the project approved?	Open
	Do the business case cover assumptions, dependencies, and constraints?	Open
	Do you need a risk assessment to be conducted?	Open
	Will the project costs be capitalized?	Open
	Do you have a high-level effort estimate for the project?	Open
	Are you supposed to use a standard template for the initiation document?	Open
	Has the project team been established or resources available to start the project?	Open
	Does the project need an approved business case to start work?	Open
	Have you organized a project kick-off meeting?	Open
	Does the project team need any training?	Open

Project Planning Checklist	Are you comfortable with the skill level of the project team?	Open
	Do you need a project management plan?	Open
	Do you have enough contingency or buffer in the budget and schedule?	Open
	Is there a vendor contract involved in the project?	Open
	Have all the project components been estimated?	Open
	Do you have a detailed project schedule drafted?	Open
	Do you need a work breakdown structure?	Open
	Have you created a baseline for the project plan?	Open
	Is the project team comfortable with the project schedule?	Open
	Do you have clearly defined the milestones for the project?	Open
	How do you plan to track project progress?	Open
	Have the team left plans and public holidays been factored into the project plan?	Open
	Do you have a resource plan for the duration of the project?	Open
	Do you need to hire additional resources for the project? If yes, has the hiring process been kicked off?	Open
	Have you factored in the resourcing costs in the plan?	Open
	Are you aware of the SMEs required for the project?	Open
	Is your project schedule detailed enough for the project team to understand the tasks?	Open
	Is there a quality assurance plan for the project?	Open
Project Execution Phase Checklist	Has the project scope been finalized by the stakeholders?	Open
	Have the business requirements been finalized and signed off?	Open
	Is there a peer/code review practice in place?	Open
	Is the team aware of the project deliverables?	Open
	Have all the hardware and infrastructure requirements been finalized and addressed?	Open
	Does the project team need to be co-located?	Open

	Is everyone in the team aware of roles and responsibilities for everyone, including themselves?	Open
	Is the team aware of the benefits and business value of the project?	Open
	Is everyone in the team fully allocated to the project?	Open
	Is the project team comfortable with the requirements and their details?	Open
	Have you planned the resources required for the implementation?	Open
	Is everyone in the project team aware of the project deadlines?	Open
	Does the project team need to be co-located?	Open
	Is everyone aware of the defect management process?	Open
	Are you aware of the impact of systems shut down for implementation?	Open
	Do you need an implementation manager for the project?	Open
	Is there a way of checking the systems are production deployment and before the business starts?	Open
	Do you have a commitment from a business for testing resources?	Open
	Do you have a plan to update the system documentation after the project is complete?	Open
	Do you have a list of housekeeping tasks for the project?	Open
	Will the system need a User Manual?	Open
	Do you have a list of critical tasks?	Open
	Will there be a need for environment setup required?	Open
	Does everyone in the project team have the required hardware and software?	Open
Project Control Checklist	Is there a mechanism to track scope creeps and change requests?	Open
	Have you created a project change management plan?	Open
	Do you have a change request log and change request template?	Open
	Do you have a communication plan?	Open

	Is there a set of standard templates for project artifacts available?	Open
	How often do you review your project budget?	Open
	Do you need daily scrum meetings?	Open
	Do you have a detailed project schedule where the largest task is less than 5 days?	Open
	Do you have a defect management process in place?	Open
	What is the frequency of status reporting?	Open
	Do you have a project status report for weekly and/or monthly reporting?	Open
	Do you plan to conduct a monthly project team meeting?	Open
	Will the project need a project control members group?	Open
	Do you need to set up regular meetings with sponsors or the project committee?	Open
	Do you need all the resources on the project till the end?	Open
	Do you have a mechanism to manage the defect count in the project?	Open
	How will you track resource utilization in the project?	Open
	How do you plan to manage ongoing leave management for the team?	Open
	Was a risk assessment conducted for the project?	Open
	Is there a repetitive process to review the project risks?	Open
	How will everyone be aware of the project risks and issues?	Open
	Have you created a project risk and issue register?	Open
	What is your stakeholder management plan?	Open
	Will you be using a project management tool for tracking?	Open
	How are you tracking the project dependencies?	Open
	How are you tracking the project action items?	Open
	Do you have the required tools to capture timesheets?	Open
	How do you plan to manage project issues?	Open

	Do you know who should be getting the project status report?	Open
Project Closure Checklist	Was an implementation review conducted?	Open
	Are all the project benefits still on track?	Open
	Will there be a closure document?	Open
	Have all the stakeholders authorized the project closure?	Open
	Are there any pending or open issues because of the project?	Open
	Do you have a list of lessons learned?	Open
	Have adequate arrangements been made for the handover of the new or updated systems/processes?	Open
	Has the project budget been finalized?	Open
	Are all the project resources released?	Open
	Have all the post-project activities been completed?	Open
	Handover is complete for all deliverables?	Open
	All deliverables are accepted and signed off by the client?	Open
	Final project status reports are complete?	Open
	All financial processes and reports are complete?	Open
	Project review is done?	Open
	Staff performance evaluations and reports completed?	Open
	Staff employment on project terminated (no more work is done on the project)?	Open
	All supply contracts and processes are terminated?	Open
	Site operations and facilities used for the project closed down?	Open
	Disposal of all equipment and materials is done?	Open
	Communication: Announcement of completion of a project (internal, external, and public relations contacts)?	Open
	Completion of storage for all the project files?	Open

11. Develop a stakeholder register and form groups for them. (Competency 8)

To identify and develop a stakeholder register and form them into groups, first of all, we need to classify the stakeholders according to the following classification:

11.1. Stakeholders Classification:

11.1.1. Internal stakeholders

Direct stakeholders are those directly associated or involved in the project. These include:

1. Client
2. Project sponsor
3. Project manager
4. Members of the project team
5. Technical and financial services providers
6. Internal or external consultants
7. Material and equipment suppliers
8. Site personnel
9. Contractors
10. Subcontractors
11. End users

They are also known as Direct stakeholders.

11.1.2. External stakeholders

Indirect stakeholders are those indirectly associated with the project, such as:

1. Support staff not directly involved in the project
2. National and local government.
3. Public utilities.
4. Licensing and inspecting organizations.
5. Technical institutions.
6. Professional bodies and personal interest groups such as stockholders, labor unions, and pressure groups.

They are also known as Indirect stakeholders.

Reference:

<https://www.designingbuildings.co.uk/>

11.2. Stakeholders Mapping or Stakeholders Matrix:

Stakeholder mapping is a systematic approach to managing relationships with stakeholders to ensure that the positive impacts of stakeholders are maximized, and negative impacts are minimized, Table 10 shows a matrix identifying key stakeholders and their levels of importance or influence

Table 10: matrix key stakeholders and their levels of importance or influence

	Stakeholder Information					Evaluation				Stakeholder classification	
	Name	Position	Location	Role in the Project	Contact Information	Major Requirement	Expectations	potential influences	phases of the project in which stakeholders have the most interest	internal or external	Supporter of the project or resistant
1	Client									internal	
2	Project sponsor									internal	
3	Project manager									internal	
4	Members of the project team									internal	
5	Technical and financial services providers									internal	

6	Internal or external consultants									internal	
7	Material and equipment suppliers									internal	
8	Site personnel									internal	
9	Contractors									internal	
10	Subcontractors									internal	
11	End users									internal	
12	Support staff not directly involved in the project									External	
13	National and local government.									External	

1 4	Public utilitie s.									External	
1 5	Licens ing and inspect ing organi zations .									External	
1 6	Techni cal institut ions.									External	
1 7	Profes sional bodies and person al interes t groups such as stockh olders, labor unions, and pressur e groups .									External	

12. Develop the two networks: (Strength/Interest) and (Influence/ Strength)

12.1. Definition of the power-interest grid:

A power-interest grid is a technique used to categorize stakeholders based on their power or influence and interest in a project. Before using the technique, you should identify all stakeholders involved in the project. You can identify stakeholders by looking at existing documentation, holding workshops, creating ‘as is’ business process maps and generally talking to people within the business.

12.2. Reason for using power-interest grid:

Categorizing stakeholders in this way can allow you to develop strategies to manage all stakeholders effectively. You may use your categorization to create a stakeholder communication plan. Stakeholders with high power and high interest will want to be engaged with regularly, whereas stakeholders with low power and low interest do not require regular and detailed communication (however, this does not necessarily mean that they should be ignored!).

12.3. Way to use the power-interest grid:

You should create a grid or use a template. It is important to place the stakeholder where they actually are and not where they (or you) would like them to be. Once you have placed the stakeholder within the grid, you can look at which category they fall under and manage the stakeholder accordingly.

The complexity of the project will determine the detail to which you fill in the grid. For example, you might want to use more than the four positions shown below. For many projects, however, it is sufficient to consider the four categories below: Keep Informed, Maintain Interest, Actively Consult and Regularly Engage.

12.4. The Power/Interest Grid:

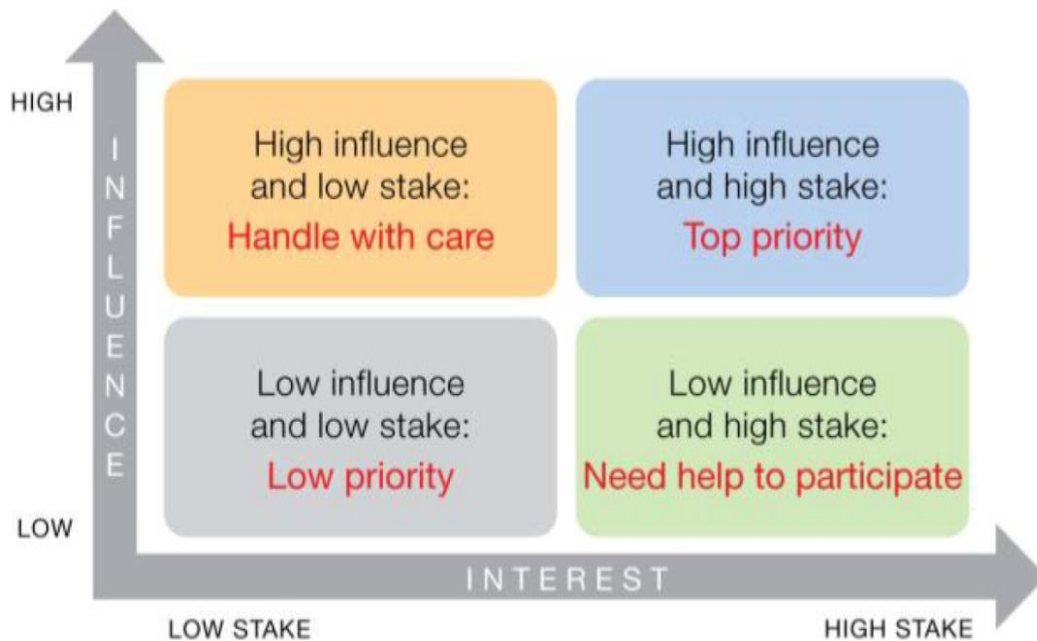


Figure 5: The Power/Interest Grid

The power/interest grid has an x-axis for interest and a y-axis for power. The grid is split into four quadrants, the bottom left is to keep informed; the top left is to actively consult; the top right is actively engaging, and the bottom right is to maintain interest.

12.5. Difference between Power and Influence:

Power is the capacity to get others to act based on the positional authority that is exercised over others; often leading to resentment.

Influence is the ability to modify how a person develops, behaves, or thinks based on relationships and persuasion; often leading to respect.

12.6. Various Sources of power:

12.6.1. Legitimate: The ability to request certain behaviors of others based on title, roles, or position (elected/ appointed)

12.6.2. Reward: The ability to control the allocation of rewards valued by others and to remove negative sanctions

12.6.3. Coercive: Ability to apply punishment (i.e., peer pressure) or take away items of value

12.6.4. Expert: The ability to influence others based on the possession of valuable knowledge or skills

12.6.5. Referent: The ability to influence others because the leader is admired and respected

12.6.6. Information: The ability to influence based on access to and control over the distribution of information

12.6.7. Ecological: The ability to influence how tasks are organized or the ability to alter the team's physical environment

12.7. Various Methods of Influence:

12.7.1. Least Effective:

1. **Exchange offer:** give something of value in exchange for something you want.
2. **Ingratiation:** get others to like (by flattery, agreement, helping) you so they comply with your requests
Personal appeal: use relationships, common ground, and rapport to get something that you want.
3. **Coercion/Pressure:** use force (persistence or threats) to get someone to act.
4. **Coalition:** build an alliance of supporters to get others to act.
5. **Power/Authority:** use positional power or formal authority to get things done.

12.7.2. Most Effective:

1. **Persuasion (rational/logical):** present facts or lay out an argument emphasizing positive benefits related to a course of action.
2. **Inspiration:** link desired outcome to shared team values or ideals and model behavior to set an example for others.
3. **Consultation:** seek advice/input from others to encourage them to become more involved, committed, and motivated to take action.

4. **Collaboration:** offer support/ assistance or provide resources to gain commitment for completion of the desired task.

13. Logical diagrams for the register of the stakeholder.

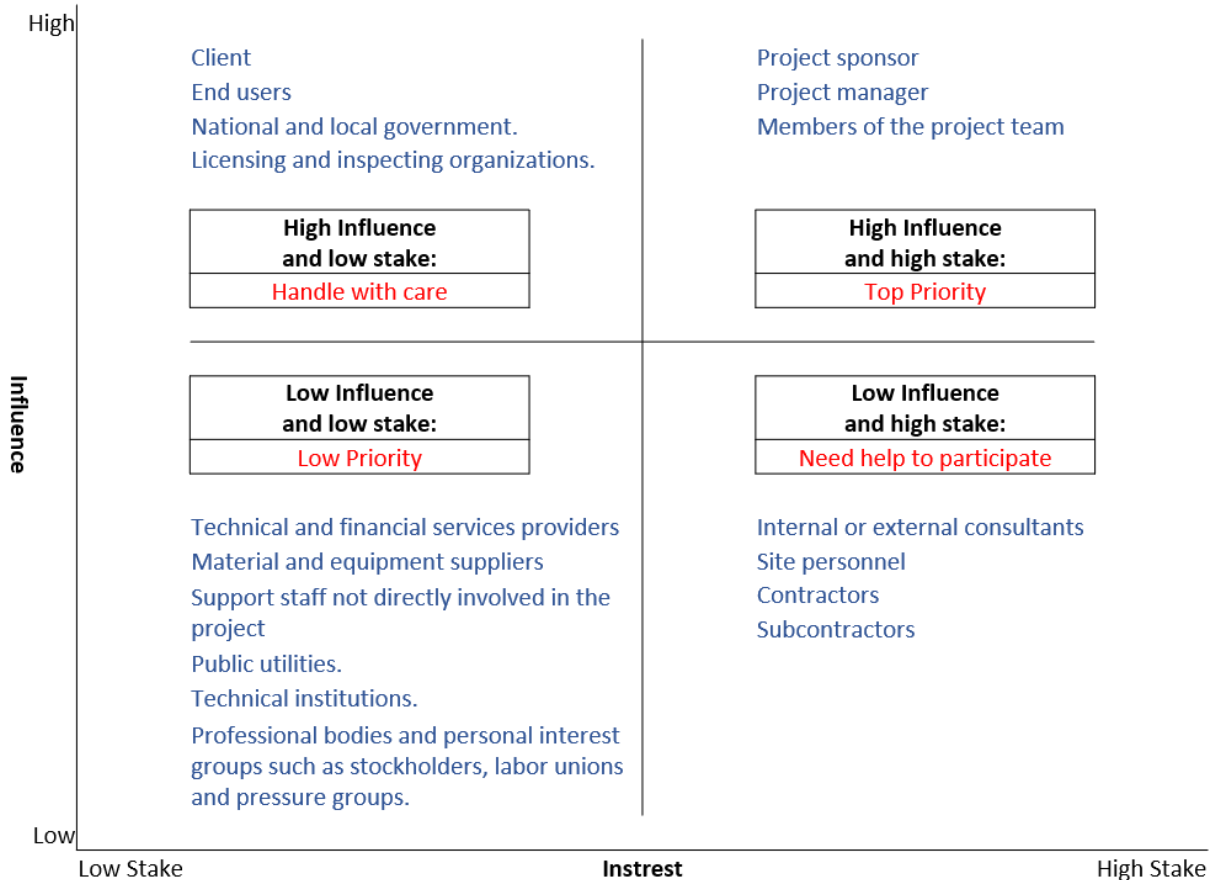


Figure 6: Logical diagrams for the register of the stakeholder

14. Identify the culture of the organization

14.1. Definition of the term organization culture:

The culture of the organization, known in English as (Culture Organization):
A set of rules that affect the behavior of individuals within a common work environment.

Also, can be defined as:

The moral values that characterize individuals who work together, and are keen to implement a specific system in organizing their work within the work environment, which helps them achieve the desired goals and be able to develop a set of proposed solutions in the event they encounter problems while achieving the required goals, (San Cristóbal R., Fernández, V., Diaz, E., 2018).

14.2. Characteristics of organizational culture:

Organizational culture is characterized by several characteristics, including:

14.3.1. It contains a set of elements that interact together in order to build a specific culture that is applied within the organization's environment, and this culture includes all means that help in promoting communication between individuals.

14.3.2. It is one of the means that help the administrative system in the institution; It promotes the idea of distributing experiences among individuals in an organized manner, which contributes to correctly maintaining the implementation of work.

14.3.3. Continuity in the application of work, as it does not stop at the end of the official working day but continues to affect all internal and external components of the facility permanently.

14.3.4. Subject to development and change by adapting to modern developments, which contribute to providing many means that help in the growth of work, and the successful application of the concept of organizational culture.

14.3.5. The ability to adapt to all the requirements of the work environment, which leads to reaching many results that are compatible with the nature of individuals and colleagues in the common work environment.

14.3. Importance of Organization Culture:

Organizational culture is important in many practical and professional fields in various work sectors, and this importance is summarized according to the following points:

- 14.4.1.** It is a clear and comprehensive guide for managers and employees, helping them to formulate a set of ideas that are commensurate with the nature of work in the institution.
- 14.4.2.** It helps in organizing the rules of behavioral dealings between employees within the same work environment, especially as it depends on the idea of applying cooperation between all colleagues at work.
- 14.4.3.** It is considered one of the tools for making administrative decisions in institutions.
- 14.4.4.** It is considered one of the factors that help in attracting qualified employees to work in the organization.

14.4. Types of Organization Culture:

There are many types of organizational cultures, including the following:

- 14.5.1** Mission culture: It depends on the distribution of tasks to employees at work.
- 14.5.2** Role culture: It is the culture that is concerned with following up the role of each department of the establishment, determining the nature of its impact on the work, and studying the extent of its effectiveness in performing its role in accordance with the rules and functional texts related to the culture of the organization.
- 14.5.3** Operations culture: It is the culture related to the nature of the means, tools, and work methods used in the implementation of operations. This culture is not concerned with the nature of the results that have been reached, but rather with the efficiency of the methods used to reach the results.

15. Proposals of the organization values that can be adopted.

organizational values reflect the mission and strategic goals of the organization. Organizations can be successful when organizational goals are aligned with organizational values and those are aligned with the personal values of people who are in this same organization (Musek, I. 2006).

15.1. Proposal of an organizational culture model for innovation:

Organizational culture is important for innovation since the capacity to innovate demands a taste for risk and willingness to carry out entrepreneurship, which becomes stronger by an appropriate climate and environment that motivates individuals to create and develop new ideas. As our's is a company within the Engineering sector, the organizational culture model for innovation is proposed. In this project, our vision is to make the building more energy-efficient as compared to the other similar buildings in the country and to obtain an Energy Star rating. The work's objective meant to design the proposal of organizational culture for innovation model that favors adopting innovation for the development of house construction and its introduction and exploitation to all cities of Saudi Arabia.

The component of organizational culture for innovation:

1. Strategy:

- The innovation lies within corporate philosophy and policies, which are clearly identified by all its members.
- The mission and vision show that innovation contributes to objective achievement.
- An approved and known innovation policy exists.
- Innovation included in strategic planning.
- Innovation indicators exist.
- The strategy rapidly adjusts to respond to changes.
- Strategic planning includes the clients' view.

2. Orientation toward the organization:

- The company plans its strategy based on a deep understanding of its customers from interacting with them, their environment, and reality
- The strategy adjusts reactively.
- The strategy involves the necessities of clients and external customers.

3. Organizational structure:

- Areas, procedures, functions, and responsibilities are clearly defined in order to enable innovation management.
- The company counts facilities and aids for innovation.
- An area leading innovation processes exists.
- Work teams are cooperative and autonomous
- Ideas may be easily manifested in hierarchies
- The members of the organization are aware of the activities performed by others
- Decisions are made participatively
- Work teams are heterogeneous

4. Communication and collaboration:

- Continuous usage of tools and channels to communicate the philosophy of innovation to the company
- There's open communication among areas
- There are external collaboration networks
- Results are communicated whether successful or failure
- Areas support each other without a formal order

5. Leadership:

- Creates an organizational environment and climate where collaborators apply innovative thinking to solve problems and constantly generate new ideas
- Leaders promote dialog and motivate the search for improvement
- The company's leaders are clearly identified
- The leadership style shows it is possible to learn from mistakes
- The company has high leadership that dares to take risks

6. Organization's behavior:

- Members feel the freedom to decide the manner to approach their tasks as well as to propose alternatives for improvement
- There is the freedom to propose new ideas
- Collaborators communicate with people from different areas In the face of change people respond without direct orders from their supervisor
- Collaborators dare to experiment in order to improve their activities

7. Support mechanisms:

- There are programs, areas, and projects to stimulate and reward the generation of new ideas that bring about innovation
- Innovation activities are led by an area
- Incentives exist to present new ideas
- Mechanisms to appraise new ideas exist
- There are resources to develop new ideas
- There is a work team with knowledge for innovation activities
- The company offers to learn and form on innovation

8. Creativity in problem-solving:

- The company promotes the usage of creative thinking to solve problems and generate new ideas
- I generate more than one alternative to solve a problem.
- I take into account long and short-term consequences when evaluating solution alternatives
- I use different methods instead of a single form of approaching
- I revert my initial form of understanding of the problems in order to consider whether the exact opposite is true
- I use some specific techniques to try and develop creative and innovative solutions
- I split the problem into small components and analyze them separately
- I help team members to find opportunities to work on their ideas even they're not in the fashion of their normal work tasks
- I make sure that there are divergent points of view in each complex problem-solving situation
- I encourage people to find new ways to approach a problem

15.2. Proposal of an organizational culture model for Embedding and Reinforcing Organisational Values and Behaviours

1. Recruitment:

Getting people in organizations who can live the values of our organizations ideally starts at the recruitment stage.

2. Induction:

Helping new colleagues understand and live the values can be done at every stage of induction.

3. Training:

every time a colleague spends time learning how to do something better provides an opportunity to reinforce our values.

4. Team meetings:

one of the best ways of living and reinforcing the values is when people are together. So, any team meeting, committee, or group discussion can be used to focus on values.

16. Three personal behaviors of the student that can influence the project.

The projects are considered successful only when they are completed within the boundaries of scope, time, cost, and quality. People's behavior is one of the key factors that drive successful project management.

The project managers deliver projects perfectly, when he/she follows a rule book, uses project management software, firefighting problems, implement the concepts from PMBOK, etc (PMBOK,2007). In addition, His/her ability to manage the thousands of interactions people have within the project and outside of it (environmental factors). The emotional bonding between individuals must be well understood and recognized to get the best out of the people. This ultimately is crucial for achieving the proper level of teamwork, communication, and performance that is needed for successful project management. Human behavior can have either positive or negative outcomes depending on the context. (Katarzyna Piwowar, S., 2014)

There are some personal behaviors of the student that can influence the project as follows:

- Lack of commitment:
- Poor time management
- Poor communication
- Interpersonal skills such as Procrastinating

- Lack of commitment:

Work commitment is important, one of the most important reasons it allows an organization to meet its goals and stick to its vision. Many individuals fear commitment and will struggle with situations that require them to establish a long-term connection or obligation to another person.

People with commitment issues or commitment phobia experience great levels of anxiety in relationships. The commitment challenges they face can take a great toll on both parties in the relationship.

- **Poor time management**

The most common signs of poor time management are the following:

Stress: Poor time management causes us to always be in a rush, which results in a lot of additional stress.

Always being late. Poor punctuality is one of the most frequent problems caused by bad time management. Time slips away easily but being late makes people perceive you as unreliable.

Ruining your professional reputation. No one's ideal co-worker is someone who's always late and doesn't respect deadlines. Most people understand if it happens once and you have a good reason, but if you have no concept of punctuality whatsoever, you'll be labeled as unprofessional.

Low productivity and poor quality of work. This leads to negative effects on performance and results.

Poor work-life balance

- **Poor communication**

Poor communication often occurs when there is a discrepancy between what is said and what is heard. In other words, the person being communicated to misunderstands.

Overall, good communication is the effective sharing of information, meaning, thoughts, and feelings between people

- **Interpersonal skills such as Procrastinating**

17. Study such behaviors, identify their reasons, and how they can be eliminated.

1. Lack of commitment:

Reasons: Lack of communication and appreciation for what they do.

Solution: to overcome these obstacles is to seek external help, whether it's in the form of individual coaching or a dating problems workshop.

In order to combat this, the managers must be actively communicating with staff, letting them know what they are doing is positively or negatively affecting the company's bottom line.

Regularly sharing the goals and vision of the top executive team.

Communicating with employees how their job affects these top goals, by bringing to their attention how their specific actions have positively or negatively affected the company's bottom line.

Praising employees when their actions help improve the bottom line, allowing them to feel appreciated for their efforts.

Recognizing when employees don't see the importance of their job, without guidance, these uncommitted people can only drag you down

2. Poor time management

Some of the causes for poor time management are:

Physiological

Research on the physiological roots of poor time management mostly surrounds the role of the prefrontal cortex. This area of the brain is responsible for executive brain functions such as planning, impulse control, attention, and acts as a filter by decreasing distracting stimuli from other brain regions. Damage or low activation in this area can reduce an individual's ability to filter out distracting stimuli, ultimately resulting in poorer organization, a loss of attention, and increased procrastination.

Solution:

- Perfectionism:

It is a belief that perfection can and should be attained. In its pathological form, perfectionism is a belief that work or output that is anything less than perfect is unacceptable. It can take the form of procrastination when it is used to postpone tasks, and self-depreciation when it is used to excuse poor performance or to seek sympathy and affirmation from other people.

In the workplace, perfectionism is often marked by low productivity as individuals lose time and energy on small irrelevant details of larger projects or mundane daily activities. This can lead to depression, alienated colleagues, and a greater risk of workplace “accidents.” Adderholt-Elliott (1989) describes five characteristics of perfectionists which contribute to underachievement: procrastination, fear of failure, the all or- nothing mindset, paralyzed perfectionism, and work a holism.

- **Low motivation:**

This is one main reason what causes procrastination. The task at hand is not motivating to us, as it does not match our aspirations. When a task is not meaningful to us, we drag our feet in completing the task. Many times the task may never be completed.

- **Poor delegation of work:**

Sometimes employees find themselves getting bogged down in routine operational tasks, which leave them no time for vital managerial functions like long-term planning and development.

Successful delegation involves giving someone else the responsibility to perform a task that is actually part of our own job. It always carries with it an element of risk, since we are assigning to someone else work for which we retain the ultimate responsibility.

People may feel that any sign of weakness reduces their standing in the eyes of others, and themselves. This may hold them back from asking for help. They may also refrain from delegating work to others due to a fear that someone else will do a better job and take the credit

- **Unassertiveness:**

Saying ‘yes’ to requests for our time is not always a bad practice. The problem occurs when we say ‘yes’ to almost any request no matter what it is, who is asking, or how much work we already have on our plate. Always saying ‘yes’ is a major source of overload and stress, and it can lead us away from our priorities into less important tasks. If we want to avoid the work and stress associated with attempting too much, we need to decide carefully whether to accept new tasks.

- **Impatience:**

Some people find it difficult to keep focusing and completing a task in one go. Instead, they attempt different things and as a result, they do not complete the tasks successfully. Even when it comes to the family life of the employees, sometimes they find it difficult to patiently fulfill the needs of their family members such as spending time on vacation.

- **Chronic vacillation between alternatives:**

Some people keep thinking of the advantages and disadvantages of the options so much that they find it difficult to arrive at a choice. This many times lead to procrastination and ends up in putting up a poor performance.

- **Evaluation anxiety:**

Some people want to impress others so much that when given a task they feel so much pressure that it delays their work. They are too anxious about others' opinions of their work.

- **Doing Things Totally New:**

This is a common cause of procrastination for many who have just started their career. When employees are asked to embark on a totally new project and they have no idea at all how to tackle it, the first reaction is to procrastinate. The uncertainty of how to carry out the task and its results causes them to delay commencing the project.

- **The lack of confidence:**

Another common cause of procrastination is the lack of confidence in completing a task. It can be real that you lack the skills but sometimes it may be a perception that you lack the skill. Because of this, you may totally avoid completing the task.

- **Management by the crisis:**

Management by crisis is a phrase used to describe the common problem of allowing unexpected events, interruptions, problems, or emergencies to dictate your priorities and actions. Sometimes we do need to react quickly to a crisis and contain it before it does more damage. The problem comes when crisis management becomes the routine rather than the exception. When crisis management becomes routine, it can easily lead to urgency addiction.

People that are addicted to urgency enjoy putting out fires, they like stepping in and solving problems, and their bosses often reward them for doing so. They have no incentive to avoid or prevent the fires because they get a payoff every time, they put one out.

3. Poor communication

Reasons: langue

Solution: training, education

18. Self-professional assessment by using SWOT model

18.1. Introduction:

Overall, modern organizations should develop long-term strategies in the face of an increasingly dynamic and competitive world. So that the company needs to develop a competitive strategy in order to achieve a competitive advantage in a market economy (Dyson, R.G., 2004).

SWOT analysis has been in use since the 1960s as a tool to assist strategic planning in various types of enterprises including those in the construction houses, (Lu, W, 2010).

18.2. SWOT Matrix Definition:

SWOT Analysis is a strategic management tool that helps an organization to identify the internal strategic factors and external strategic factors to determine its competitive position in the market, the internal organizational factors as strengths and weaknesses, and the external situational aspects as opportunities or threats (Tamošaitienė, J and Gaudutis, E, 2017). SWOT stands for Strengths (S), Weakness (W), Opportunities (O), and Threats (T), These are explained in figure 1: (Amer, S, 2020)

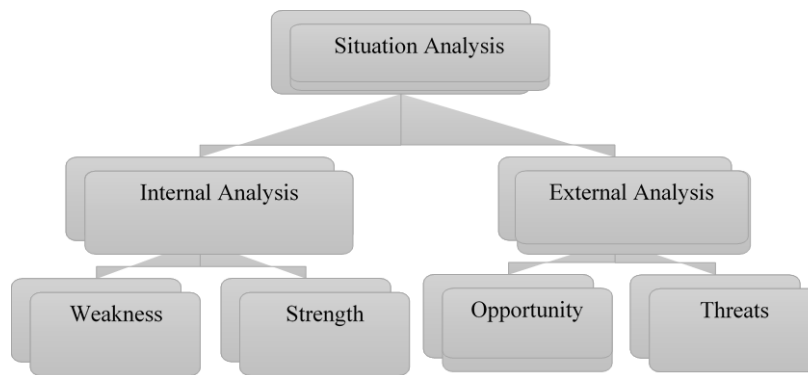


Figure 7: Situation Analysis of SWOT

The internal analysis is used to recognize resources, capabilities, core competencies, and competitive benefits inherent to the organization. The external analysis recognizes market opportunities and threats by looking at competitors' resources as presented in figure 2, (Sammut, T and Galea, D, 2015).

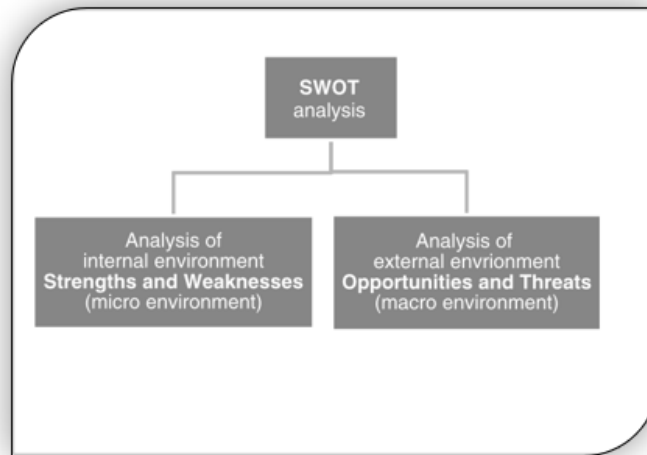


Figure 8: SWOT analysis main components

18.3. SWOT Strengths, Weaknesses, Opportunities, and Threats:

18.3.1. Strengths: The strengths of the organization are the core competencies, in which the business has an edge over its rivals.

18.3.2. Weaknesses: Weaknesses can be understood as the areas of limitations of the business, that hinder the growth of the organization and even lead to a strategic disadvantage. These are the areas that require improvement to perform competitively.

18.3.3. Opportunities: Opportunities can be identified as the condition, which is beneficial to the organization in the business environment, that the business could exploit for the achievement of advantages.

18.3.4. Threats: the adverse external factors and events that may interrupt the business from achieving its goals, such as supply-chain problems, market problems, or a shortage of recruits, (Lu, W, 2010).

18.4. SWOT Matrix Strategies Objective:

The primary objective of the SWOT matrix is the following:

18.4.1. To identify the strategies that an organization can utilize to exploit external opportunities, counter threats, and build on and protect the company's strengths, and eradicate its weaknesses.

18.4.2. The SWOT Analysis helps in ascertaining the factors that influence the efficiency and effectiveness of any product, project, or business entity.

- 18.4.3. To help decision-makers share and compare ideas
- 18.4.4. To provide linearity to the decision-making process allowing complex ideas to be presented systematically

18.5. Who needs SWOT Analysis?

18.5.1. Management:

- 18.5.1.1. When the manager has issues with work output
- 18.5.1.2. Assigned to a new job
- 18.5.1.3. New financial year – fresh targets
- 18.5.1.4. Job holder seeks to improve performance on the job

18.5.2. Business Unit:

- 18.5.2.1. When the team has not met its targets
- 18.5.2.2. Customer service can be better
- 18.5.2.3. Launching a new business unit to pursue a new business
- 18.5.2.4. A new team leader is appointed

18.5.3. Company:

- 18.5.3.1. When revenue, cost & expense targets are not being achieved
- 18.5.3.2. Market share is declining
- 18.5.3.3. Industry conditions are unfavorable
- 18.5.3.4. Launching a new business venture

18.6. Step of Conduct SWOT Analysis

- 18.6.1. Analyze Internal & External Environment
- 18.6.2. Perform SWOT Analysis & Document
- 18.6.3. Prepare Action Plans

18.7. Benefits of SWOT Analysis:

- 18.7.1. It is a source of information for strategic planning and the setting of objectives for strategic planning.
- 18.7.2. Provides a framework to identify & analyze the strengths and weaknesses of the organization.
- 18.7.3. Provides a motivation to analyze a situation & develop suitable strategies and
- 18.7.4. Builds the organization's strengths.
- 18.7.5. Reverse its weaknesses.
- 18.7.6. Exploit its response to opportunities.

18.7.7. Overcome organization's threats.

18.7.8. It helps in identifying the core competencies of the firm.

18.7.9. It helps in knowing past, present, and future so that by using past and current data, future plans can be chalked out.

18.8. Limitations of SWOT Analysis:

Even though the SWOT Matrix is broadly used in strategic planning, the analysis does have some limitations. (Datta, K. and et al, 2014)

18.8.1. Certain capabilities or factors of an organization can be both a strength and a weakness at the same time. This is one of the major limitations of SWOT analysis.

18.8.2. SWOT does not show how to accomplish a competitive benefit, so it must not be an end in itself.

18.8.3. The matrix is only a starting point for a discussion on how proposed strategies could be implemented. It provided an evaluation window but not an implementation plan based on the strategic competitiveness of the company

18.8.4. SWOT is a static assessment

18.9. SWOT Analysis of our company

SWOT analysis is an extremely interactive procedure and requires effective coordination among several departments within the company such as – marketing, finance, operations, management information systems, and strategic planning. (Milosevic, IN, 2010). When creating a SWOT analysis, always start with a new set of strengths, weaknesses, opportunities, and threats. Occasionally, an issue that is a threat in one project.

Table 12 shows the main strengths, weaknesses, opportunities, opportunities, and threats for the company ((Flanagan, R, 2007) (W.S., Li, and et al, 2009))

Table 11: SWOT analysis list

Company Name: Company Inc.		Date: 10 Oct 2021
Strengths		
1	Advanced Project Management	
2	Workforce Stimulation	
3	Knowledge of the Subcontractor	
4	Modern Technology	
5	Use of Modern Machinery	
6	Skillful Work Team	
7	Strong financial condition	
8	A large customer base.	
9	unique product	
10	Cost Advantage	
11	Quality in product and customer service	
12	Plenty and cheap construction materials are available	
13	Particularly specialized in housing/office buildings	
14	Reputation	
15	Strong design and construction capacity	
16	Profits from multiple portfolios	
Weaknesses		
1	Inexperienced Workers	
2	Resistance to New Methods of Working	
3	Lack of Coordination	
4	Possibility of Injury at Work	
5	Undeveloped Relationship with the Subcontractor	
6	Obsolete facilities and outdated technology.	
7	The unit cost of a product is higher than the competitors.	
8	No or less internal control.	
9	Less quality in products and services offered.	
10	Weak brand image.	
11	The financial condition is not very sound.	
12	Underutilization of plant capacity.	
13	Lack of major skills or competencies, and intellectual capita	
Opportunities		
1	The domestic construction market is still going strong	

2	Favorable Contract Terms	
3	Increasing collaboration and partnering amongst international competitors	
4	Reliable Investor	
5	Favorable Financing Arrangements	
6	Possibility of Developing a Well-Coordinated Project Team and Project Management Strategy for Future Projects	
7	Looking for areas of development, by utilizing skills and technology to enter new markets	
8	Adding new products to the existing product line to increase customer base.	
9	Forward and backward integration.	
10	Acquiring rivals' businesses.	
11	Joint ventures, mergers, and alliances to increase market coverage.	
Threats		
1	High Level of Groundwater	
2	Small Area for Storage and Manipulation on the Construction Site	
3	Supervisory Board with an Interest in the Project	
4	Repeated Changes in Allocation of Space	
5	A downtrend in market growth.	
6	A new entrant to the market.	
7	Substitute products that can decrease sales.	
8	Increasing the bargaining power of customers and suppliers.	
9	New regulatory requirements	
10	Changes in a demographic environment will decrease demand for a firm's product.	

19. Three behaviors contradict moral integrity.

19.1. Defining Integrity:

It is the integrity and moral values that the individual possesses, such as honesty, honesty, transparency, honor...etc.

It can be defined as:

Generosity in the morals that must be characterized by a person regardless of his age, such as fighting corruption and holding fair elections free of fraud, and justice and equality...etc.

19.2. Integrity types:

19.2.1. Intellectual integrity:

It is the movement of thought or the movement of thought, to rise above the sin of the people and to deceive and deceive people, in the field of thought or through misleading phrases, sentences, and generalizations.

19.2.2. Integrity at work:

Integrity is considered a characteristic of leadership, which is honesty, sincerity, and transparency in work, and integrity in the workplace is very important because these traits promote a positive workplace culture and level, where there is open communication, good decision-making, and a strong moral compass that guides all decisions and actions, while Irresponsible behavior and a lack of confidence can make the work environment uncomfortable and stressful.

If an employee is known for his integrity then he will be worthy of trust and respect from the people around him, since integrity is not only important on a personal level, but also vitally important at the workplace level, and organizations known for their integrity work better than others.

19.3. 3 behaviors that are incompatible with moral integrity:

19.3.1. Stealing:

it is the taking of another person's property without the permission or consent of that person with the intent to deprive him of his property and use it for the purpose of ownership.

It harms the interests of others, whether private or public health.

Such as stealing money, ideas, or even efforts made by other people to accomplish a particular task.

19.3.2. Procrastination:

It is postponing the performance of tasks or postponing the implementation of projects to another time for flimsy pretexts and made-up excuses or doing a less important task instead of accomplishing the most important task.

Example: Evasion of debts and financial obligations to others with the ability to repay.

19.3.3. Lying:

It is not telling the truth and telling the opposite of reality

Examples:

1. include not telling the truth about the status of the project if it is about to be completed or stumbled
2. Giving promises of promotions to employees and not keeping them.

20. Analyze the financial, social, and technical influence, if any, of such behaviors on the works of the project and the relationships.

20.1. Stealing:

Theft within the workplace, no matter what is stolen, will undoubtedly have financial implications for business owners

The amounts are large and can often lead to the bankruptcy of a company depending on the scale of theft or may cause a shortage of resources and thus delay in the delivery of the project which affects the relationship with the client

This thing can be controlled by neutralizing its causes, such as allocating cash flow with people directly involved in financial dealings and keeping records for this.

20.2. Procrastination:

Delaying work or postponing its implementation may lead to the impact of the schedule or the depletion of the project budget or the need to increase the project budget and thus the tendency to use the financial reserve for emergencies or the need for additional resources

20.3. Lying:

For example, lying about job qualifications directly affects the project, as this increases the risk when assigning the work to an incompetent person to complete the work, or he may complete it incorrectly, and this leads to the re-work or correction, and this affects the work costs and schedule

Another example is the devious methods of giving employees promises of promotions or a salary increase, as this affects the example of correct leadership and turns the leader from a leader to an ineffective leader and leads to the team's lack of confidence in the decisions or promises of their leader.

21.Register of the stakeholder.

The main stakeholders involved in this project are the project manager, contractor, and supplier. Other stakeholders include Menefah Alanazi from the local government construction office, Sustainability Expert Abdulrahman Qaramsh, and Chief Architect Mushari Alzaidi. Sustainability Expert will make sure that our construction activities are in line with green buildings guidelines and that we achieve the Energy Star rating on this project.

The project manager will closely work with the house owner and act as a representative of our construction company to oversee the whole project including the progress of the project and ensure resources are well utilized, and delivery meets time and also ensure the result are to the intended satisfaction. The project manager is distinguished to ensure the project remains within the budget along with its specifications and the manage the other project stakeholders as well to ensure the project is successfully met through the initiation, the planning process, and the execution of the project. The supplier or the vendor will be the Seif Suppliers who will ensure that all the materials needed at the site are delivered on time upon payment. Seif Suppliers are answerable to the project manager who answers to the owner of the property.

Table 12: Team member

Name	Title	Organization
Hattan Sabban	Project Sponsor	House Owner
Hassan Alhirafy	Vendor	Seif Suppliers
Mohammed Alsati	Project Manager	Unique Builders
Mushari Alzaidi	Chief Architect	Engineering Department
Abduarhman Qaramsh	Sustainability Expert	Green Co.
Menefah Alanazi	Local Authority	Construction Government Office

22. Personal communication and the effective communication.

Personal communication

Personal communication is defined as communication that occurs for the purpose of communicating personal information, thoughts, and feelings. Personal communication may include emails, interviews, chats, and other media. Effective communication is necessary for personal communication (Emmitt, S., & Gorse, C., 2006). Effective communication can be defined as the communication between two or more individuals where the message is effectively conveyed so that it is understood by all the recipients. To be an effective communicator, you must be able to listen carefully as well as convey yourself clearly to others around you. **Effective communication** needs a wide range of abilities, including both verbal and nonverbal clues, as well as close listening. Effective communication is essential both in and out of the job because it helps you to properly transform your goals and sentiments into messages that are readily understood. Perhaps the most crucial life skill is the ability to communicate effectively. It is what allows us to communicate with others and understand what is communicated to us.

More than merely exchanging information is required for **effective communication**. It is necessary to comprehend the emotion and purpose underlying the information. In addition to being able to properly express a message, you must also be able to listen in such a manner that you grasp the entire meaning of what is being said and make the other person feel heard and understood. Nonverbal communication should support, not contradict, what is being communicated. If you say one thing but your body language suggests another, your audience will likely suspect you of deception.

Communication that is clear and concise develops trust in others. Your ability to listen carefully and accept diverse points of view gives others confidence that you are making the best judgments for everyone in the group. As you act as a role model, this trust will spread to your team, and they will feel confident in their teammates' ability to carry out their tasks and obligations. The capacity to effectively communicate has a significant influence in resolving disputes and avoiding prospective conflicts from forming. The goal is to be cool, make sure all sides are heard, and come up with a solution that works for everyone.

23.The shapes, models, and channels of the personal communication.

The project manager will meet with the project owner on a monthly basis to discuss the project's progress. Daily and weekly meetings with the contractor and supplier will be held as needed, with at least one meeting every two weeks. Here are several methods and mediums used for communication in our team and at our workplace:

1. Video messaging.
2. Direct messaging.
3. Email.
4. In-person Meetings.

23.1. Definitions:

23.1.1. Video messaging:

For improved collaboration with long-distance or remote personnel, our company employs video messaging services. Because the applications display people through video, they are frequently chosen over phone calls. In comparison to a phone conversation, video conferencing enables a more personal and private encounter for discussing sensitive information with a faraway contact.

23.1.2. Direct messaging:

Our company also offers its employees instant messaging software. These tools enable people to communicate with each other directly throughout the day, making organizational communication quicker and more efficient. These applications provide both one-on-one and group communication. Furthermore, these applications enable real-time interactions without the latency associated with email responses.

23.1.3. Email:

Email is the sending and receiving of messages via a virtual mailbox. Email is used in our business for both internal and external communication. Once an email has been sent, it cannot be edited or altered in any way, demanding careful editing of each message.

23.1.4. In-person:

In-person meetings are our company's preferred communication channel. In-person communication entails conversing with one or more people face to face. Depending on the circumstances, in-person contact is frequently more valuable than internet communication. No one, for example, hides behind a computer screen when conversing in person. This frequently fosters more open conversation. Furthermore, with in-person contact, all parties interact directly with one other without delay or dependency on technology.

To communicate effectively, one must understand and be understood. Knowing the proper communication strategies is just as crucial as having great communication abilities. Our company utilizes visual communication via images, charts, graphs, and maps during project status reports. The type of content in the status reports depends upon the audience. Higher management is more interested in visual aids because they don't have the time to read lengthy reports. For communicating with line managers both written and visual aid are employed depending upon the scenario or information at hand.

24. The communication matrix.

A communication matrix is just a convenient technique to keep important stakeholders informed. It includes details such as project owners, deadlines, project status, objectives, and so on. It contains a list of all stakeholders, their preferred communication channels, and frequency of communication.

The first stage in developing your communication strategy is determining what type of communication your stakeholders require from the project in order to make sound choices. This is referred to as the communication needs analysis. Stakeholder analysis assists you in determining who to communicate with and why. Once you've clarified your objectives and gained a thorough understanding of the various audiences with whom you must communicate, it's time to plan your message, that includes determining everything you need to say or write in order to meet your objectives, and also when and

how these communications will be conveyed. Our project communication matrix is shown below:

Table 13: The communication matrix

Stakeholders	In-Person Meeting	Direct Messaging	Video Messaging	Email
Project Sponsor	Monthly	As required	As required	Weekly
Vendor	Weekly	X	X	As-required
Chief Architect	Project Start, then monthly	As required	As required	Monthly
Sustainability Expert	Project Start and weekly	Weekly	X	Weekly or as required
Local Authority	Project Start	As required.	X	As required

25. Three wrong scenarios of communication.

1. Unclear communication channels

Our company and project team has invested time and effort in creating clear communication channels that foster employee trust. Employees and employers that have a high level of confidence in each other have higher morale and overall productivity. Teams collaborate more effectively, and managers are more forthcoming about future changes that may affect their teams. When an employee wants something handled, rather than going through the chain of command, they send a direct message to the right individual, resulting in a quick response. This eliminates wrong communication scenarios.

2. Sending right information to wrong individuals and vice versa

Our organization conveys messages through a wide range of communication methods and channels, and we have already listed them above. The project manager has to make certain that all text is well-written and devoid of grammatical mistakes. He must allow any written communication to be seen by other team members before sending it. Allowing people to review his work enhances the likelihood of detecting and correcting even minor faults. Sending the right information to the right audience and keeping their communication needs in mind will ensure that wrong communication scenarios are avoided.

3. Using wrong communication channels

In-person communication is typically more successful than phone or email communication, depending on the message, and is the preferred communication channel for our company. Understanding when to employ the various modes of communication is critical to the success of a company's overall communication. Email is ideal for sending non-sensitive information. Video conversations are frequently the most efficient way of dealing with a difficult problem that has already resulted in the spread of misinformation. When presenting sensitive material, an in-person approach in a private environment, such as an office, is preferable. In-person communication and using proper body language minimizes the chances of wrong messages delivery.

4. Risks of oversharing information

While our company benefits from openness, the idea of oversharing still necessitates caution. Oversharing sometimes results in gossip or the transmission of sensitive or improper information. The project manager must consider the necessity and significance of workplace secrecy. For example, hold sensitive information meetings in a private and secure office, avoid incorporating confidential material in emails, and discourage gossip or other improper communication as needed. This will also limit wrong communication scenarios.

26. Develop and prepare stakeholder assessment matrix.

Stakeholder Analysis is the first stage in Stakeholder Management, which is a critical technique used by effective managers to get support from stakeholders (Scheffran, J., 2006). Stakeholder management may assist a manager in ensuring that his projects succeed when others may fail.

Stakeholder Analysis is the first stage in Stakeholder Management, which is a critical technique used by effective managers to get support from stakeholders. Stakeholder management may assist a manager in ensuring that his projects succeed when others may fail.

Stakeholders are the people who have a vested interest in your project. They may be powerful advocates or opponents of your ideas, so you must determine who your stakeholders are and win them over as quickly as feasible. This may be accomplished by completing a Stakeholder Analysis, a three-step method for identifying, prioritizing, and comprehending your stakeholders.

Stakeholder Analysis consists of three phases. To begin, determine who your stakeholders are. Next, determine their authority, influence, and interest so you know who to target. Finally, have a thorough grasp of the most essential stakeholders so that you can predict how they will react and how you may gain their support. The stakeholder assessment matrix for our project is shown below.

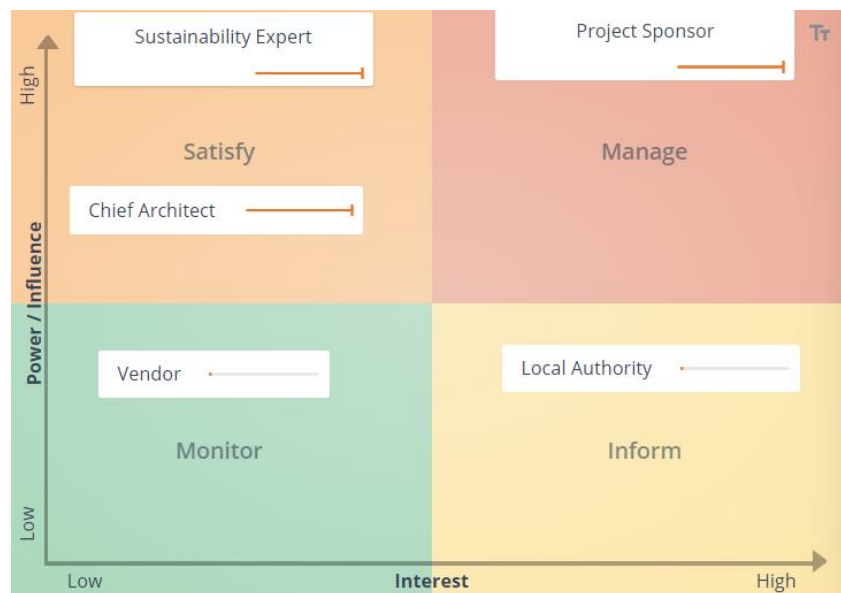


Figure 9: stakeholders assessment matrix

27. Describe and identify the leadership model, which is preferred to the project leadership.

27.1. Introduction:

leaders play a pivotal role in leading their followers to fulfill organizational desired goals effectively. A leader can be defined as a person who delegates or influences others to act to carry out specified objectives, (Mullins L., 2004).

Today's organizations need effective leaders who understand the complexities of the rapidly changing global environment. If the task is highly structured and the leader has a good relationship with the employees, effectiveness will be high on the part of the employees.

Different leadership styles are a leader's approach to providing direction, implementing plans, and motivating people, and may affect organizational effectiveness or performance (Nanjundeswaraswamy, T. S. and Swamy D. R., 2015)

Leadership is a social influence process in which the leader seeks the voluntary participation of subordinates to reach organization goals, (Omolayo, B.,2007).

27.2. Leadership Styles:

27.2.1. Affiliative Leadership Style:

This leadership style focuses on conflict resolution and creating personal connections between employees and their managers to build a sense of community and trust

27.2.2. Authoritarian / Commanding / The Boss/Autocratic Leadership Style:

- is centered on the boss. the leader holds all authority and responsibility.
- The leader centralizes decision-making, and limits participation.
- leaders make decisions on their own without consulting subordinates. They reach decisions, communicate them to subordinates and expect prompt implementation.

27.2.3. Coaching Leadership Style:

- involves teaching and supervising followers.
- A coaching leader is highly operational in a setting where results/ performance require improvement.
- Basically, in this kind of leadership, followers are helped to improve their skills.
- coaching leadership does the following: motivates followers, inspires followers, and encourages followers

27.2.4. Democratic Leadership Style

- In this leadership style, subordinates are involved in making decisions. Unlike autocratic.
- This leadership is centered on subordinates' contributions.
- The democratic leader holds final responsibility, but he or she is known to delegate authority to other people, who determine work projects

27.2.5. Laissez-faire Leadership Style

- Laissez-faire leadership gives authority to employees. (LEAVE IT BE)
- Subordinates are allowed to work as they choose, with complete freedom to make the decision. with minimal or no interference.

27.2.6. Pacesetting Leadership Style

- Pacesetting leadership is when the leader sets an example of high performance, high pace, and high quality.
- Team members are expected to follow suit, and the pacesetting leader values results more than anything.

27.2.7. Transformational / Visionary Leadership Style

- The transformational leadership style is one of the most implemented styles. It has integrity, defines clear goals, encourages clear steps to communication, and is expressive.
- This type of leader inspires their team to work together towards a common target.
- Transformational leaders combine the best practices and are leaders who are trusted and can motivate others.

27.3. Preferred Model:

Autocratic leadership style (AL) places more emphasis on performance and low emphasis on people.

The focus of power is with the leader and all interactions within the group move towards the leader. The leader unilaterally exercises all decision-making authority by determining policies, procedures for achieving goals, work tasks, relationships, control of reward, and punishment (Van Vugt et al., 2004).

The basic assumption underlying autocratic leadership style is based on the premise that people are naturally lazy, irresponsible, and untrustworthy, and leaving the functions of planning, organizing, and controlling to subordinates would yield fruitless results and so such functions should be accomplished by the leader without the involvement of people.

Further, Likert's (1961) four management systems, characterized autocratic leadership style system as an exploitative-authoritative system where power and direction come from the top downwards, where threats and punishments are employed, and where communication is poor and teamwork is non-existent.

Jung, Jeong, and Mills (2014) described an autocratic leadership style on a continuum and opined that autocratic leaders make decisions and announce them, without inviting suggestions from subordinates.

Autocratic leader relies heavily on authority, control, power, manipulation, and hard work to get the job done (Puni et al., 2016).

In the autocratic leadership system, formal centralized structures, procedures, processes, and mechanisms are clearly defined and are enforced to ensure that subordinates do their jobs efficiently within the rules.

- Punishments are often applied when mistakes are made and sanctions are in the form of withholding attention or good assignment or making people feel guilty.
- Motivation under this leadership style is by the means of economic incentives which are extrinsic in nature and based on performance.
- Development within an autocratic system comes from hard work and rarely is the delegation of authority practiced.

Most theorists have identified autocratic leaders with authoritarian leaders simply because research has proven that there is a strong positive correlation between autocratic leadership style and authoritarianism (Chemers, 2014; Schuh, Zhang, & Tian, 2013; Svolik, 2013).

28. Reasons for which such model is preferred.

1. A leader like this can achieve results quickly.
Projects such as house building need an autocratic leader that's drive results fast and of good quality.
2. Quick decision-making.
This project needs fast decisions during the process that's insure achieving results matching with time gone.
3. Focused target.
An assertive leader focused on his target in a professional way that drives expected results at the right time.
4. Close supervision.
Autocratic leaders follow up with their subordinates close to making sure all processes are on track and Rapid intervention to solve any pending.
5. Maintain order and disciple.
6. Good for emergencies/crisis situations.
Autocratic leaders feature as decision making and fast response its ideal model for emergencies and crisis that depends on fast solutions.

29. Five proposals for the motivation methods that are compatible with the nature of the project.

29.1. Introduction:

Motivation leaders need to communicate with their employees thoroughly and manage human capital, finance, and marketing wisely. In simple terms, leadership is a process by which an individual motivates or influences others to achieve organizational goals (Kesting et al., 2016). It is the process of enhancing and encouraging the self-esteem of employees to achieve organizational tasks and goals. Employee motivation is a way to achieve unusual goals, in which they put effort above and beyond stated organizational goals.

Comprehensively speaking, employee motivation is the extent to which employees are bound emotionally or psychologically towards the organization (Anitha, 2014).

Coordinating and delivering projects are the most important things in any project. Meeting the timelines of a project is one thing, but choosing ways to motivate and inspire the team is something important.

A successful Leader in all fields should know the proper ways to motivate and inspire the team. It is most important to keep the team not only going through the motions but ensure that they want to get things done and done perfectly.

Following are proposals to be used for motivation:

1. Big things and small things to be celebrated:

Honor your team when accomplishing a job and doing it well. The team must be recognized in the company or when a project is finished.

A good idea to financially incentive. This will move your team to put the best of their efforts to do their work.

2. Reward after a hard-working day:

Working for long hours deserves a treat and this will reflect on the behavior of the team. Leaving work early or coming the next day late a bit. Taking the team to celebrate for dinner or having coffee will be an advantage to gain their trust always.

3. Engage with your team always:

Be aware of what is the team working on and toward what they are moving, guide, direct, correct, and appreciate.

Answer the questions of the team will reduce the miss understanding of the scope
The team will feel motivated and on track with the presence of their leader and his support.

4. Don't take advantage of your team

Let the team lean on you sometimes if you can give supports considering yourself as part of the team and doing a task, even that takes more time. Just because one task might be menial does not mean that you are not capable of doing it.

5. Keep a relaxed and comfortable atmosphere

Do not expect to have productivity in a bad atmosphere in the working environment. Even through the stress, the support for your team is something appreciated and valuable. Keep the stress away so that will not affect the team. Some stress can be positive when a deadline needs to be met, but too much of that may go to the opposite side of the comfort zone.

6. Team, are people too:

Every part of the team has family and personal issues have to deal with. Thus, while work is extremely important, you must acknowledge that they have a personal life as well

Convey a message to your team that you care about them and their well-being and support them when they are going through any difficulties, in or out of work

7. Leading by example:

The team should take you as a model for their work. For sure that the team is giving an eye on you, so you need to be a good example always.

Your behavior is paramount, so you always want to execute admirable behaviors to gain the respect you deserve and keep your team in line and motivated.

8. Grow and grow your team:

The skills that your team has, take advantage of, and allow each team member to grow and shine with their abilities. Give changing jobs to the team and take them to

the comfort zone to keep their interest up. You don't want your team to be bored from what they are doing

30.Design RACI model for 3 administrative measures of the project.

30.1. Introduction:

A RACI matrix is a common technique used to implement a decision-rights framework to clarify the roles and responsibilities for key processes. The RACI matrix clarifies responsibilities and ensures that everybody is assigned to do all the project needs to be accomplished, ((Averdunk, I., 2021), (Weill, Peter, W and Ross J. W. 2004))

30.2. Definition:

The RACI model is a straightforward tool used for explaining the roles of stakeholders in the project for avoiding confusion over those roles and responsibilities during a project.

The acronym RACI stands for (Cristini, T, 2019):

1. Responsible: The stakeholders responsible for doing the work in order to complete the tasks and project.
2. Accountable: The stakeholder who is accountable for the correct and thorough completion of the task. This must be one individual and is often the project executive or project sponsor.
3. Consulted: The key stakeholder who provides information for the project and with whom there is two-way communication. This is usually several people, frequently subject matter experts.
4. Informed: The stakeholders kept informed of progress and with whom there is one-way communication. These are individuals that are affected by the outcome of the tasks, so need to be kept up to date.



Figure 10: RACI member

A RACI chart is a common way of showing stakeholders who are responsible, accountable, consulted, or informed and are associated with project activities, decisions, and deliverables.

Delegation is an important part of a project manager's role, so recognizing roles and responsibilities early in a project is important.

30.3. Creating a RACI Matrix (step-by-step)

1. Identify Roles
2. List Tasks project and list them on the left-hand side of the chart in completion order
3. Identify all the project roles and list them at the top of the chart.
4. Assign Each Task to a Role and Responsibility
5. Complete the cells of the chart identifying who has the responsibility, the accountability, and who will be consulted and informed for each task.
6. Ensure every task has a role responsible and a role accountable for it.
7. No task should have more than one role accountable. Resolve any conflicts where there is more than one for a particular task.
8. Share, discuss and agree on the RACI Matrix with stakeholders before the project starts.

30.4. Advantage of RACI Matrix:

RACI Matrix has the following advantages:

- 1- Avoiding Individuals Overload
- 2- It prevents the overwork of team members.
- 3- It removes role confusion.
- 4- It helps eliminate unnecessary tasks.
- 5- It is one of the good communication tools.
- 6- It can be used for resource allocation

30.5. Disadvantages of RACI Chart

The RACI matrix may have the following disadvantages:

1. Complex projects make RACI charts extensive with many team members. The identification of which individual is responsible for any given task can also be difficult.

2. Stakeholders will be confused if they don't understand the differences among the terms, especially Responsible versus Accountable and Consulted versus Informed.
3. It's a formality and a waste of time if no one references it after approval.
4. It is not suitable for all types of projects.
5. It may add complexity to the process or project

Table14: RACI Matrix For construction house

	Leadership			Team Member	
	Project Sponsor	Financial Manger	legal	Project manager	Project Engineers
Initiate Phase Activities					
Request review by PMO	R/A				
Develop Base Project	R	A/C			A/C
Submit Project Request	R	A/C	A/C		I
Develop business case	A/C				
Final Legal Review and Approval	R		A/C		
Plan Phase activity					
Create project charter	C			R/A	C
Create Schedule	I			R/A	C
Create Safety Plan	I			R/A	I
Execute Phase Activities					
Build Deliverables	C/I	C/I			R/A
Create Status Reports	I	I	I	R/A	R/A
Performance Phase Activities					
Create Project Closure Report/Documents	C/A	C/A	C	C	C/A
CREATE lesson learned	I	I		R/A	I

31. Identify the conflict and crisis

31.1. What is conflict?

Conflict, in general, is a social phenomenon that reflects a state of unease or psychological pressure resulting from incompatibility between two or more desires or a conflict of two or more wills.

Also, it can be said that:

A condition caused by a real or imagined conflict of needs, values, and interests. The conflict can be internal (within the same person) or external (between two or more individuals).

Conflict as a concept helps explain many aspects of social life, such as social differences, conflict of interests, and wars between individuals, groups, or organizations.

A common definition of conflict is:

"When two or more parties perceive conflicting goals and seek to weaken each other's abilities to reach the goal."

31.2. Attitude towards conflict:

The conflict situations that a person constantly experiences are his attitudes towards his psychological and biological activity. Hunger, for example, is a "conflict situation in which the strength of the need for food and the strength of the commitment to social conditions for gratification conflicts. Whenever the urgency of the biological force is weak, the behavior is biased towards the strength of psychological factors, as it is in simple hunger or at the beginning of hunger. The opposite occurs when hunger intensifies, as it begins to bias towards the biological factor.

31.3. The nature of the conflict:

It is the situation, or the body that appears within the dialogue, or the situation that leads to the occurrence of conflict between people, and the nature of the conflict depends on two sides, the first is positive, and the second is negative. On the dialogue, as for the negative side of the conflict, it is what negatively affects the dialogue, and turns it from a mere dialogue to discuss ideas into a kind of attempt to destroy the parties for each other, and the keenness of each party to impose its opinion on the other.

The nature of the conflict is characterized by rationality, objectivity, and transparency depending on the principles and the foundations on which the parties to the conflict depend in dealing with each other. If these principles depend on the positive side of the conflict, then useful results will be reached. Then no useful results will be reached, and the struggle will continue for a very long time.

31.4. Forms of conflict:

1- Differences:

It is a lack of agreement between individuals on something, and it is part of human nature; Every human being looks at the things around him with a special view of him and deals with situations in his environment in his own way.

Therefore, the differences often result in a conflict in which each person seeks to prove that his view and method are the correct ones, and the dispute can end with the understanding of all parties to reach an appropriate result.

2- Disputes:

It is a set of differences that are related to the existence of reasons that lead to, or reject an opinion, or decision, and lead directly to the occurrence of conflicts between the disputants.

The conflict depends on the argument, and the discussion that must be accompanied by a state of intense anger within the conflict session, which results in an increase in the intensity of the conflict and does not lead to reaching any results, or decisions that are agreed upon by all.

3- Crises:

Any threat that may cause harm to people or property, or lead to disruption of the workflow, as every institution or company is subject to crises that may lead to damage to its name and reputation.

The term crisis management has emerged, which is concerned with studying the potential risks that may occur in the future and affect work, and developing a plan to address them positively.

31.5. How are crises managed?

Crisis management needs a plan, as the crisis management plan is known as Crisis Management is a reference tool, not a detailed work program, and it does not contain specific and specific steps for how to solve the crisis, but rather includes lists of key contact information, reminder points for what to do when faced, and templates to document how to respond to each crisis.

31.6. Some examples of expected crises:

31.6.1. The occurrence of natural disasters:

such as floods caused by the explosion of water pipes or heavy rain, or damage caused by storms.

31.6.2. The presence of thefts and acts of sabotage:

such as the company's exposure to theft of money or equipment, or its exposure to sabotage that leads to the destruction of machinery and vehicles, in addition to various safety and security risks.

31.6.3. Fire outbreak:

Fire is one of the most dangerous crises that can disrupt business and destroy buildings and machinery.

31.6.4. Power outages:

It is a potential danger, and it is considered a crisis as it leads to the inability to use information technology, communication systems, and the operation of devices, machines, and equipment.

31.6.5. IT system downtime:

such as the exposure of the information system to viruses, or hacking attacks, which leads to system downtime, and the inability of employees to perform their work effectively and efficiently.

31.6.6. The spread of diseases and infection:

The spread of infection among facility employees or animals may occur if the work involves animals, crises that lead to many health and material risks.

31.6.7. Loss of key employees:

The absence of an administrative employee with a pivotal role in the workplace can cause a crisis for employers, whether his absence is due to illness for a period, or his absence from work completely.

31.6.8. Disagreement with suppliers:

In the event of a supplier crisis, it is necessary to plan how to obtain alternative supplies.

32. Three expected scenarios of the conflict's events in the project.

Conflict emerges when two or more conflicting alternatives, reactions, or courses of action are considered to fulfill a specific event or circumstance, or when the interested parties feel a danger to their wants, interests, or concerns. The building process is fraught with ambiguity, and uncertainty that breeds strife (Furst, 2012). The capacity to deal with people effectively, elicit their cooperation, and manage disputes can be important to the success of a construction project.

Expected Conflict Scenarios:

The nature of the building business throughout the world is such that there is already a dispute between the primary construction project players, owners, design specialists, and contractors. The construction business is notorious for having a high level of conflict and dispute. Some of the anticipated conflict scenarios on our project are outlined here.

1. Conflict arises as a result of a breakdown in communication between individuals over their wants, ideas, views, objectives, or values. The breakdown in communication may occur between the stakeholders and it will be the responsibility of the Project Manager to maintain good communication with all involved stakeholders.
2. It is the role of the design expert to define and design the project scope in order to fulfill the owner's functional, budgetary, schedule, and environmental project objectives. When a design expert fails to achieve his responsibilities, the owner is nearly always displeased with the outcome, resulting in stringent contact between the parties. Furthermore, when the scope of the work is unclear, it creates an uneasy relationship between the owner and the contractor in the future, as they argue about the scope and quality of the work, as well as whether the work is appropriately characterized by the contract documents prepared by the design professional.
3. Contracts are common sources of dispute in the construction business; practically every stage of the building process is governed by some kind of agreement. Contract disputes can occur in a variety of areas, including breach of contract in contract clause interpretation, an inspection of work terms, indemnification clauses, payment of supplies, and obligation to third parties, to mention a few.
4. While each member of the construction crew may have a distinct goal in connection to their profession, their main goal should be to complete the project within the time frame specified. When team members' aims are incompatible, conflict might emerge.

Furthermore, their interpretations of contract papers, terms, and conditions may differ, resulting in inconsistencies and disagreement.

33. The optimal strategies to deal with each conflict and specify the reason of preference.

We have defined some of the optimal strategies to deal with conflicts on this project (Vallerand, 2021). These include:

1. Conflicts in the workplace are frequently the result of poor communication. Ensure that everyone involved in the project understands what is expected of them. Keeping everyone on the same page and informed of any adjustments or revisions to the project or timeline plays an important role in minimizing conflicts. Construction projects create a vast amount of documentation and communication; the quality of those papers, in terms of clarity and meaning, might be confusing, provocative, or even overpowering. Small misunderstandings may be avoided by using straightforward and careful language, preventing them from growing into larger disagreements.
2. When a potential issue is discovered, the initial stage in conflict resolution should be a negotiation. This aids in the maintenance of excellent business ties and is less expensive than any other sort of formal resolution.
3. It is critical that the persons in charge of project management have a thorough grasp of the contracts, as well as the rights and duties of all parties involved in the project. Contracts must be explicit and unambiguous, defining each party's duties and obligations and, if relevant, specifying the modalities of dispute settlement. A sufficient provision for contingencies and risk reserves, as well as a clear decision-making process and thorough assessments, are all helpful tools for dealing with potential claims.
4. Internal management processes are the most effective barrier to construction conflicts: this necessitates detailed preparation of the procedures and activities to be taken to avoid or rapidly identify and handle disputes.
5. Alternative dispute resolution (ADR) or out-of-court agreements frequently enable stakeholders to discover their own successful solutions to construction conflicts. Tensions are generally addressed internally, promptly, and privately, preventing

confrontations from escalating. As a result, ADR can significantly save the parties' resources, expenses, and time.

34.Root Cause Analysis

1. Delaying due materials
 - 1.1. Pre-planning: no contact with a contractor in enough time to insure all materials are available.
 - 1.2. Miss-communications: confirmation issue while communication between purchaser and contractor to provide required material at the right time.
2. Wrong delivery
 - 2.1. Miss-communications: wrong requested material from supplier or wrong loaded material.
3. Wrong installation
 - 3.1. Miss-communications: wrong requested order to the contractor.
 - 3.2. Follow-up issue: no close supervision and check point for each phase during the project.

35.Distribute of the human resources on the functions.

First, the project manager Mohammed Al-Sati

- **Scope Management:** The scope of work is determined by defining the works that will be included in the project, and other works that will not be part of the project.
- **Time Management:** It is through managing the processes related to the completion of the project within a specific time, by defining and following up the activities and estimating their resources and the time needed to implement them. It also includes developing and controlling the schedule.
- **Cost Management:** The costs and budget needed to establish the project are determined.
- **Quality Management:** This is done by defining the necessary methods to reach the maximum levels of perfection and perfection in the project field while maintaining sustainability and survival.

- **Integration Management:** This is done by defining, defining, compiling, and coordinating the various management processes and activities of the project within the project management process group.
- **HR Management:** It means attracting employees, selecting them, training them, providing them with rewards, and placing the available competencies in the appropriate places for them and others with regard to the affairs of employees or workers.
- **Communication Management:** It is to develop a plan that defines the different ways of communication between the management and project workers on the one hand, and between the management and stakeholders in the project on the other hand, while specifying the most important information that must reach each of those parties.
- **Risk Management:** It is defined by identifying the risks expected to occur in the project, the means of preventing their occurrence, and setting alternative plans in case they actually occurred.
- **Procurement Management:** It includes the management of matters related to procurement and supply, by defining the materials to be purchased, the place from which they will be purchased, the purchase criteria, what contracts are used in that process, and the type of those contracts.
- **Stakeholder Management:** It means managing the relationship with the project parties, and every person who affects the project or is affected by it negatively or positively is considered a party to the project.

Second, the deputy project manager, M. Meshari Al-Anzi

1. Support the Project Manager in daily project implementation tasks.
2. Support contract and supplier management, ensuring approvals of results.
3. Monitor project performance and coordinate the implementation of strategic initiatives.
4. Preparing and submitting reports to the project manager.

Third, the contract manager. ENG. AbdulRahman Qaramsh

1. Ensure compliance with legal, governmental and regulatory requirements and rules relating to contracts and tenders.
2. Motivating the company's departmental employees through effective leadership, directing and motivating the employee to perform to the best of his abilities.

3. Conducting performance appraisal sessions to review the employees' work performance.
4. Appointment of Bid Analysts for the assigned tenders.
5. Ensure that contracts are consistent with the result of the Bidding Committee, award notification, and Tender Committee examination.
6. Ensure that construction and engineering code policies and departments are followed

Fourth, the project coordinator a. Munifa Al-Anzi

1. Use various tools to monitor working hours, plans, expenses, and schedule deadlines.
2. Monitoring the progress of projects and preparing reports on the achievements made on the projects.
3. Ensure that standards and requirements are met by performing quality assurance tests.
4. Coordinate project management activities, resources, equipment, and necessary data.
5. Divide projects into executable actions with appropriate time frames.
6. Communicate with clients to determine requirements, goals, and deadlines.
7. Distribute tasks to teamwork and assist in schedule management.
8. Ensure that clients' needs are met as projects continue to evolve.
9. Preparing periodic reports on the analysis of risks and opportunities.
- 10.Overseeing the procurement department in projects.
- 11.Monitoring the progress of projects and dealing with any problems that arise.
- 12.Cooperating with the project manager and providing the necessary support.
- 13.Follow up on the issuance of all legal papers such as contracts and terms of the agreement...etc.
- 14.Create and maintain project documents, plans, and reports.
- 15.Participation in the preparation of budgets.

Fifth: Director of Human Resources a. Mohammed Hamid

1. Forming a link between the company's management and employees, and solving the problems that occur between them.
2. Evaluate the performance of employees and submit reports to the company's management.

3. Supervising the interviews of individuals nominated for admission to the company.
4. Training employees and developing their skills through the establishment of training programs.
5. Supporting employees and motivating them to develop and improve performance.
6. Develop and direct strategies and administrative services in the company.
7. Publishing job advertisements in the company[2].
8. Disbursing salaries to employees and reviewing the salary budget[2].
9. Monitoring compliance with laws and regulations in all departments of the company[2].
10. Management of compensation and reward programs in the company[2].
11. Supervising the acceptance or rejection of leave and leave[2].
12. Monitoring the work of the human resources department[2].

Sixth: Sales Manager a. Hassan Sabban

1. Working to convert each potential client into a permanent client.
2. Develop long-term and short-term sales plans for the company in order to achieve sales targets.
3. Carefully select the sales department staff, in addition to working on training and developing their skills continuously, in addition to giving them advice throughout
4. Work and assist them to achieve the goals assigned to them by the Sales Manager.
5. Supervising the processing of sales contracts in coordination with the company's legal department.
6. Permanent study of the real estate market and knowledge of all the strengths, opportunities, and threats within the market in order to take advantage of them and turn them into promising opportunities that serve the company.
7. Full knowledge of all technical, administrative, and financial details of the company's projects in order to help him give the correct perception to customers because of their positive impact during the presentation and negotiation processes.
8. Studying competing companies in a deep and continuous study and knowing their strengths and weaknesses and their competitive advantages. Supervising the development of the promotion and advertising plan with the Marketing Department.

Seventh, Director of Finance and Administration a. Awad Al Sabban

1. Management of company budgets
2. Account management

3. Preparing and supervising the company's profit reports
4. Considering, reviewing, verifying costs, expenses, and revenues
5. Planning and directing the efforts of employees in the financial department of the company
6. Supervising the overall operations and activities of the company's finance department

Eighth, director of engineering supervision m. these are the boys

1. Determining the responsibilities of the contracting engineers.
2. Clarify some of the contractor's responsibilities, obligations, and rights when executing the works.
3. Clarify the conditions, instructions, and regulations related to implementation.
4. Determining the basic steps for supervising the implementation of the work of the various projects.
5. Determining the procedures followed in the supervision of the implementation of projects.
6. Raising the level of quality of project implementation, by raising the level of supervision over them, and implementing quality control programs, thus reducing project maintenance and operating costs.
7. Reducing problems and obstacles that may arise during the project implementation period.
8. Creating an atmosphere of trust and a spirit of cooperation between the elements of the project (contractor/supervising agency/employer).
9. Analyzing the client's needs, objectives and safety needs.
10. An initial conception of the functional, aesthetic, idea, and suitability of the standard standards.
11. Develop and submit a final design proposal through appropriate presentation methods.
12. Preparing working drawings and specifications for building materials and various details, materials, finishes, furniture, and constants such as bathroom and equipment, and their conformity with the system and scientific evidence.
13. Cooperating with the rest of the engineers and obtaining technical licenses in the fields of mechanical, electrical, loads and approval requirements.
14. Reviewing and evaluating the design during implementation and after the completion of the project.

15. Counter, schedule, coordinate, and control engineering projects.
16. Monitor compliance with applicable laws, practices, and quality assurance policies.
17. Interact on a daily basis with clients to explain their needs and requirements.
18. Quality control, performance standards, and specifications required by the project.
19. Follow up on work, budget, schedule, plans, and staff performance and report regularly on project status.
20. Defining and distributing responsibilities to the work team within the project.
21. Cooperating and communicating with the project manager and various departments to provide assistance and technical support.
22. Follow up on achievements and set delivery dates.

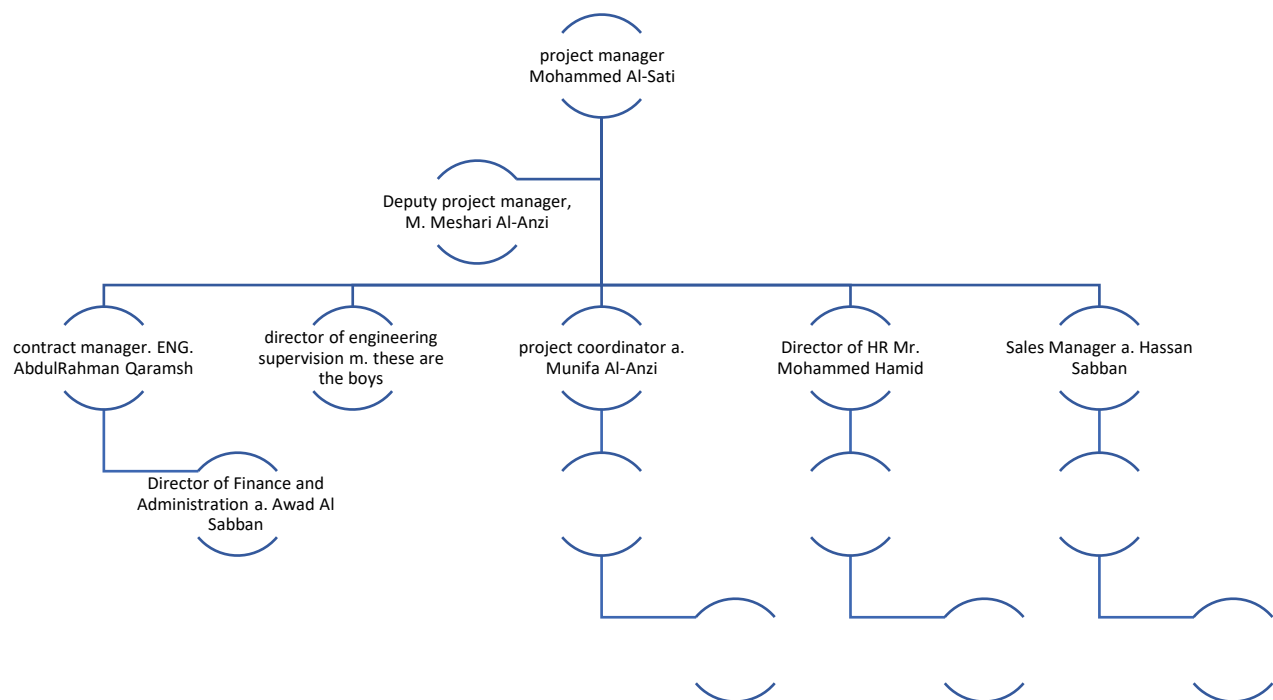


Figure11: Distribute of the human resources

36. Analyze the influence of conducting the Crashing and Fast-tracking process on the timetable, in addition to representing the table after achieving the two measures.

Reducing Project Crashing Time

Reasons for reducing the time to complete the project.

Plan to reduce activities.

Steps to follow to reduce project time.

Reducing project completion in the case of an open budget.

Reducing project completion in the case of a set budget.

First: Reasons for reducing the time to complete the project and expediting its completion:

The need to reduce project completion time may arise from what is estimated at the planning, scheduling, and implementation phases.

In the planning stage: the entity wishing to implement the project submits time estimates for the different stages and activities and determines the expected times for completing each activity and stage, and this is within the (project bid) that is submitted for the purpose of obtaining the right to complete the project.

The entity for whose account the project is being undertaken (the client or the beneficiary) may discuss these estimates with the company submitting the bid. In most cases, these parties ask the bidding company to reconsider its estimates and plan with the aim of compressing the time of completion of the project for various reasons expressed by the client or the beneficiary of the project.

In the project implementation phase: there may be an urgent need to implement the project in a time less than the time agreed upon when the project agreement was signed.

A - The transportation problem in one of the major cities may have reached the point where the project cannot be completed within the time proposed and agreed upon in the project contract. (generally)

B- An example of this is also sanitation projects that require an urgent implementation to avoid the undesirable effects of not providing this service in a timely and critical manner, especially since delays in this type of project may affect the implementation of other facilities associated with the completion of this project. (generally)

C - Also one of the reasons for the haste in implementing the project and the pressure of time to complete it before the time agreed upon in the project contract, is an economic reason. The entity for whose account the project is being completed (the client or the beneficiary) may wish to complete the project in a shorter period so that it can achieve a

specific return or income in the case of early completion to seize the times of occasions and holidays or to penetrate the market with a new product before other competitors in the market, so competition conditions call for pressure. The time to complete the project beyond the time agreed upon in advance. (generally)

W- Another reason that calls for reducing the time to complete the project is to avoid the rise in the cost of implementing the project because the prices of construction supplies are increasing significantly. In the event that certain costs are agreed upon in the contract for the project, it is in the interest of the implementing agency or the client that the project be implemented in a shorter and faster time to avoid the increase in costs for them. (in general and in particular)

C - In the military field and international military projects, the period of rapid completion and rapid implementation of such projects plays a very important role in order to achieve progress in areas such as the nuclear race, armament programs, and space conquest. All this calls for compressing the time of completion of these projects beyond the specified and agreed-upon time in advance. (generally)

H- One of the reasons that call for reducing the time during the implementation of the project is the change of circumstances under which the original plan for implementation has been drawn up. A kind of new financing may appear that was not available during the project planning process, such as international loans that are specifically provided to help finish the project. Major projects in some countries, such as roads, transportation, and sewage networks projects. When this type of new funding is available, the project organizers must develop a specific plan for distributing these funds in a way that ensures reducing the time to complete the project at the lowest possible cost. (generally)

Second: Plan to reduce activities:

Reducing project completion time inevitably requires additional resources. It may be necessary to have another number of people to be employed for this purpose or to operate the existing workers for additional periods, and it is also necessary to have new machines and equipment that achieve better technological performance and therefore faster completion, and all of this would increase the costs of the project.

For this increase in costs to be as small as possible, there must be a so-called optimum (reduction plan) for the activities which in turn will lead to the overall reduction of the project completion time.

And as an important rule: we must make it clear that if you want to reduce the time to complete the project, the attention should be focused mainly on critical activities.

The example below, which shows the following: Business Network Our project Build a model house, sequential activities, critical activities, and the minimum time required to complete the project.

„And that the minimum time needed to complete the project is (450) days because the total critical activities are (450) days and the length of the critical path is (450) days.

In the project of our graduation project, if we add new resources to activity (c), which is a non-critical activity so that its time is reduced from (100) days to (80) days, we will notice that the least time required to complete the project is still (450) days.

In other words, the project completion time is still governed by the critical path. Therefore, adding new resources to the non-critical activity is a waste of effort, resources, and costs.

For example, reducing the time required for activity (f), which is a critical activity, by an amount of (120) days, will result in reducing the time to complete the project to (330) days.

This means that the procedure is an effective procedure that has a direct impact on the completion time of the project.

We must realize that the process of reducing (crashing) the time of project completion - through critical activities - is a process that has two aspects:

First: the geometric aspect.

The second is the economic aspect.

As for the first aspect: the engineering aspect: it is represented in answering the possibility of reducing the time required to complete a specific activity from a technical point of view. For example, you must wait for a certain period of time until the foundations are solid enough before building on them. In other words, project specialists and executives must answer the following question:

Is it possible to reduce the time of activity? If yes, what is the maximum possible reduction for each activity?

-As for the second aspect: It is the economic aspect: it is represented in the additional material burden borne by the project in terms of costs resulting from the process of reducing the critical activity, and consequently for the project as a whole.

Reducing the time required for the activity requires additional resources that are often more expensive to obtain than the original costs.

The employment of individuals working in the project on extra shifts or holidays entails the payment of wages higher than the normal days, and this characteristic appears in the contracting sector.

If the project owner wishes to complete it in a short period, he must pay the prices of building materials, which are certainly more than the prices specified previously when signing the project contract.

It is the cost to be taken into account when deciding to reduce, as we will see in an upcoming example.

On the other hand, the decision to speed up the completion of the project as a whole by reducing the times of critical activities must be accompanied by a study of the return and cost at the level of the project and not only the activities.

If the expected additional realized return from accelerating the project exceeds the additional cost, the decision to speed up will be justified, otherwise, such a decision will not be justified if the costs are more than the return achieved from reducing the time of completion of the project.

So far, we have explored the theoretical basis for the process of reducing activity and project time.

Now, what are the steps that are followed to achieve this procedurally? The answer lies in the following:

Third: Steps to follow to reduce project time:

We made estimates for the normal and low time for each activity.

We have made estimates of the normal costs and the cost of low time for each activity.

We have identified the critical path and critical activities.

We started the process of reducing critical activities, starting with the critical and least expensive activity, provided that this reduction is in one unit of time.

We reviewed the impact of this on the critical path and the available budget.

Continue the steps until you reach the desired date or until you use all the funds

Fourth: Reducing project completion in the case of an open budget.

Fifth: Reducing project completion in the case of a set budget.

Fast-tracking in project management:

Fast-tracking in project management is **a technique where activities are performed in parallel**, instead of being carried out sequentially using the original schedule. Simply put, fast-tracking a project means different tasks are worked on simultaneously, instead of waiting for each task to be completed separately.

What is fast-tracking in project management?

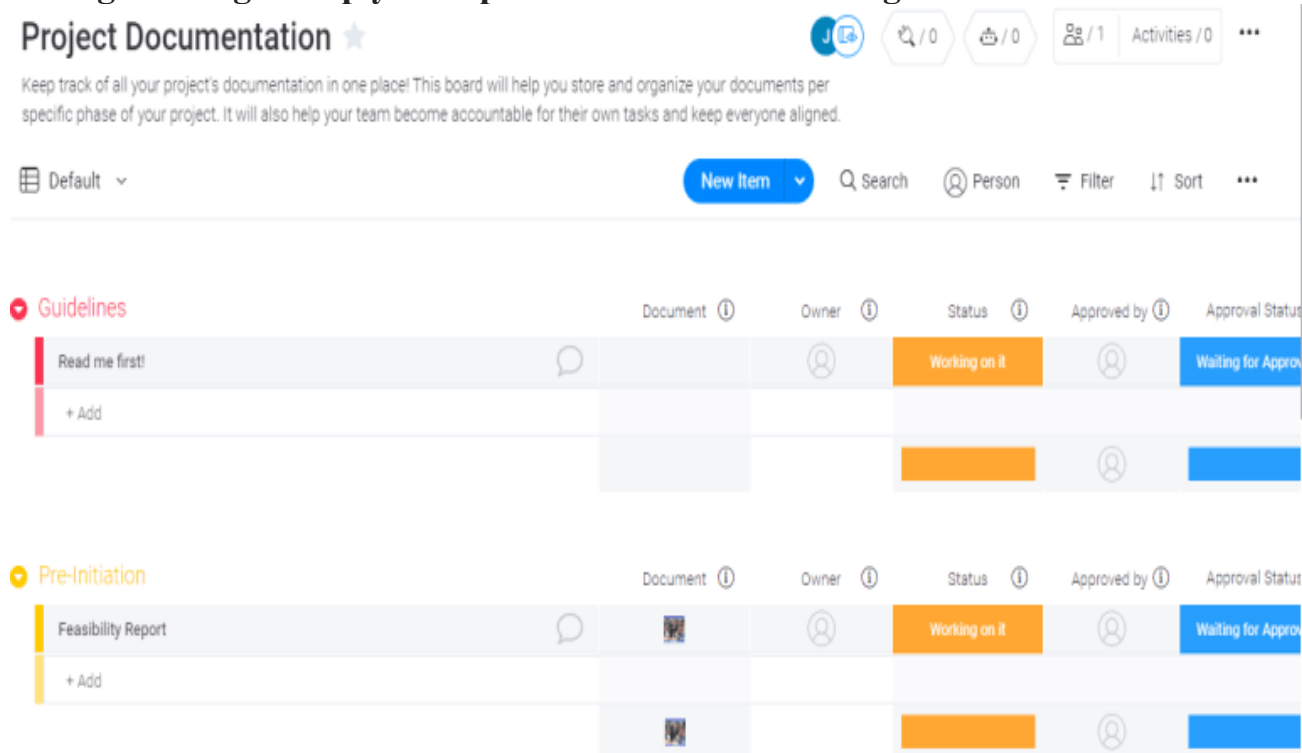
Fast-tracking in Project Management is a technique where activities are performed in parallel, instead of being carried out sequentially using the original schedule. Simply

put, fast-tracking a project means different tasks are worked on simultaneously, instead of waiting for each task to be completed separately. However, fast-tracking *can only be applied* if the activities question can actually be feasibly overlapped.

Fast-tracking allows you to compress a project timeline and shorten the project duration.

When you fast-track project schedules, a planned activity partially or completely overlaps with another. So, activities that were initially scheduled to be done one after another are rearranged to occur at the same time.

A diagram might help you to picture what we're talking about:



Reference:

<https://pmstudycircle.com/>

If this sounds like it might be necessary to hit your project deadlines, know that you're not alone.

An estimated 48% of projects are not completed on time — resulting in huge financial losses for businesses of all sizes.

Teams can fall behind on a project schedule for a number of reasons:

- Undefined project scope

- Lack of materials or resources
- Malfunctioning equipment
- Low levels of productivity
- Poor communication
- Not using proper types of collaboration tools

If a project is delayed, the situation isn't entirely hopeless. Fast-tracking can help you recover a schedule when things start to veer off track.

However, it should be noted early that fast-tracking (while an awesome scheduling technique) can only be applied when the task you're trying to fast track isn't dependent on the completion of the one before it.

Nonetheless, if managed well (and you really do need to be hot on the management of a fast-tracked project) it can be a life-saver.

When to fast track your project

Fast-tracking is one common approach to schedule compression; the crashing technique is the other. So, if fast-tracking a project isn't feasible, a project team can choose to "crash" a schedule instead.

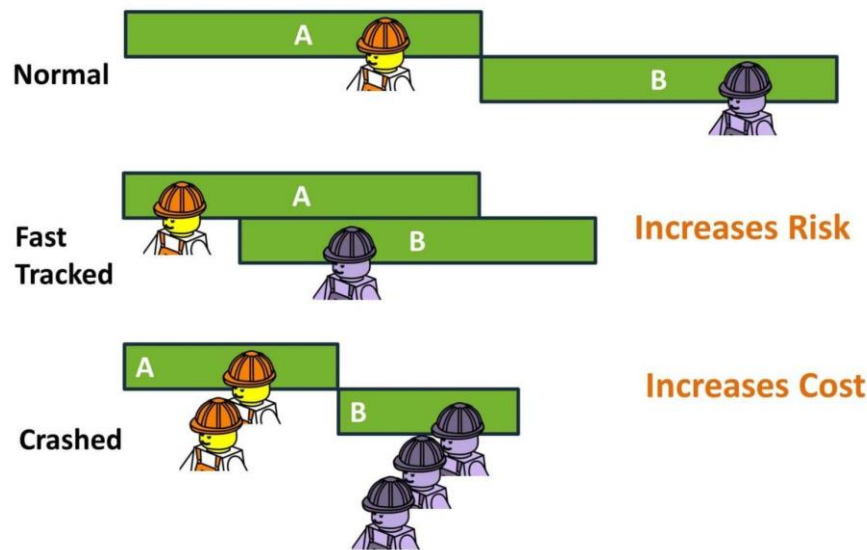
Project crashing is when you add additional resources to an activity, rather than moving up its start date.

Let's look at an example for a construction project. Instead of having one person wire a new house, you could add additional resources (e.g., hire more electricians) to get the job done faster.

Project crashing can speed up project delivery times by compressing the schedule, but there are increased costs to consider. Allocating extra resources also means that you could be taking people away from other projects.

And you have to keep the phrase "*too many cooks in the kitchen*" in mind. Sometimes adding extra people is more hassle than it's worth.

Here's an example of how a normal project schedule compares to fast-tracking as well as crashing:



Recourse: <https://getxinstitute.com/>

Now that you have a solid understanding of the benefits and process of fast-tracking, let's examine a few of its dangers.

The dangers of fast-tracking a project:

Fast-tracking a project sounds great — you can perform multiple tasks together and potentially deliver before the deadline.

But fast-tracking a project that's already in motion is risky. It means you'll have to rework the current schedule and communicate those changes to your team.

Running too many projects at the same time is also one of the biggest project management challenges that organizations face:

Running too many tasks at once comes with the same pitfalls.

Consider the impact that multitasking has on productivity.

Studies have shown that people who multitask make more mistakes and are less efficient. Slamming your team with more work than they can handle can affect their output quality.

And fast-tracking only works for activities that can be overlapped. You can't fast-track a new paint job until the rest of the car is built.

There's also the risk that fast-tracking a project won't affect the end date.

The critical path is the longest series of tasks through your project — It's the path that determines your final delivery date. This means the only way fast-tracking will change your end date is if it's done to tasks on this path (aka the critical activities).

How to fast track a project:

Proper planning is essential to fast-tracking a project. Follow these steps to get started with this project management technique:

1) Create a fast-tracking plan

Fast-tracking means taking an already created schedule and compressing it so that certain activities are completed sooner, and the overall schedule duration is shorter.

But, before you jump into the fast track process, here are some questions to ask:

How much time do you need to recover?

What activities are on the critical path?

What are the dependencies?

You also need to consider the impact that changing the schedule will have.

For example, if you assign more work to a team member, will they have the materials and time to complete the tasks? Will you need to pay overtime to ensure the work gets done before the deadline?

2) Reconfigure the schedule

The next step is to identify your fast-tracking opportunities and update your schedule.

Activities that aren't dependent on the ones before them are complete can be fast-tracked.

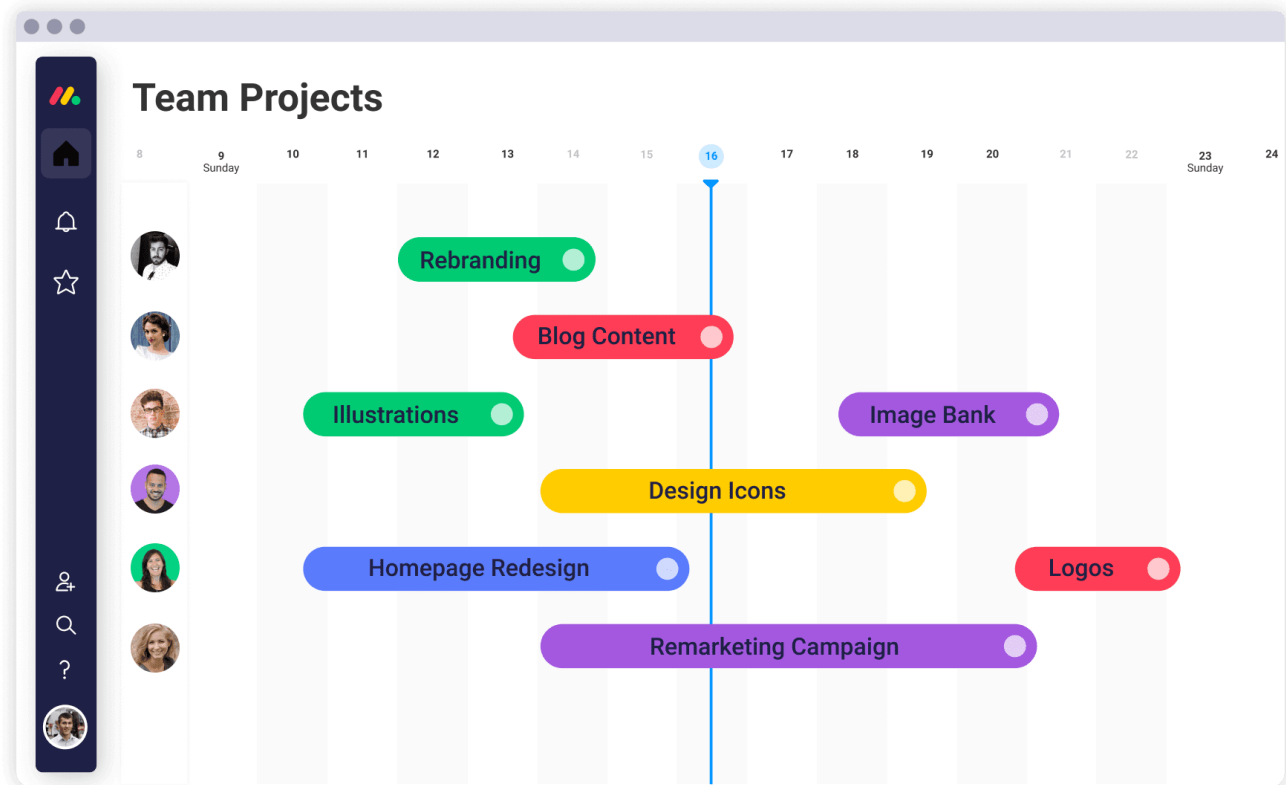
For example, let's say you're planning an event. You're responsible for finding a venue, arranging guest speakers, and sending out invites.

While you'll eventually need to tell the guest speakers were to show up, you don't have to have the venue locked in before starting your speaker search. But you can't create invitations to the event until your venue is confirmed.

Look at your critical path, identify the opportunities, and reconfigure activities that can overlap with each other.

Using a Gantt chart or timeline is useful here as you can better visualize your critical path activities, task sequences, and durations.

Here's an example of how a marketing and design team's projects could overlap



Here we can see that “Rebranding” and “Illustrations” overlap with each other. They’re being worked on at the same time by the same team.

3) Monitor progress

The signs of a failing project aren’t always easy to spot. That’s why it’s important to constantly monitor the project and ensure things are on the right track.

Communicate frequently with your team and make sure they have everything they need to do their jobs.

You can use monday.com’s project tracker template to get an overview of where things stand and identify potential bottlenecks:

Process Management ★

Add board description

88 / 1 Activities / 0

Main Table ▾

New Item ▾

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This Month

	Owner	Priority	Phase I	Phase II	Phase III	Timeline	Progress	
Project 1		★★★	Done	Working on it		Jul 1 - 7	34%	
Project 2		★★★	Done	Done	Stuck	Jul 5 - 15	67%	
Project 3		★★★	Done	Done	Done	Jul 4 - 9	100%	
+ Add								
		2.3 / 3					67%	

Next Month

	Owner	Priority	Phase I	Phase II	Phase III	Timeline	Progress	
Project 4		★★★				Aug 28 - 31	0%	
Project 5		★★★				Aug 11 - 14	0%	
+ Add								
		2 / 3					0%	

Completed tasks

	Owner	Priority	Phase I	Phase II	Phase III	Timeline	Progress	
Project 6		★★★				May 19 - 25	0%	
Project 7		★★★				Jun 17 - 23	0%	
+ Add								
		2 / 3					0%	

4) Keep track of any problems

It's likely you'll experience some hiccups when fast-tracking a project.

Document any problems and note down how you addressed them. That way you'll be better prepared if a similar situation happens in the future.

How can project management software help you with fast-tracking?

Project management software enables you to see an overview of ongoing tasks, their status, and the people responsible for them all at a glance.

This lets you identify activities that can be fast-tracked and monitor the impact of any changes you make to the schedule. Moving one task will automatically shift related ones.

37. Develop general rules for the negotiation process.

Negotiation is the process through which two or more people (or organizations) settle a problem or reach a better conclusion by reaching a compromise. Negotiation is a method of avoiding arguments and reaching an agreement with which both parties are happy. Our company and project team believes in integrative negotiation. Integrative negotiators do not believe in a set pie, but rather think that both parties may generate value or mutual benefits by proposing trade-offs and reframing the problem such that everyone walks away with a win-win solution.

Our company and project team has devised several rules for the negotiation process. These rules are discussed below:

- Know your negotiation goal
- Develop a plan before starting negotiations
- Thoroughly study and don't underestimate your counterpart
- Try to make negotiation a win-win situation for both parties
- Don't negotiate with yourself
- Strongly react if you find that the opposing party is untrustworthy
- Always negotiate in writing

38. Two negotiation plans

Since our company is a construction firm most of the time, we will be negotiating with our material vendors and suppliers. The negotiations can take place within the team or company as well.

Table 15: Negotiation Plan A

Description of what is being negotiated:		
Negotiating project schedule and timeline with the project owner.		
Relationship Type:		
New relationship.		
	Ours	Theirs
Most Desired Outcome	Complete project by 1 September 2023.	Complete project by 1 July 2023.
Goal	Get an increase in the project completion time by at least 2 months.	Finish the project as decided earlier.
Least Acceptable Agreement	Increase project completion time by 2 months.	Increase project completion time by 1 month.
The best alternative to a negotiated agreement	Increase project completion time by 1 month.	Increase project completion time by 1 month.
Known facts	The project team is busy as a new project has been taken which will run parallel to this project.	The owner wants to move in July. He is living in a rented apartment and wants to move in as quickly as possible.
Assumptions	Some team members will have to be re-allocated from this project to another project and it will result in a shortage of workers.	The project team is solely working on this project.
Trades (equal trade-offs)	Reduce 1 month from the additional time asked.	Grant one month additional to complete the project.
Conclusion	Granted 1 month additional to complete the project.	Granted 1 month additional to complete the project.

Table 16: Negotiation Plan B:

Supplier Name: SEIF Suppliers	Their Team: XYZ	Our Team: XYZ				
Target #	Description of Negotiable Element	Must-Have? (Y/N)	Like to Have? (Y/N)	Objective	Strategy to obtain objective	Outcome Status
1	Reduce the proposed cost of the materials purchased in bulk	Y	Y	Due to high volume, it will be necessary to cut costs.	Purchase items in bulk at the start of the project.	The supplier has agreed to reduce costs by 5%.
2	Increase the quality of materials	Y	Y	This project requires the best quality materials.	Explain supplier your requirements for the materials.	The supplier has agreed to supply the best quality materials.
3	Reduction in the materials delivery time	Y	Y	Timely delivery of materials will be crucial for the success of this project.	Purchase materials in bulk and order materials when sufficient quantities are still available at the construction site.	The supplier has agreed to deliver materials in time.

39.To identify the Triple constraint of the project

Cost, Time, and Scope are the three constraints in a project. The project must be completed within \$900,000 before August 2023. The project scope includes a basement foundation, landscaping, entryway, two-story home with 4 bedrooms and an office area, 2-car garage, and deck/patio.

40.To set up a list of the project success factors

- Customer expectations met
- Customer satisfied with the quality
- Timely completion
- Completed within budget
- Meets quality requirements
- Meets design requirements
- Satisfaction of all involved stakeholders

41. To develop and identify work breakdown structure, in addition, to preparing a guide to illustrate it

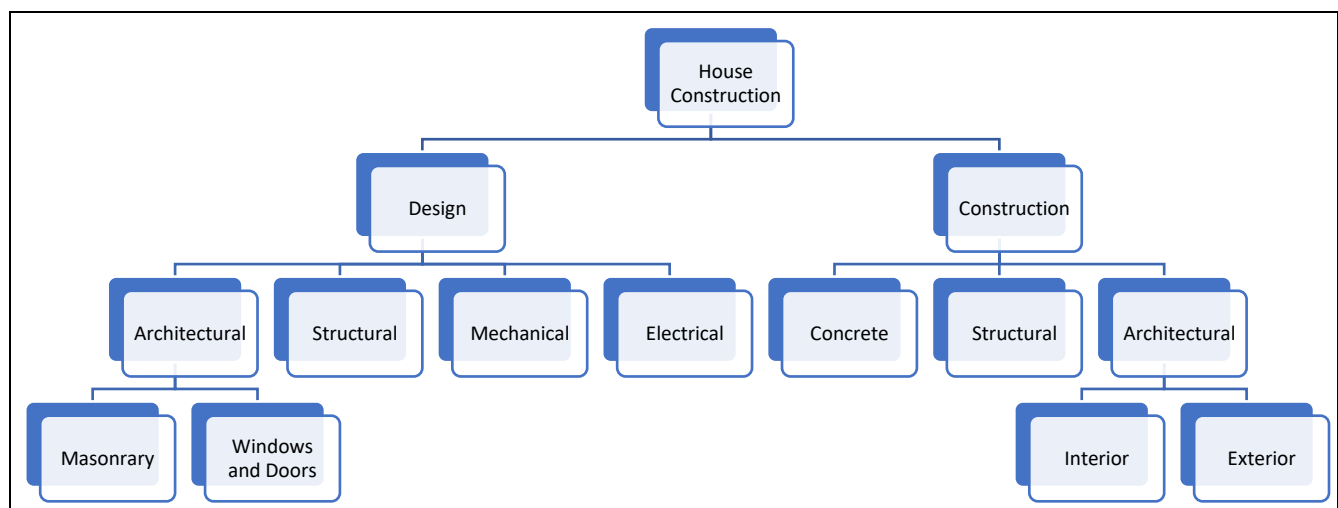


Figure 12: work breakdown structure

42.To identify the Requirement traceability matrix

The requirements traceability matrix is a grid that links product requirements from their origin to the deliverables that satisfy them. The implementation of a requirements traceability matrix helps ensure that each requirement adds business value by linking it to the business and project objectives. It provides a means to track requirements throughout the project life cycle, helping to ensure that requirements approved in the requirements documentation are delivered at the end of the project. Finally, it provides a structure for managing changes to the product scope.

Tracing requirements includes but is not limited to:

- Business needs, opportunities, goals, and objectives.
- Project objectives.
- Project scope and WBS deliverables.
- Product design.
- Product development.
- Test strategy and test scenarios.
- High-level requirements to more detailed requirements.

Attributes associated with each requirement can be recorded in the requirements traceability matrix. These attributes help to define key information about the requirement. Typical attributes used in the requirements traceability matrix may include: a unique identifier, a textual description of the requirement, the rationale for inclusion, owner, source, priority, version, current status (such as active, canceled, deferred, added, approved, assigned, completed), and status date. Additional attributes to ensure that the requirement has met stakeholders' satisfaction may include stability, complexity, and acceptance criteria. Figure provides an example of a requirements traceability matrix with its associated attributes. (Project Management Institute. (2017).P 148-149).

43.To specify the methods used in requirement collection.

Data-gathering techniques that can be used for this process include but are not limited to:

- Brainstorming.
- Interviews.
- Focus groups.
- Questionnaires and surveys.
- Benchmarking.

(Project Management Institute. (2017). P 142-144).

44.To develop the hierarchical structure of the objectives of the project connected to the strategy.

Develop Project goals with these tools and Techniques:

- Expert judgment
- Data gathering
- Interpersonal and team skills
- Meetings

(Project Management Institute. (2017).P 153-154).

45.To develop, identify, and prepare the scope statement (Its limits- and objects that are not included)

Project scope management entails ensuring that all needed work, and only the essential work, is completed in order to finish the project (PMI, 2004). Any effort that does not meet the project's requirements is considered out of scope and must be avoided. The Project Scope Statement serves as a recorded foundation for all project possibilities, as well as a means of directing project effort and communicating the scope of the project to the entire project team and other relevant parties. Initially, in the project lifecycle, a project team prepares a Project Scope Statement to clearly define the project's bounds. The collection of activities that guarantee that a project's scope is appropriately specified and mapped is known as project scope management (Mempyans-Robinson, 2006).

Project managers and supervisors may use scope management approaches to distribute the proper amount of work to accomplish a project effectively.

1. Identify the project's requirements:

The first stage in creating a project timetable, allocating project resources, and setting project objectives is defining the project's requirements. Only by following these procedures will we be able to comprehend the work that has to be done, i.e., the project's scope must be specified. After that, team members may be assigned jobs and instructed in order to complete a project within the time and budget constraints.

2. Recognize the project's goals:

To define the project scope, start by determining the project's goals, which might include building a new product, launching a new service inside the company, or creating a new piece of software. A project's fundamental purpose may be one of many; the project manager guarantees that the team produces outcomes in accordance with the features or functions that have been established.

3. Establish the project's scope:

The scope of a project is primarily defined by the resources and labor that go into creating a product or service. The scope of work describes the objectives that will be accomplished in order to obtain a good outcome.

With input from all stakeholders, we developed a scope statement that includes a project analysis and the translation of goals into deliverables. The design expert and project manager's job is to identify and design the project scope to meet the owner's functional, financial, scheduling, and environmental project goals. When they fail to do so, the owner is almost usually dissatisfied with the results, resulting in frequent friction between the partners. Moreover, when the scope of the work is ambiguous, it creates an acrimonious relationship between the owner and the contractor in the future, as they argue about the scope and quality of the work, as well as whether the work is appropriately described by the contract documents prepared by the design professional and project manager.

For our project, the project scope includes a basement foundation, landscaping, entryway, two-story home with 4 bedrooms and an office area, 2-car garage, and deck/patio within the budget of \$900,000. Any modifications to the scope of the project must be approved by the sponsor/owner of the project. The project must be completed before August 2023. The project scope also includes obtaining an Energy Star rating. Everything else is outside the scope of this project. If any addition is required as a design requirement or customer preference it will be added through a proper change control process.

46.To develop, identify, and explain the concepts: Scope creep and giving examples

Scope creep occurs when a project is not adequately defined, developed, or documented (Komal et al., 2020). This must be eliminated if at all feasible since it might lead to the project's uncontrolled expansion. Change is unavoidable in almost every project, but it's the unmanaged changes that create project delays and scope creep. Modifications to a project's scope that are acknowledged and implemented as part of the revised scope are managed and do not result in scope creep. Any unapproved alterations that may have an impact on production, deliverables not being met, and budgets being surpassed is termed scope creep. When scope creeps are permitted in a project, the finished product may appear significantly different from what was initially envisioned.

A good example of scope creep in our project is when the Sponsor adds something new to the project, such as design changes, such as three bedrooms instead of two. Another example of scope creep is when the Sponsor requests last-minute adjustments to the building's interior finishes in order to make it more contemporary and in line with current construction industry trends. This will increase the project budget and timeline since it was not previously included in the scope.

A lack of project change control can also be a cause of scope creep. Modifications to the design requirements can be made by the project sponsor and designer without informing the project manager. This leads to scope creep, as the manager is unaware of these changes and when suddenly he is asked to incorporate these changes into the project, he might not have the necessary people, budget, or materials to employ those changes. A good way to deal with scope creep is to have a change control process. An example of a change request for this project is provided below:

Title of Authorized Requestor:	Owner				Request Number	12-DE		
Department/Division:	Design							
Description of change requested								
	The interior finishing of the building needs to be modified.							
	The stakeholders want interior finishing of the building to be more modern and according to the latest trends in the building industry							
Expected benefit of the change								
	Stakeholder		Value Added Description			Value-Added Amount		
	Residence Owner		The proposed change significantly improves the			30,000	35000	
			safety vulnerabilities. It slightly improves the					
			environmental impact of the building too.					
			Future selling also profitable with these changes.					
Implementation Requirements								
	USB outlet plugs, a technology-sawvy entertainment center, or something as simple as a designated space for tablets and laptops.							
	Show off building windows with high hanging window treatments. New O&M procedures needs to be opted according to the							
	latest building industry requirements. Inspection and testing procedures needs to be modified. Bathrooms need to be well furnished.							
	Training must be provided to workers so that they can carry out the required work affectively.							
	For all the changes a building designer needs to employed.							
Cost of Implementation								
							Low	High
	1.	New Materials					12000	16,000
	2.	Inspection and testing					4000	6000
	3.	Building Designer					8000	10000
	4.	Special equipment					10000	14000
						Total	\$ 64,000	\$ 81,000
Return on Investment								
	Annual savings (revenue enhancement or cost reductions)							\$ 50,000
	Cost of implementation							72,500
						1st Year Savings	\$ (22,500)	
	Return on Investment (1st year) (1st year savings divided by cost)							-31.03%

Figure 13: Change Request

47.To illustrate product analysis management.

Product analysis is a critical project management step that is required for projects that include products as an outcome. It's a tool that's utilized to define a product's scope. It usually entails raising inquiries about a product and formulating responses that define the product's usage, qualities, and other pertinent factors before delivery. It's a good tool for projects when the outcome is a product rather than a service or a result (Moustafaev, 2014). It enables project managers to ensure that the product and project scopes are both properly defined and realistic.

In project management, product analysis is a useful technique. It is used to see whether the product that will be supplied will be successful in attracting the target customer.

Value engineering is a sort of product analysis that entails determining the most cost-effective approach to complete activities, work packages, and the whole project. We'll create an initial plan of activities and then employ a qualified expert to figure out how to perform it efficiently and affordably. Because this is a construction project and we are offering a service or an end result in the form of a decent house, product analysis management strives to optimize project operations to reduce costs while maintaining the project schedule and quality.

On this project, value engineering will also be used. Value engineering is a systematic approach to examining intended building characteristics, methods, equipment, and material choices in order to provide necessary products at the lowest life cycle cost while maintaining needed quality, safety, dependability, and wellbeing.

Value engineering, when appropriately performed during the design phase of a construction project, evaluates different design alternatives to maximize the project's predicted cost/worth ratio upon completion. Value engineering elicits suggestions on how to maintain or improve performance while lowering life cycle costs. Our company utilizes specialized know-how and experience of past projects to suggest cost-cutting adjustments while preserving or improving quality, value, and functional performance throughout the building phase, thanks to shared savings.

48.To illustrate the transformation of the work packages in Work Breakdown Structure to activities.

A work breakdown structure (WBS) is a breakdown of a project that is graphical, hierarchical, and focused on deliverables. It's a useful diagram for project managers since it helps them to break down the scope of their projects and see all of the activities needed to finish them (Burghate, 2018). The first step in creating a project schedule is to create a work breakdown structure (WBS). It lays out all of the tasks that must be accomplished (along with a proper sequence) in order to meet the project's goals and objectives. We can better grasp our project scope and devote resources to all of our project activities by visualizing it in this way.

We created a thorough hierarchical representation of work packages and activities using a work breakdown structure (WBS). In a WBS, a work package is the smallest unit. Outcomes are often split into smaller, more reasonable pieces of work when generating a Work Breakdown Structure utilizing the decomposition approach.

The WBS work packages must be transformed into small tasks after all of the project's deliverables have been defined. To perform the transformation of work packages into activities:

- Project activities are first defined.
- The activities are organized in a logical order.
- The project manager must be able to estimate the time of the activities, the resources needed to execute them, and the cost of completion.
- To perform each activity, resources are allocated.

The decomposition process persists until the deliverables are compact enough to be classified as work packages. Each of these work packages should be compact enough to aid the Project Manager in estimating the time and cost of the project. Work packages may be planned, budgeted, tracked, and managed. The activity list is created by breaking down the work packages into activities. The project schedule will then be created using this activity list. Activity is intended to last a certain amount of time. A milestone is a one-time occurrence that has zero duration. Budget and/or resource consumption is also a factor in activities. When creating our activities list in Project Professional we also assigned costs to each activity in the form of human and material resources.

Summing these costs, we obtained our project budget. Then we added contingency reserves to tackle any unexpected changes or risks in the project lifecycle. A simplified version of our project WBS is drawn below:

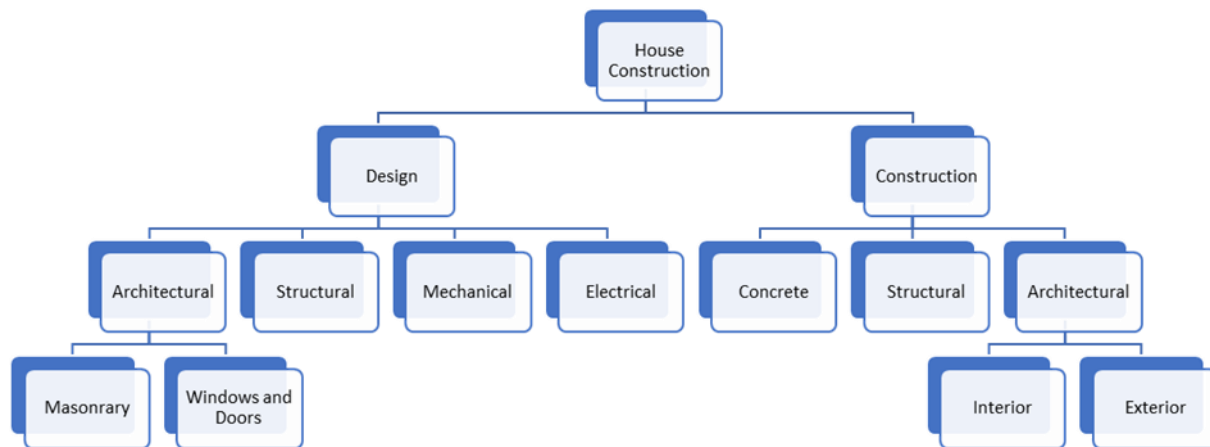


Figure14: Project WBS

49.To develop the functions list or the activities included in each work package in WBS

Functions list or the Activities included in each work package in WBS

Table 17: Function List

Task Name
House Construction Project
Charter Approval
Architectural Design Approval
Permit/Set-Up
Receive notice to proceed and sign the contract
Finalize plans and develop an estimate with the owner, and architect
Prepare and submit project schedule
Obtain building permits
Sign contract and notice to proceed
Building Permit Approval
Mobilize on Site
Install temporary power
Install temporary water service

Prepare site - laydown yard and temporary fencing
Site Grading and Utilities
Clear and grub site
Rough grade site (cut and fill)
Perform final site grading
Erect building batter boards and layout building
Site grading and utilities completed
Foundations
Excavate foundations
Form column piers and spread foundations
Pour column piers and foundations
Prepare and pour a concrete floor in the elevator pit
Steel Erection
Erect steel columns, beams, and joist - 1st and 2nd floors
Erect steel columns, beams, and joist - 3rd floor and roof
Install stairs and miscellaneous iron railing
Touch-up paint on steel
Landscape completion
Form and Pour Concrete - Floors and Roof
Form 2nd floor including all floor openings
Strip forms from roof slab
Form 1st floor
Install electrical underground
Install plumbing underground
Install rebar and in-floor utilities
Strip forms from 1st-floor slab
Dry In
Install 1st-floor sheathing
Install 2nd-floor sheathing
Install roof decking
Hang 1st-floor exterior doors
Install 1st-floor windows

Install 2nd-floor windows
Exterior Finishes
Complete exterior brick
Complete exterior siding
Interior Finishes
Insulation
Place wall insulation - 1st floor
Place wall insulation - 2nd floor
Place ceiling insulation - 2nd floor
Conduct insulation inspection
Paint and Wallpaper
Texture all except entry and kitchen - 1st floor
Paint all except entry and kitchen - 1st floor
Hang wallpaper entry and kitchen - 1st floor
Paint exterior siding & trim work
Cabinets
Install 1st floor - kitchen cabinets
Install 1st floor - master bath and guest cabinets
Install 2nd floor - hall bath and private bath cabinets
Install chair rails, crown moldings, trim
Interior finishing completed
Masonry Work
Rough-in plumbing at toilets and masonry walls
Lay masonry at core, mechanical, and toilets
Install exterior masonry work
Install roof drains
Install tile in toilet rooms
Roofing
Install flashing at parapet walls
Pour lightweight concrete roof fill
Install seamless roofing material
Spread stone ballast on the seamless roof

Set rooftop equipment
The window wall and storefront closures
Install window wall aluminum and glass
Install interior stud walls and drywall
Install interior doors and hardware
Install storefront doors and hardware
Building Finishes
Install millwork and wood trim
Paint walls and woodwork
Install conduit at ceiling plenum space
Install duct in ceiling plenum space
Install hardware and accessories
Complete interior and exterior sod and plantings
Plumbing
Rough-in plumbing in drywall walls
Tie-in fire line riser and set valves
Set plumbing fixtures and trim
Flush, test, and clean piping and fixtures
Electrical
Rough-in electrical in masonry walls
Rough-in electrical in drywall walls
Pull wire in conduit and set area transformers
Install and terminate electrical devices
Make electrical terminations for HVAC equipment
Install light fixtures - test and clean
Heating and Ventilating - AC
Set equipment in the mechanical room
Rough-in mechanical in masonry walls
Rough-in mechanical in drywall walls
Final Clean-up and Occupancy
Install hard tile flooring in common areas
Substantial completion date

Complete Final Inspections
Complete elevator inspection and certification
Perform final walk-through inspection
Issue final completion documents including warranties
Issue final request for payment
Apply certificate of occupancy
Certificate of Occupancy Obtained

50.To illustrate the relationships between the activities

Table 18: Relationships between activities

Task Name	Duration	Start	Finish	Predecessors
House Construction Project	390 days	1/1/2022	7/3/2023	
Charter Approval	0 days	1/1/2022	1/1/2022	
Architectural Design Approval	0 days	2/10/2022	2/10/2022	
Permit/Set-Up	136 days	1/3/2022	7/12/2022	
Receive notice to proceed and sign the contract	3 days	1/3/2022	1/5/2022	1
Finalize plans and develop an estimate with the owner, architect	3 days	1/6/2022	1/10/2022	4
Prepare and submit project schedule	2 days	1/11/2022	1/12/2022	5
Obtain building permits	4 days	1/6/2022	1/11/2022	4
Sign contract and notice to proceed	1 day	1/12/2022	1/12/2022	5,7
Building Permit Approval	0 days	7/12/2022	7/12/2022	
Mobilize on Site	138 days	1/13/2022	7/25/2022	
Install temporary power	5 days	7/12/2022	7/18/2022	9
Install temporary water service	5 days	1/13/2022	1/19/2022	8

Prepare site - laydown yard and temporary fencing	5 days	7/19/2022	7/25/2022	11,12
Site Grading and Utilities	33 days	7/26/2022	9/8/2022	
Clear and grub site	3 days	7/26/2022	7/28/2022	13
Rough grade site (cut and fill)	2 wks	7/29/2022	8/11/2022	15
Perform final site grading	2 wks	8/12/2022	8/25/2022	16
Erect building batter boards and layout building	2 wks	8/26/2022	9/8/2022	17
Site grading and utilities completed	0 days	9/8/2022	9/8/2022	18
Foundations	15 days	9/9/2022	9/29/2022	
Excavate foundations	1 wk	9/9/2022	9/15/2022	19
Form column piers and spread foundations	4 days	9/16/2022	9/21/2022	21
Pour column piers and foundations	5 days	9/22/2022	9/28/2022	22
Prepare and pour a concrete floor in the elevator pit	1 day	9/29/2022	9/29/2022	23
Steel Erection	20 days	9/30/2022	10/27/2022	
Erect steel columns, beams, and joist - 1st and 2nd floors	1 wk	9/30/2022	10/6/2022	24
Erect steel columns, beams, and joist - 3rd floor and roof	1 wk	10/7/2022	10/13/2022	26
Install stairs and miscellaneous iron railing	1 wk	10/14/2022	10/20/2022	27
Touch-up paint on steel	1 wk	10/21/2022	10/27/2022	28
Landscape completion	0 days	10/27/2022	10/27/2022	29
Form and Pour Concrete - Floors and Roof	25 days	10/28/2022	12/1/2022	
Form 2nd floor including all floor openings	5 days	10/28/2022	11/3/2022	26,30
Strip forms from roof slab	2 days	11/4/2022	11/7/2022	32

Form 1st floor	4 days	11/4/2022	11/9/2022	32
Install electrical underground	5 days	11/10/2022	11/16/2022	34
Install plumbing underground	5 days	11/17/2022	11/23/2022	35
Install rebar and in-floor utilities	6 days	11/24/2022	12/1/2022	36
Strip forms from 1st-floor slab	2 days	11/24/2022	11/25/2022	36
Dry In	16 days	11/28/2022	12/19/2022	
Install 1st-floor sheathing	3 days	11/28/2022	11/30/2022	38
Install 2nd-floor sheathing	3 days	12/1/2022	12/5/2022	40
Install roof decking	3 days	12/6/2022	12/8/2022	41
Hang 1st floor exterior doors	1 day	12/9/2022	12/9/2022	42
Install 1st-floor windows	3 days	12/12/2022	12/14/2022	43
Install 2nd-floor windows	3 days	12/15/2022	12/19/2022	44
Exterior Finishes	19 days	12/20/2022	1/13/2023	
Complete exterior brick	16 days	12/20/2022	1/10/2023	45
Complete exterior siding	3 days	1/11/2023	1/13/2023	47
Interior Finishes	12 days	1/16/2023	1/31/2023	
Insulation	4 days	1/16/2023	1/19/2023	
Place wall insulation - 1st floor	1 day	1/16/2023	1/16/2023	48
Place wall insulation - 2nd floor	1 day	1/17/2023	1/17/2023	51
Place ceiling insulation - 2nd floor	1 day	1/18/2023	1/18/2023	52
Conduct insulation inspection	1 day	1/19/2023	1/19/2023	53
Paint and Wallpaper	7 days	1/19/2023	1/27/2023	
Texture all except entry and kitchen - 1st floor	1 day	1/19/2023	1/19/2023	53
Paint all except entry and kitchen - 1st floor	1 day	1/20/2023	1/20/2023	56
Hang wallpaper entry and kitchen - 1st floor	1 day	1/23/2023	1/23/2023	57

Paint exterior siding & trim work	4 days	1/24/2023	1/27/2023	57
Cabinets	6 days	1/24/2023	1/31/2023	
Install 1st floor - kitchen cabinets	2 days	1/24/2023	1/25/2023	58
Install 1st floor - master bath and guest cabinets	1 day	1/26/2023	1/26/2023	61
Install 2nd floor - hall bath and private bath cabinets	1 day	1/27/2023	1/27/2023	62
Install chair rails, crown moldings, trim	2 days	1/30/2023	1/31/2023	63
Interior finishing completed	0 days	1/31/2023	1/31/2023	64
Masonry Work	21 days	2/1/2023	3/1/2023	
Rough-in plumbing at toilets and masonry walls	1 wk	2/1/2023	2/7/2023	64
Lay masonry at core, mechanical, and toilets	1 wk	2/8/2023	2/14/2023	67
Install exterior masonry work	1 wk	2/15/2023	2/21/2023	68
Install roof drains	2 days	2/28/2023	3/1/2023	69
Install tile in toilet rooms	1 wk	2/8/2023	2/14/2023	67
Roofing	33 days	2/22/2023	4/7/2023	
Install flashing at parapet walls	4 days	2/22/2023	2/27/2023	69
Pour lightweight concrete roof fill	2 days	3/2/2023	3/3/2023	70,73
Install seamless roofing material	5 days	3/13/2023	3/17/2023	74FS+5 days
Spread stone ballast on the seamless roof	5 days	3/20/2023	3/24/2023	75
Set rooftop equipment	2 wks	3/27/2023	4/7/2023	76
The window wall and storefront closures	15 days	2/22/2023	3/14/2023	

Install window wall aluminum and glass	1 wk	2/22/2023	2/28/2023	69
Install interior stud walls and drywall	1 wk	3/1/2023	3/7/2023	79
Install interior doors and hardware	1 wk	3/8/2023	3/14/2023	80
Install storefront doors and hardware	1 wk	3/1/2023	3/7/2023	69
Building Finishes	25 days	3/1/2023	4/4/2023	
Install millwork and wood trim	1 wk	3/15/2023	3/21/2023	82,80
Paint walls and woodwork	1 wk	3/22/2023	3/28/2023	84,81
Install conduit at ceiling plenum space	1 wk	3/1/2023	3/7/2023	79
Install duct in ceiling plenum space	1 wk	3/8/2023	3/14/2023	80,86
Install hardware and accessories	1 wk	3/29/2023	4/4/2023	85
Complete interior and exterior sod and plantings	1 wk	3/29/2023	4/4/2023	85
Plumbing	25 days	3/1/2023	4/4/2023	
Rough-in plumbing in drywall walls	1 wk	3/1/2023	3/7/2023	79
Tie-in fire line riser and set valves	1 wk	3/8/2023	3/14/2023	91
Set plumbing fixtures and trim	1 wk	3/15/2023	3/21/2023	91,67
Flush, test, and clean piping and fixtures	1 wk	3/29/2023	4/4/2023	85,92,93
Electrical	26 days	3/8/2023	4/12/2023	
Rough-in electrical in masonry walls	1 wk	3/8/2023	3/14/2023	79
Rough-in electrical in drywall walls	1 wk	3/15/2023	3/21/2023	79

Pull wire in conduit and set area transformers	1 wk	3/22/2023	3/28/2023	96,86
Install and terminate electrical devices	1 wk	3/29/2023	4/4/2023	98,97
Make electrical terminations for HVAC equipment	1 day	4/12/2023	4/12/2023	98,77
Install light fixtures - test and clean	1 wk	4/5/2023	4/11/2023	99
Heating and Ventilating - AC	15 days	4/12/2023	5/2/2023	
Set equipment in the mechanical room	1 wk	4/12/2023	4/18/2023	101
Rough-in mechanical in masonry walls	1 wk	4/26/2023	5/2/2023	103
Rough-in mechanical in drywall walls	1 wk	4/19/2023	4/25/2023	103
Final Clean-up and Occupancy	25 days	4/26/2023	5/31/2023	
Install hard tile flooring in common areas	1 wk	4/26/2023	5/2/2023	105
Substantial completion date	0 days	5/31/2023	5/31/2023	
Complete Final Inspections	3 days	5/31/2023	6/2/2023	
Complete elevator inspection and certification	3 days	5/31/2023	6/2/2023	108
Perform final walk-through inspection	1 day	6/5/2023	6/5/2023	110
Issue final completion documents including warranties	1 day	6/6/2023	6/6/2023	111
Issue final request for payment	1 day	6/7/2023	6/7/2023	112
Apply certificate of occupancy	2 days	6/8/2023	6/9/2023	113
Certificate of Occupancy Obtained	0 days	7/3/2023	7/3/2023	

51.To develop the logical diagram of the project activities, and identify the critical path.

Logical diagrams and project activities are too complex to be displayed here. A Microsoft Project File has been attached through which the Project Activities with Critical Path and Network Diagram of the project can be viewed.

52.To prepare Gantt chart and Milestones model.

Gantt Chart has been drawn using the Project Professional software. It is too complex to be properly displayed here. A separate file has been attached through which the project Gantt Chart can be viewed. Project milestones are listed below:

Table 19: Project milestones

Milestones	Description	Date
Charter Approval	Must be completed 3 months before project initiation.	1-Jan-22
Architectural Design Approval	Design must be completed for project guidance.	10-Feb-22
Building Permit Approval	Must be acquired before commencing construction.	12-Jul-22
Landscaping completion	Includes driveway construction, excavation, foundation, and grading.	27-Oct-22
Exterior finishes, wiring, and plumbing	Install electrical wiring, water conduits, and finish exterior.	1-Jan-23
Interior Decoration	Interior finishing as per customer needs.	1-May-23
Project Completion	Project completed and preparing for the occupancy certificate	31-May-23
Certificate of Occupancy	The client can finally move into the residence.	3-Jul-23

53.To clarify Deming's model for quality.

53.1. **Definition of the Deming Model of Quality Management or (Deming's 14 Points on Quality Management):**

A core concept on implementing total quality management (TQM), is a set of management practices to help companies increase their quality and productivity. (Anderson, J.C., Rungtusanatham, M., Schroeder, R.G., 1994).

53.2. **Deming's 14 Points for Total Quality Management are as follows:**

1. Create constancy of purpose for improving products and services.
2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.
4. End the practice of awarding business on price alone; instead, minimize total cost by working with a single supplier.
5. Improve constantly and forever every process for planning, production, and service.
6. Institute training on the job.
7. Adopt and institute leadership.
8. Drive out fear.
9. Break down barriers between staff areas.
10. Eliminate slogans, exhortations, and targets for the workforce.
11. Eliminate numerical quotas for the workforce and numerical goals for management.
12. Remove barriers that rob people of pride of workmanship, and eliminate the annual rating or merit system.
13. Institute a vigorous program of education and self-improvement for everyone.
14. Put everybody in the company to work accomplishing the transformation.

53.3. **Deming cycle:**

Deming cycle is a four-step iterative technique used to solve problems and to improve organizational processes, the stages are Plan-Do-Check-Act (PDCA).

(Chen, Y. and Li, H., 2019)

- P – Plan, or planning.
- D – Do, or the execution.
- C – Check, ie the test and control.
- A – Act, which is the action.

53.4. The concept of PDCA cycle:

1. Plan:

The plan is the primary link of quality management. Through the plan, it determines the quality management policy and objectives, as well as measures and action, plans to achieve the goals and objectives. The plan includes quality management goals and quality assurance work plans.

2. Do:

The implementation includes two steps, that is, the completion of the plan of action plan and the technical activities of the construction operations that are required by the method and requirements specified in the plan. First of all, we must do a good job in planning and implementing the plan. Implementation includes the implementation of the organization, implementation of technology and materials. Secondly, in the construction activities carried out according to plan, we rely on the quality assurance work system to ensure the implementation of the quality plan.

3. Check:

The inspection is to check the plan, check the implementation and effect of the implementation, and promptly detect the deviations and problems in the implementation of the plan. The inspection generally includes two aspects: First, check whether the planned action plan has been strictly implemented, check whether the actual conditions have changed, summarize the experience of successful implementation, and identify the reasons for failure to implement the plan; second, check the results of the implementation of the plan. That is, whether the quality of the construction meets the requirements of the standard, and it is should be carefully evaluated and confirmed.

4. Action:

Action is based on inspection, affirming successful experience and forming standards to facilitate the use of this as a basis for processing in future work, and consolidating the results; and taking measures to correct deviations in the implementation of plans, overcoming shortcomings,

53.5. Application of PDCA cycle in project quality management:

The quality management in the decision phase and the quality management before construction is equivalent to the first link P in the PDCA cycle. Their functions are equal and their purposes are the same. They are all collecting materials, formulating standards and plans, demonstrating feasibility, and making preparations. In the project, it is equal to the design stage. The designer should fully collect the data and communicate with the owner to provide high-quality drawings. The quality management in the construction

process is equivalent to the second and third links in the PDCA cycle, D and C. In addition to the construction, the site control and inspection are also performed in this link. This is equivalent to construction supervision. The main responsibility of the task and supervision is to check and avoid the occurrence of engineering quality problems. If quality accidents occur, on-site processing is also required. This content takes into account the functions of the second and third aspects of the PDCA cycle. The quality management after the completion of the project is equivalent to the last link A in the PDCA cycle. In this link, all parties involved in project quality management review and summarize the quality of the project and ask questions, which can be resolved through consultation. The problems that emerge can be an important part of future project quality management. Realizing the PDCA cycle in the project quality management content can better promote the continuous improvement of the project quality management (Chenggang M., 2007) (Haiyan, S.,2007). It can be seen from this that the quality assurance system is running in accordance with the cycle of the PDCA cycle. Once it is run, the construction quality will be improved by one step. If any one of these links goes wrong, it will lead to deviations in the quality of the project. Therefore, these four links are interlocking.

54.To develop the SIPOC model, and Ishikawa for one of the issues of the project outputs.

54.1. Data Visualization:

Data representation methods that can be used for this process include, but are not limited to, the following:

1-Flowcharts:

Flowcharts are also referred to as process maps because they show the sequence of steps and branching possibilities List of a process that converts one or more inputs into one or more outputs. Flowcharts show activities, decision points, branching loops, parallel paths, and the overall ordering of processing by plotting the operational details of actions that are in a horizontal value chain one of the versions of the value chain known as the Sebeka model (suppliers, inputs, processes, outputs, customers) shown in **Figure 13**

2-Boolean data model:

Logical data models are the visual representation of an organization's data, articulated in business language and independent of any proprietary technology. The Boolean data model can be used to determine where data integrity or other quality issues arise.

3-Matrix Diagrams:

Matrix diagrams help to find the strength of relationships between the various factors, causes, and goals that exist between

The rows and columns that make up the matrix. Depending on the number of factors being compared, a project manager can use different formats

In this process, matrices help to. Roof-shaped and bottom-shaped L, T, Y, X, C matrix diagrams; Example

Facilitate identification of key quality metrics that are critical to project success.

4- Create a mind map.

Mind mapping is a graphical method used to organize information in a visual organization. The mind map is often formed in quality around a single concept of quality, drawn as an image in the middle of a white horizontal page, to which are added representations of ideas in the form of pictures, words, and parts of words. A mind mapping technique can assist in the rapid collection of project quality requirements, constraints, dependencies, and relationships.

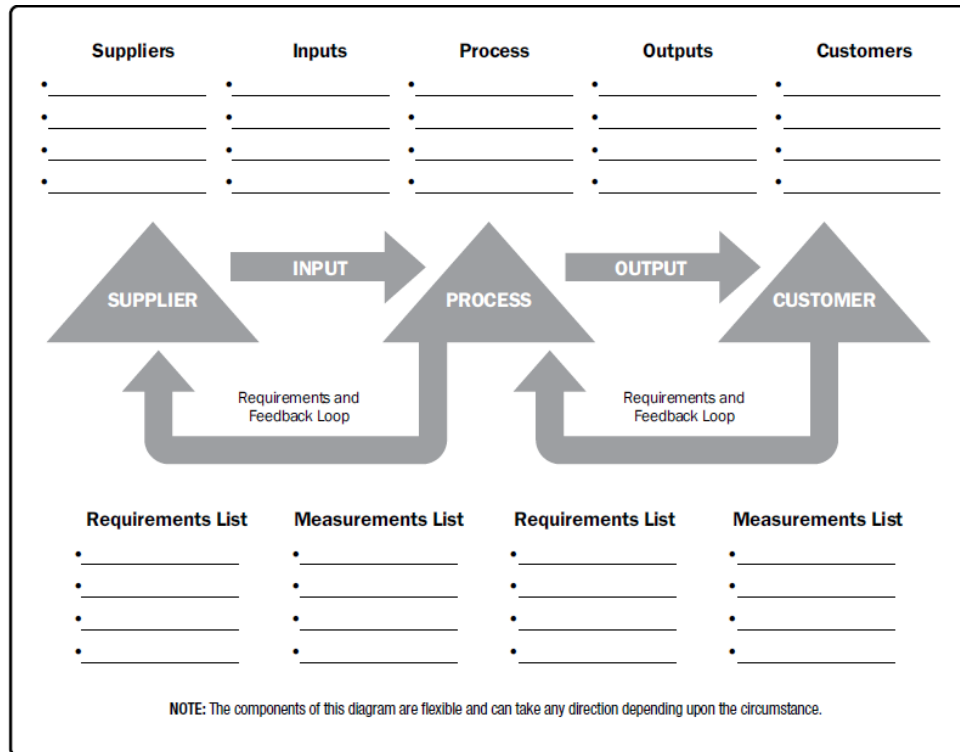


Figure 15: SIPOC

5- Test planning and examination:

During the planning phase, the project manager and project team determine how to test and examine the product, delivery, or service to meet stakeholder needs and expectations, as well as how to meet the goal of product performance and reliability. Tests and examinations are industry-specific and may include, but are not limited to, alpha and beta testing in software projects, strength testing in construction projects, manufacturing inspections and field testing, and non-destructive testing in engineering.

6- Meetings:

Project teams can hold planning meetings to develop a quality management plan. Attendees may include the project manager, project sponsor, project team members, selected stakeholders, any individual involved in project quality management activities, and others if necessary.

7- Develop a quality management plan: Outputs:

Quality management plan:

A quality management plan is a component of a project management plan that outlines how to implement applicable policies, procedures, and guidelines to achieve quality objectives. It describes the activities and resources needed for the project management team to achieve the project's set of quality objectives. The quality management plan may be formal, informal, detailed, or general framework. The style and details of the quality management plan are determined by the project requirements

54.2. Cause and Effect Diagrams:

Cause-and-effect diagrams are also known as fishbone diagrams, why-why diagrams, or Ishikawa diagrams. This type of diagram divides the reasons for a specific problem statement into separate branches, helping to identify the main or root cause of the problem.

Figure 14 is an example of a cause and effect diagram

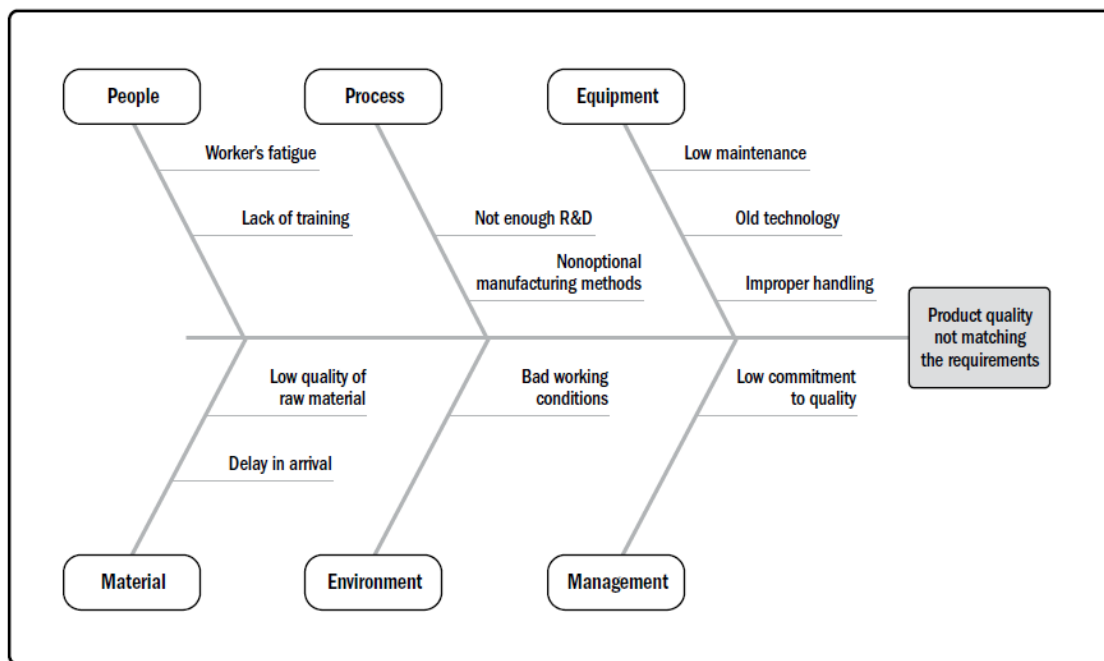


Figure 16: Cause-and-Effect Diagram

55.To establish Cost Breakdown Structure, and the project balance in accordance with WBS.

55.1. Cost Breakdown Structure:

Project budget													
INCOME		Amounts in \$US											
Internal funding													
Sales													
Total Internal Income		-											
External Funding													
Fahad Almutairi		900,000											
Total External Income		900,000											
Total INCOME		900,000											
EXPENSES		Amounts in \$US											
Salaries		SALARY SPECIFICATION: <table border="1"> <thead> <tr> <th>Number of employed</th> <th>Method of cost computation (x hours per week, x \$US an hour, x weeks)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10,30,40</td> </tr> <tr> <td>1</td> <td>15,25,30</td> </tr> <tr> <td>2</td> <td>30,20,35</td> </tr> <tr> <td>12</td> <td>40,10,44</td> </tr> </tbody> </table>		Number of employed	Method of cost computation (x hours per week, x \$US an hour, x weeks)	1	10,30,40	1	15,25,30	2	30,20,35	12	40,10,44
Number of employed	Method of cost computation (x hours per week, x \$US an hour, x weeks)												
1	10,30,40												
1	15,25,30												
2	30,20,35												
12	40,10,44												
Project staff manager	12,000												
Project coordinator(s)	11,250												
Administrative staff	42,000												
Technical / production staff	211,200												
Other													
Subtotal		276,450											
Specialists													
Consultant fees		50,000											
Subtotal		50,000											
PR and printing costs													
Prints of material		500											
Subtotal		500											
Travel and accomodation costs													
Travel costs		1,000											
Accommodation costs		2,000											
Hall rent													
Rent of equipment (e.g. beamer)		10,000											
Transportation		3,000											
Food/refreshments		4,000											
Other													
Subtotal		20,000											
Other expenses													
Equipment costs (Please specify)		90,000											
Rent													
Material Costs		350,000											
General office expenses/stationary		5,000											
Internet, telephone and postage fees													
Banking fees		5,000											
Tax		5,000											
Insurance		20,000											
Legal fees		2,000											
Miscellaneous													
Other													
Subtotal		477,000											
Total EXPENSES		823,950											
RESERVE PERCENTAGE		5.00%											
RESERVE TOTAL		37,447.00											
TOTAL EXPENSE INCLUDING RESERVE		861,397											

Figure 17: Project Budget

55.2. Task Cost Overview:

Table 20: Task Cost Overview

Name	Fixed Cost	Actual Cost	Remaining Cost	Cost	Baseline Cost	Cost Variance
Charter Approval	-	-	-	-	-	-
Architectural Design Approval	-	-	-	-	-	-
Permit/Set-Up	-	-	2,987.70	2,987.70	-	2,987.70
Mobilize on Site	-	-	2,480.00	2,480.00	-	2,480.00
Site Grading and Utilities	-	-	5,280.00	5,280.00	-	5,280.00
Foundations	-	-	2,000.00	2,000.00	-	2,000.00
Steel Erection	-	-	352,160.00	352,160.00	-	352,160.00
Landscape completion	-	-	-	-	-	-
Form and Pour Concrete - Floors and Roof	-	-	154,473.60	154,473.60	-	154,473.60
Dry In	-	-	2,560.00	2,560.00	-	2,560.00
Exterior Finishes	-	-	3,040.00	3,040.00	-	3,040.00
Interior Finishes	-	-	72,720.00	72,720.00	-	72,720.00
Masonry Work	-	-	3,520.00	3,520.00	-	3,520.00
Roofing	-	-	4,160.00	4,160.00	-	4,160.00
The window wall and storefront closures	-	-	33,200.00	33,200.00	-	33,200.00
Building Finishes	-	-	4,800.00	4,800.00	-	4,800.00
Plumbing	-	-	3,200.00	3,200.00	-	3,200.00
Electrical	-	-	104,160.00	104,160.00	-	104,160.00

Heating and Ventilating - AC	-	-	102,400.00	102,400.00	-	102,400.00
Final Clean-up and Occupancy	-	-	800.00	800.00	-	800.00
Complete Final Inspections	-	-	480.00	480.00	-	480.00
Perform final walk-through inspection	-	-	160.00	160.00	-	160.00
Issue final completion documents including warranties	-	-	270.00	270.00	-	270.00
Issue final request for payment	-	-	194.70	194.70	-	194.70
Apply certificate of occupancy	-	-	510.00	510.00	-	510.00
Certificate of Occupancy Obtained	-	-	-	-	-	-

56.To calculate Earned Value Management of the project after ending of 20% of its period and completion of 50% of the outputs case-by-case basis.

Earned Value Management:

1. EM after 20% of Project Completion:

Table 21: EM after 20% of Project Completion

Task Name	Planned Value - PV (BCWS)	Earned Value - EV (BCWP)	AC (ACWP)	SV	CV	EAC	BAC
House Construction Project	11,787.70	11,787.70	11,787.70	-	-	855,556.00	855,556.00
Charter Approval	-	-	-	-	-	-	-
Architectural Design Approval	-	-	-	-	-	-	-
Permit/Set-Up	2,987.70	2,987.70	2,987.70	-	-	2,987.70	2,987.70
Receive notice to proceed and sign contract	480.00	480.00	480.00	-	-	480.00	480.00
Finalize plans and develop estimate with owner, architect	595.20	595.20	595.20	-	-	595.20	595.20
Prepare and submit project schedule	447.50	447.50	447.50	-	-	447.50	447.50
Obtain building permits	825.00	825.00	825.00	-	-	825.00	825.00
Sign contract and notice to proceed	640.00	640.00	640.00	-	-	640.00	640.00
Building Permit Approval	-	-	-	-	-	-	-
Mobilize on Site	2,480.00	2,480.00	2,480.00	-	-	2,480.00	2,480.00
Install temporary power	800.00	800.00	800.00	-	-	800.00	800.00
Install temporary water service	800.00	800.00	800.00	-	-	800.00	800.00
Prepare site - lay down yard and temporary fencing	880.00	880.00	880.00	-	-	880.00	880.00
Site Grading and Utilities	5,280.00	5,280.00	5,280.00	-	-	5,280.00	5,280.00
Clear and grub site	480.00	480.00	480.00	-	-	480.00	480.00
Rough grade site (cut and fill)	1,600.00	1,600.00	1,600.00	-	-	1,600.00	1,600.00

Perform final site grading	1,600.00	1,600.00	1,600.00	-	-	1,600.00	1,600.00
Erect building batter boards and layout building	1,600.00	1,600.00	1,600.00	-	-	1,600.00	1,600.00
Site grading and utilities completed	-	-	-	-	-	-	-
Foundations	1,040.00	1,040.00	1,040.00	-	-	2,000.00	2,000.00
Excavate foundations	400.00	400.00	400.00	-	-	400.00	400.00
Form column piers and spread foundations	640.00	640.00	640.00	-	-	640.00	640.00

2. VM after 50% Deliverables Completion

Table 22: VM after 50% of Deliverables Completion

Task Name	Planned Value - PV (BCWS)	Earned Value - EV (BCWP)	AC (ACWP)	SV	CV	EAC	BAC
House Construction Project	597,701.30	597,701.30	597,701.30	-	-	855,556.00	855,556.00
Charter Approval	-	-	-	-	-	-	-
Architectural Design Approval	-	-	-	-	-	-	-
Permit/Set-Up	2,987.70	2,987.70	2,987.70	-	-	2,987.70	2,987.70
Receive notice to proceed and sign contract	480.00	480.00	480.00	-	-	480.00	480.00
Finalize plans and develop estimate with owner, architect	595.20	595.20	595.20	-	-	595.20	595.20
Prepare and submit project schedule	447.50	447.50	447.50	-	-	447.50	447.50
Obtain building permits	825.00	825.00	825.00	-	-	825.00	825.00
Sign contract and notice to proceed	640.00	640.00	640.00	-	-	640.00	640.00
Building Permit Approval	-	-	-	-	-	-	-
Mobilize on Site	2,480.00	2,480.00	2,480.00	-	-	2,480.00	2,480.00
Install temporary power	800.00	800.00	800.00	-	-	800.00	800.00
Install temporary water service	800.00	800.00	800.00	-	-	800.00	800.00
Prepare site - lay down yard and temporary fencing	880.00	880.00	880.00	-	-	880.00	880.00

Site Grading and Utilities	5,280.00	5,280.00	5,280.00	-	-	5,280.00	5,280.00
Clear and grub site	480.00	480.00	480.00	-	-	480.00	480.00
Rough grade site (cut and fill)	1,600.00	1,600.00	1,600.00	-	-	1,600.00	1,600.00
Perform final site grading	1,600.00	1,600.00	1,600.00	-	-	1,600.00	1,600.00
Erect building batter boards and layout building	1,600.00	1,600.00	1,600.00	-	-	1,600.00	1,600.00
Site grading and utilities completed	-	-	-	-	-	-	-
Foundations	2,000.00	2,000.00	2,000.00	-	-	2,000.00	2,000.00
Excavate foundations	400.00	400.00	400.00	-	-	400.00	400.00
Form column piers and spread foundations	640.00	640.00	640.00	-	-	640.00	640.00
Pour column piers and foundations	800.00	800.00	800.00	-	-	800.00	800.00
Prepare and pour concrete floor in elevator pit	160.00	160.00	160.00	-	-	160.00	160.00
Steel Erection	352,160.00	352,160.00	352,160.00	-	-	352,160.00	352,160.00
Erect steel columns, beams and joist - 1st and 2nd floors	350,800.00	350,800.00	350,800.00	-	-	350,800.00	350,800.00
Erect steel columns, beams and joist - 3rd floor and roof	800.00	800.00	800.00	-	-	800.00	800.00
Install stairs and miscellaneous iron railing	400.00	400.00	400.00	-	-	400.00	400.00
Touch-up paint on steel	160.00	160.00	160.00	-	-	160.00	160.00
Landscape completion	-	-	-	-	-	-	-
Form and Pour Concrete - Floors and Roof	154,473.60	154,473.60	154,473.60	-	-	154,473.60	154,473.60
Form 2nd floor including all floor openings	960.00	960.00	960.00	-	-	960.00	960.00
Strip forms from roof slab	320.00	320.00	320.00	-	-	320.00	320.00
Form 1st floor	640.00	640.00	640.00	-	-	640.00	640.00
Install electrical underground	150,800.00	150,800.00	150,800.00	-	-	150,800.00	150,800.00
Install plumbing underground	800.00	800.00	800.00	-	-	800.00	800.00
Install rebar and in-floor utilities	633.60	633.60	633.60	-	-	633.60	633.60

Strip forms from 1st floor slab	320.00	320.00	320.00	-	-	320.00	320.00
Dry In	2,560.00	2,560.00	2,560.00	-	-	2,560.00	2,560.00
Install 1st floor sheathing	480.00	480.00	480.00	-	-	480.00	480.00
Install 2nd floor sheathing	480.00	480.00	480.00	-	-	480.00	480.00
Install roof decking	480.00	480.00	480.00	-	-	480.00	480.00
Hang 1st floor exterior doors	160.00	160.00	160.00	-	-	160.00	160.00
Install 1st floor windows	480.00	480.00	480.00	-	-	480.00	480.00
Install 2nd floor windows	480.00	480.00	480.00	-	-	480.00	480.00
Exterior Finishes	3,040.00	3,040.00	3,040.00	-	-	3,040.00	3,040.00
Complete exterior brick	2,560.00	2,560.00	2,560.00	-	-	2,560.00	2,560.00
Complete exterior siding	480.00	480.00	480.00	-	-	480.00	480.00
Interior Finishes	72,720.00	72,720.00	72,720.00	-	-	72,720.00	72,720.00
Insulation	640.00	640.00	640.00	-	-	640.00	640.00
Place wall insulation - 1st floor	160.00	160.00	160.00	-	-	160.00	160.00
Place wall insulation - 2nd floor	160.00	160.00	160.00	-	-	160.00	160.00
Place ceiling insulation - 2nd floor	160.00	160.00	160.00	-	-	160.00	160.00
Conduct insulation inspection	160.00	160.00	160.00	-	-	160.00	160.00
Paint and Wallpaper	21,120.00	21,120.00	21,120.00	-	-	21,120.00	21,120.00
Texture all except entry and kitchen - 1st floor	20,160.00	20,160.00	20,160.00	-	-	20,160.00	20,160.00
Paint all except entry and kitchen - 1st floor	160.00	160.00	160.00	-	-	160.00	160.00
Hang wallpaper entry and kitchen - 1st floor	160.00	160.00	160.00	-	-	160.00	160.00
Paint exterior siding & trim work	640.00	640.00	640.00	-	-	640.00	640.00
Cabinets	50,960.00	50,960.00	50,960.00	-	-	50,960.00	50,960.00
Install 1st floor - kitchen cabinets	50,320.00	50,320.00	50,320.00	-	-	50,320.00	50,320.00

Install 1st floor - master bath and guest cabinets	160.00	160.00	160.00	-	-	160.00	160.00
Install 2nd floor - hall bath and private bath cabinets	160.00	160.00	160.00	-	-	160.00	160.00
Install chair rails, crown moldings, trim	320.00	320.00	320.00	-	-	320.00	320.00

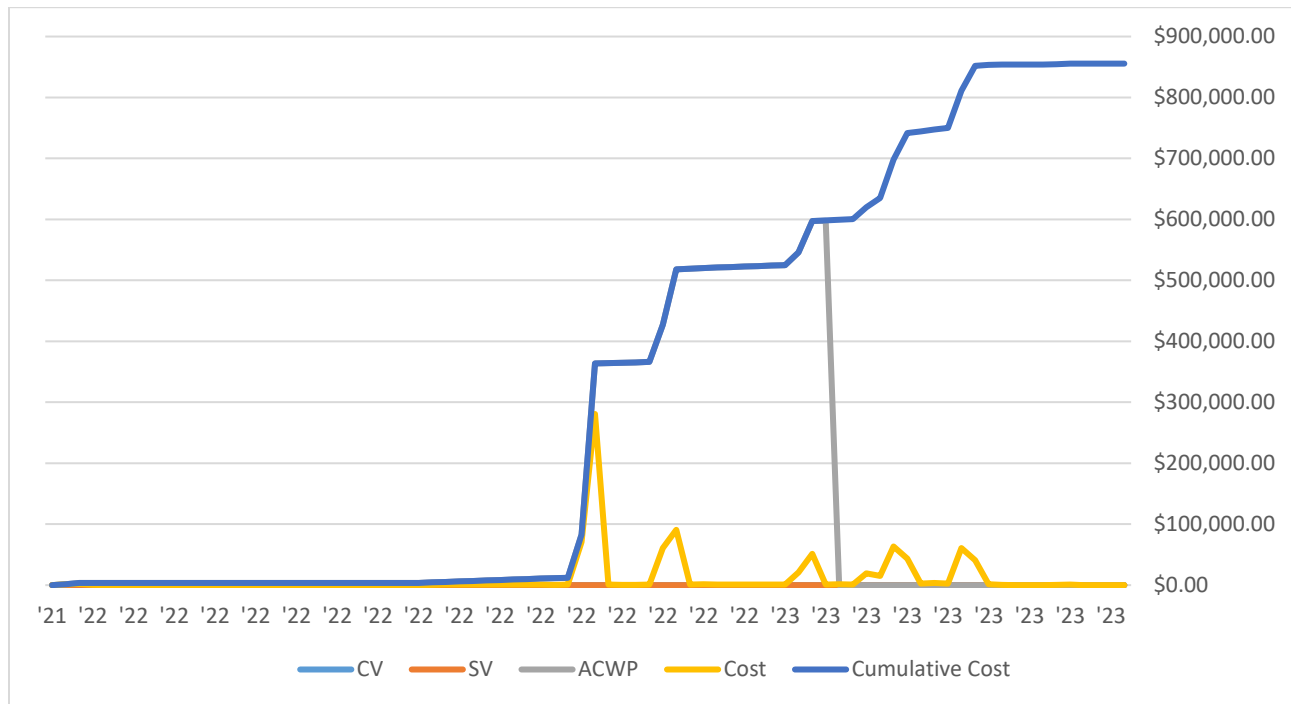


Figure 18: Earned Value

57.To explain the concept of Resource Leveling and Smoothing.

Resource Leveling:

When we have limited resources and may need to extend the schedule, we use resource-leveling. Allocating resources and resolving any issues resulting from over or under-allocation of resources for projects are not covered by resource-leveling. Another project management technique for optimizing your resources is resource smoothing, which modifies your schedule's activities so that resources don't exceed the boundaries set during planning.

When scheduling of available resources is restricted and has to be utilized optimally, resource leveling is employed. When trying to compress your schedule, resource leveling is usually done before resource smoothing. The main goal of leveling is to efficiently allocate resources so that a project can be completed within a certain time frame. Below are some of the resource leveling techniques that will be employed on this project.

1. Critical path analysis:

The critical pathway analysis is a project activity scheduling methodology. It's the most popular strategy for finishing a project, and it entails looking at the longest and shortest time duration pathways in the network diagram. This is accomplished by examining your resource dependencies in order to determine a realistic timeline for completing a job. The critical route tasks are the ones that are regarded to be very significant using this resource-leveling approach, and evaluating these pathways will reveal activity interdependencies, highlighting the resources required to cooperate on them.

2. Fast tracking:

Fast-tracking is a resource leveling planning approach that allows you to purchase additional time by executing things in tandem that you wouldn't ordinarily undertake. This method of resource leveling can only be used if activities overlap, enabling you to fulfill tasks on time and without incurring extra charges.

3. Crashing:

Crashing is a technique for reducing your duration by providing extra resources to activity at the lowest feasible cost. When you implement crashing, you'll prioritize based on the team with the lowest crash cost per unit, and this emphasis will enable your team members to choose tasks that provide the greatest value to your company. Understanding which projects are on the critical path and which are not helps you to recognize which activities benefit from more resources in advance, allowing you to prioritize and reorganize schedules for future projects.

Resource Smoothing:

When time restrictions are the most significant impediment to output, resource smoothing is applied. The goal is to complete a project on schedule while avoiding resource demand peaks and valleys. When it comes to resource smoothing, you should try to maximize resources while keeping the timetable as short as possible. Because you

won't be able to extend the timeline, the project's critical path and finish date must stay the same.

You must be cautious and avoid any delays, since they may disrupt the essential route. When it comes to resource smoothing, time is essential; you have a certain timeline to adhere to, and you must optimize resources properly.

In this Resource Optimization Technique, the Project Manager optimizes the usage of specific assigned resources in those activities that need it in order to avoid exceeding a previously determined limit of use. This restriction might have been set in response to a customer's request, or accordance with corporate rules or legislation. The Free Float of activities that are not on the Critical Path is studied in this scenario, and the results are utilized to change resource allocation. In other words, the Resource Smoothing approach does not lengthen the Critical Path and may not be appropriate for all resource optimizations.

Resource leveling and smoothing have been performed using Project Professional Software for this project.

58.To be trained on distributing the project resources of equipment and tools.

We have identified the following equipment and tools to be critical for this project and assigned proper resources to this equipment and tools.

Table 23: Project resources of equipment and tools distributing

Tools and Equipment	Concrete Crew	Carpenter Crew	Electrical Crew	Tile Crew	Masonry Crew	Grading Crew	Windows doors and Glass Crew	Landscape Crew
Concrete Mixer	X							
Masonry tools					X			
Tile Cutter				X				
Excavator						X		X
Saws		X					X	
Drills		X	X				X	
Bulldozer						X		X
Caulking Guns		X	X				X	
Sawhorse		X					X	

59.To develop the procurement execution process, and contractor selection.

The process of soliciting seller bids, choosing a seller, and awarding a contract is known as procurement execution. The major advantage of this method is that it establishes agreements that harmonize internal and external stakeholder expectations. The team will receive bids or proposals during the Conduct Procurements process and will use previously stated selection criteria to choose one or more sellers who are competent to undertake the task and acceptable as sellers.

Contract planning is the process of laying out each contract for the project's work. You figure out how you'll manage the contract, what criteria it must achieve to be regarded successful, how you'll choose a seller, and how you'll manage the contract after the work begins. These are some of the contract kinds that our firm is prepared to get into with contractors.

Fixed-Price Contracts

A fixed-price contract is a formal agreement between a project organization and a person or firm to deliver products or services to the project at a predetermined price. The contract normally specifies the quality of the products or services, the timeliness with which the project must be completed, and the cost of supplying those goods or services. Fixed-price contracts need the presence of at least two or more vendors with the credentials and track records necessary to meet the project's requirements. The other need is a work scope that will almost certainly not alter.

The incentive fee in a fixed-price contract gives an incentive for exceeding the contract's stated baseline on the project. A bonus may be included in the contract if work on a key project milestone is completed on time. If the task is not completed according to the contract, many contracts include a penalty provision.

Cost-Reimbursable Contracts

The organization commits to reimburse the contractor for the cost of delivering the service or supplying the items under a cost-reimbursable contract. Cost-plus contracts are sometimes known as cost-reimbursable contracts. When the scope of work or the costs of doing the task are unknown, cost-reimbursable contracts are often employed.

Time and Material Contracts

The contractor may charge an hourly rate for labor, plus the cost of supplies, plus a percentage of the overall expenditures for minor operations with a high level of

uncertainty. This contract is known as a time and materials contract (T&M). The contractor normally produces timesheets and invoices for materials bought on the project, and time is usually contracted on an hourly basis. The contractor is paid for the time spent on the project based on the agreed-upon rate and the actual cost of the materials.

The general procedure of seeking replies from suppliers and analyzing those responses may be repeated for large procurement goods. Based on a preliminary proposal, a shortlist of qualified suppliers may be established. Based on the more precise and complete requirements document received from the sellers on the shortlist, a more extensive assessment may be done. Furthermore, the tools and strategies discussed here may be utilized alone or in conjunction with certain vendors. Contractors will be chosen via a bidding procedure. For the project at hand, all bidders must be pre-qualified. Every pre-qualified bidder must present a Best Value Evaluation Questionnaire along with supporting evidence that must be validated under oath. Bids will be assessed, and contractors that are qualified for the job will be chosen.

60.To developing the supplier comparison model and the scoring model

The process through which a corporation finds evaluates, and deals with suppliers is known as supplier selection. As a result of this process, supplier selection is made. A matrix approach is usually adopted by most companies for evaluating and selecting suppliers. Matrix's main goal is to reduce purchasing risk, increase the total value to the company, and establish long-term relationships between suppliers and buyers.

Vendor assessment refers to an organization's process of evaluating and approving vendors and suppliers to see whether they can satisfy the organization's commitments and standards after they've signed a contract. In addition, the final purpose of vendor evaluation is to set criteria for building a safe, perfect, low-risk supplier and supplier portfolio.

After receiving RFPs from vendors, the next stage in our supplier selection process is proposal scoring. The act of giving numerical numbers to the RFP replies supplied in a vendor's proposal is known as a request for proposal (RFP) scoring, or proposal scoring. RFP scoring is a data-driven technique to enable fair and impartial vendor selection as part of the proposal review process. (Khaled, et al, 2011)

Our organization may prioritize various components of RFPs depending on their value to the business using the weighted scoring technique. This scoring technique provides a better view of which bidder gives the highest long-term value in strategic sourcing

RFPs. In general, our company's preferred method for selecting suppliers is weighted scoring. The 5 point rating system, which classifies each vendor based on several performance standards and then assigns weights to each characteristic depending on the skill needs for a certain kind of project, is the most basic technique of supplier assessment and scoring adopted by many companies.

Our company utilizes a weighted 5 points rated system for selecting and evaluating suppliers. The weight for each factor is based on the project requirements. Points from 1 to 5 are assigned to each supplier for each factor. 5 is the best score for a given factor and 1 is the worst.

Table 24: Factor rating System for evaluating suppliers

Factors	Weight	Supplier No. 1	Supplier No. 2	Supplier No. 3
Price	0.22	2	3	4
Delivery Timeliness	0.1	2	5	3
Quality	0.3	4	5	5
Service Reputation	0.15	4	2	3
Business Structure	0.05	1	5	1
Engineering Capacity	0.05	5	3	3
Production Capacity	0.08	2	4	5
Financial Stability	0.05	4	1	2

After assigning weights to each factor and points to each supplier, the next step is to calculate scores utilizing this formula.

Score=SUM (Weight of each factor*Rating Point)

Table 25: Supplier scoring and ranking

Suppliers	Score	Ranking
Supplier No. 1	3.1	3
Supplier No. 2	3.73	2
Supplier No. 3	3.83	1

The supplier with the best score is assigned the first rank and so on. The supplier ranked first is the one that matches our company and project requirements, and that supplier is usually selected. If for any reason, we cannot make a contract with supplier ranked 1, we move towards supplier ranked second.

61.To prepare agenda- Invitation and virtual record of a virtual meeting.

Agenda-Invitation:

Table 26: Agenda-Invitation

Date of Meeting	1-Jun-21	Start Time	10:00 AM
Location		End Time	10:30 AM

Meeting Created By:		Position:		Company:	
Facilitator:		Position:		Company:	
Minute Taker:		Position:		Company:	
Time Keeper:		Position:		Company:	

Call-in Number		Call Code		Meeting Web Link	
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Meeting Title:	
Subject of Meeting	
Department	

Objective	
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Attendees Requested:					
Name:		Position:		Company:	
Name:		Position:		Company:	
Name:		Position:		Company:	
Name:		Position:		Company:	

Agenda Items:					
Item Number	Start Time	Duration	Description	Responsibility	End time
1			Introductions/Roles:		
2			· Welcome by The Company		
3			· Introductions and roles of each person in the construction phase		
4			· Objectives of the meeting		
5			· Designate a meeting note taker		
6					
7			Organization and Communications (The Company/Client):		
8			· Function and authority of key The Company personnel (identify the name of individuals)		
9			· Function and authority of Client key personnel (identify names of individuals)		

10			· Roles and responsibilities of The Company and CLIENT		
11			o Emergency notification process		
12			o Communication protocols (process, emails, approvals, etc.)		
13			o CLIENT subcontractor oversight expectations		
14			o Team leads for M&V, witnessing, commissioning, and inspections (identify names)		
15			o Written agreement if needed (e.g., tri-party) clarifying responsibilities (personnel and costs)		
16					
17			Reporting Requirements/Post Award Deliverables (The Company/CLIENT):		
18			· Ensure mutual understanding of requirements and deliverables		
19			· Deliverables		
20			o Updated organizational chart (if needed)		
21			o Updated schedule		
22			o Commissioning report		
23			o Post-Installation report		
24			o Reports		
25			o Notification of utility interruption		
26			o Operation work procedure		
27			o Maintenance work procedure/maintenance work requirements and checklist		

28			o O&M manuals and spare parts lists		
29			o As-built drawings		
30			o Training		
31					
32			Site Specific, Facility Access & Security Requirements (The Company/CLIENT):		
33			· Project office/sitting approval		
34			· Contractor personnel site and/or building access requirements; non-citizen access requirements for prime and subcontractors		
35			· Security badging process and badging/ lower-tier subcontractor list		
36			· Clients – process and coordination		
37			· Restrictions/allowable equipment (e.g. cell phones, laptops, and radios)		
38			· Vehicle access approval requirements		
39			· On and off-hour access		
40			· Keys (If applicable)		
41			· Vehicle licensing /registration		
42			· Staging/lay-down yard and/or office space allocations for contractors		
43					
44			Construction (CLIENT):		
45			· Construction schedule		

46			· Schedule for construction update meetings		
47			· Project status reports		
48			· Plan of the Day (POD)/Plan of the Week (POW) meetings during construction		
49			· Equipment data sheets		
50			· Submittal schedule, coordination of submittal reviews, and approval process		
51			· Preparing reviewers to ensure review readiness		
52			· Project charter and/or partnering sessions (as needed)		
53			· Weekly meetings (include subcontractors when beneficial)		
54			· Changes and contract modifications		
55					
56			Safety & Environmental Planning (The Company/Site Staff):		
57			· Site-specific safety plan, worker licensing, and certifications		
58			· Burn permit approval requirements		
59			· Safety training		
60			· Hazardous materials		
61			· Site injury reporting and response requirements		
62			· Environmental permits before construction		
63			· Site characterization testing, mitigation of adverse conditions, hazard monitoring (e.g., asbestos)		

64					
65			Quality Control and Quality Surveillance:		
66			· CLIENT quality control plan:		
67			o Implementation progress		
68			o Testing/witnessing/other Issues		
69			o Changes		
70			· The Company Surveillance:		
71			o Verify that contract requirements are fulfilled and document performance		
72			o Inspections		
73					
74			Permits/Outages (The Company):		
75			· Utility service interruption permits approval		
76			· Utility reconnect permits approval (including hot-work permits)		
77			· Site personnel support for outages		
78			· Service interruption scheduling		
79			· Low voltage outage permits		
80			· Lock-out/tag-out procedures		
81			· Excavation/penetration permits (include an indication of digging equipment) and marking boundaries		
82					
83			Acceptance:		
84			· Timing		
85			· Procedures		
86			Roles and authority		

Notes:	
1	The Minutes shall be recorded describing the discussions held during the meeting on the requirements for each of the agenda items and the relevant Parties' obligations during the Execution of the Services
2	
3	

Agenda Prepared By:		Signature:		Date:	
Agenda Approved by:		Signature:		Date:	

62.To identify performance measurement course and submit reports, in addition to explaining the reason.

Performance measurement or performance evaluation?

This function (performance measurement: includes four processes of building measurements, then evaluation, evaluation, and improvement) is considered one of the most important functions of human resources management. It relies on confidential reports prepared by the direct manager, which often do not represent the true evaluation of performance on the one hand, and on the other hand, the evaluation is carried out by one person and not by a workgroup.

Away from performance problems and how to avoid or mitigate them, but the evaluation is based on one topic, which is whether this worker does his work or not and whether he will pay a bonus or not.

Evaluation in the modern sense aims to change for the better:

The human element is indispensable and is undoubtedly inevitable at any stage, whether the work is manual, automatic, or computerized. These rapid and successive developments in the world of communications and information technology have enhanced the importance of human resources, and many experiences have confirmed that the success of the institution's mission is in the hands of workers, and achieving

Objectives depend on the performance of employees, but the success of change efforts depends on the success of changing the behavior and thinking of human resources.

Performance in the modern concept is to answer the following questions:

Last year, what did we want to be?

How are we doing this year?

What do we want to be in the next year?

This is evaluation in the modern sense.

Performance meaning:

Changing the meaning of performance in administrative environments looking for continuous improvement becomes inevitable in terms of its content, development, and measurement. Most likely, the annual adequacy reports models that are filled with the requirements of the incumbent or with specifications such as firmness, good appearance, practical experience, and other criteria for measuring efficiency will need completely different criteria.

Some have even suggested that it is possible for performance evaluation to become unnecessary in the midst of this rapid movement and extreme flexibility, and in this case, it can be satisfied with the variables governing performance, the most important of which are, for example, quantity, accuracy, speed, response, continuous development at work.

The importance of performance measurement:

Evidence is increasing day after day - on the importance of human resources for the success of any organization in reaching its goals. Institutions with a high level of performance are nothing but institutions that have a highly trained and committed workforce, and this is the key to competition for any organization that seeks excellence and survival.

The concept of performance indicator:

The Key Performance Indicators, or KPI, is an aid to the amount of progress made towards achieving management goals. They are pre-defined measures by the administration of what they want to measure (financial, administrative, technical, etc.) that are used to help ensure that the administration has succeeded in achieving its goals and making the necessary progress.

The following points can be presented to clarify the concept of key performance indicators:

- Key performance indicators are data based on the intrinsic characteristics of an organization's activity, which stand as a criterion for measuring other relevant data.
- Performance indicators are a set of reports, tables, and graphs. They may include sales figures, production processes, information about work crews, their habits and tendencies, or real-time information about the supply line.
- Performance indicators: they are interrelated ratios that are useful in measuring the main activities and results in the organization. Financial reports indicate what has been accomplished on the ground, while performance indicators include activities and performance in addition to financial and other data on the market situation, all of which are organized together in specific engagements and relationships., which gives a clear picture of the course of work, indicates the variables, and helps control their effects.

The importance of performance indicators:

Performance indicators are an effective tool for verifying the extent to which goals are achieved, and one of the techniques for measuring the success of departmental performance that is used with the quality and organizational development programs for modern departments, and through which the department's ability to achieve its specific objectives through its strategy is identified. The nature of the tasks and activities of the various departments (equipment, technology, buildings, administrative, supervisory, etc., and measuring these indicators uses several technical, administrative, and technical methods to determine these indicators in measuring performance and the work of these departments.

In today's modern administrations, KPIs are valuable indicators for teams, managers, and leaders to quickly assess progress toward goals that can be measured using SharePoint KPIs. There is a lot of controversy currently about the actual value of performance indicators, as companies complain of wastage due to the volume of papers and documents that are accumulated every month for the purpose of preparing reports, but executives defend this situation because these reports contribute to their decision-making process and help them to discuss their opinions as well as It helps identify the organization's resources, and most of all it gives them confidence in the quality and level of decisions they make.

The performance indicators are:

- An indispensable part of the standard measurement.
- A way to help businessmen define their professional reality
- An ideal way to assess the effectiveness of the work and the adequate capabilities of the organization.
- A means of identifying opportunities of strategic importance to the organization
- Everything that is actually measured, is therefore developed. Without measurement, there will be no correct decision or implementation.
- Performance indicators play other roles. We can consider them as a direct means of comparing performance (Benchmarking) or as the Dictionary of Administrative Terms calls comparative benchmarking, whether it is to compare similar organizations or to compare the current performance with the past in the same organization.

The golden rule in management:

the evaluation process is one of the five basic administrative processes, which are known as management functions. This highlights the importance of the evaluation and evaluation process, as it gives us the means to predict and measure the effectiveness of the administrative process and the extent to which the desired goals of the project or organization are achieved.

There is an important role in measuring performance says:

"What we can measure, we can modify, develop and control."

And in the Skills for Success Foundation for Human Development, they always repeat the golden rule in management science developed by the trainer Dr. Muhammad Al-Amri (a coach and administrative and educational consultant) about the process of measuring organized performance, which says:

Everything that does not have a measure cannot be measured, its management cannot be controlled, its quality cannot be controlled, its risks cannot be predicted, and it cannot be improved and developed. Here lies the benefit of measurement, as this golden rule clearly shows the importance of the process of measurement and evaluation in the administrative process.

Benefits of KPIs:

- speed: Performance indicators focus on key themes and provide the organization with a clear idea of costs, quality, and performance in the pipeline in a limited time.
- Ease of use: Since performance indicators require a specific amount of data, finding and monitoring indicators will be done at a low cost.
- Focus on the basic procedures: Performance indicators emphasize actions that are vital and form the basis for them.
- Multidimensional performance: KPIs cover multiple dimensions of performance to enable approaches across pipelines and organizations.
- Filling the void in performance: KPIs help fill potential performance gaps in areas that affect the competitiveness of the supply line.
- Confidentiality and Comparability: Indicators are expressed using ratios, to achieve comparability and to maintain specificity.

The performance indicators are represented by some questions and their answers, such as:

- Does the administration perform the task as required and in accordance with the objectives?
- What is the progress or backwardness of the task?
- What is the minimum you have completed?

KPI's usually use a number of tools and methods used in Q-Tools and planning in determining the number of indicators through which performance can be measured and compared in various fields, knowledge of the current situation, and planning for a better future situation, in addition to knowing the progress made in management to reach the desired goals. Technology has contributed to the development of measuring departmental performance indicators, and programs have been allocated to them that measure these indicators as performance indicators for each field of work, activities, and product in the organization.

Types of performance indicators: Performance indicators KPI consist of a set of values that measure the extent of success in achieving management objectives, and their types can be classified into the following aspects:

- Quantitative indicators (such as statistics and various numerical data).
- Practical indicators (deal with existing management processes).

- Directional Indicators (indicating whether management is improving and progressing or vice versa).
- Actionable indicators (demonstrating the extent to which management is satisfied with the effective change control method).
- And departmental performance indicators are viewed by modern administrations as a strategy to achieve goals and results, and a strong indicator of organizational success or failure.
- Therefore, they are considered as a medical thermometer in terms of measuring (temperature, pressure, and other diseases or other diagnoses) to outperform modern administrations and their success in performing their tasks in the required manner.

Determine quality indicators:

Determining performance indicators is a determination of quality indicators and is considered one of the most important performance measurement processes, whether measuring productivity or measuring services, without which the quality system becomes rigid without any improvements, and there are generally two types of quality indicators:

The first is for quality control:

it relates to the standards that the organization wishes to maintain, which are formulated at the level of the general management of the organization, using expressions similar to those used in formulating the basic requirements of the specification or using lower-level requirements related to specific characteristics, such as safety, reliability, and satisfaction beneficiaries, and so on.

The second: to improve quality, as it is often confined to reducing errors and waste (eliminating non-conformities in supply, improving control, ... etc.), and developing new products with distinctive features and qualities that satisfy the needs of beneficiaries more effectively.

The role of quality in measuring performance indicators:

One of the advantages of the Total Quality Management (TQM) methodology is the adoption of measurement using quantitative methods such as statistics and number indicators with qualitative analysis of the results.

The importance of quality in measuring performance to reach effective results, and one of the characteristics of measurement is the ability to identify modification, development, and change.

Categories of Departmental Quality Performance Indicators:

In general, departmental quality performance indicators can be categorized into five categories:

Performance indicators for management: it deals with the organization and the surrounding community.

Product performance indicators: they deal with the requirements of the organization, its employees, beneficiaries, stakeholders, and competitors.

Operations performance indicators: they deal with the capabilities of operations, their returns, their effectiveness, and their ability to control.

Internal performance indicators of the administration: it deals with the ability of the administration, its return, its effectiveness, the extent of its response to changes, the work environment, and so on.

Performance indicators for human resources: they deal with skills, knowledge, capabilities, motivation, and development of employees.

Are our administrations in the Arab world interested in the real measure of organizational performance?

Measurement is the main criterion for the success of the performance of small and large departments. Measurement of departments is similar to examination, and through examination and diagnosis, problems that may be faced by departments of all sizes, shapes, and types are treated.

Steps to develop KPIs:

There are five that should be followed:

The first step:

Emphasis on results “What gets measured is what gets achieved.” Based on this rule, we believe that performance indicators should support its desired results, for example, improving customer service, developing customer relationships, reducing production costs, raising morale, and the level of solidarity among the work team.

The second step:

Building goals: The first step leads to building specific goals. The comprehensiveness of these goals is chosen by their achievability.

The third step:

Develop and test performance indicators: Objectives can be measured by:

-When dealing with performance indicators as results, it is easier for managers to identify the causes of unsatisfactory results.

- Balancing indicators of progress and indicators of regression in performance.
- Measure the components of each target as a specific composition.
- Modify performance indicators to fit the existing information management strategy.
- Identify areas of progress to develop the most appropriate performance indicators.

The results of this process can be selected by doing a "minus and surplus" analysis.

This leads us to the fact that when performance indicators are built, management must judge whether there are weaknesses or exaggerations in the adopted measures.

The fourth step:

Responsibility framework: This stage is concerned with defining the responsibility for each indicator separately. Likewise, caution should be exercised in the application, especially when the results stem from joint efforts and the internal cooperation of the work team.

Fifth step:

Launching the process: The launch of the KPI system includes four main phases:

- Performance indicators as goals: At the outset, we must look at performance indicators. As high-level objectives, they should be posted throughout the organizational structure to achieve clear communication about events. This allows the work team to identify appropriate performance indicators and implement "plans" to achieve these goals. Of course, you must ensure that these plans complement each other. The management here should be flexible to alter these plans when necessary.
- Individual performance plans: Depending on the established plans, each employee must develop his own performance plan. To do this, he has to select the most important performance indicators from the relevant overall plan. To be exceeded then at the appropriate level.
- Development of documentation for the new system: When the KPI system is launched, a record must be allocated consisting of an update system for the next planning cycle.
- Training: To help employees achieve their performance indicators, and because they are responsible for doing so, they must be provided with appropriate options regarding training. Whether it's the group training for development Institutional or individual training. Experience training includes technical and practical experiences, as well as experiences based on behavioral performance foundations.

It remains to point out several important considerations in designing the performance indicators model:

- The organization's strategy is what leads to its development, not performance indicators.
- The organization must first define its strategy, its interim, and main objectives, after that it can define its own high-level performance indicators.
- Performance indicators measure the basic components of organizational success in the organization:
- Each indicator must be entrusted with monitoring one of the goals to measure its progress. Performance indicators must always be linked to strategic, interim, and procedural goals (tasks) because they are basically linked to the mechanisms of action to reach these goals. On this, a complete network of processes should be built in connection with the performance indicators.
- Adopting performance indicators and measurement processes:
- The main activities at the leadership level in the organization should be related to the activities taking place at the lower levels, as well as to the tasks at the individual level, and the measurement should be done from the perspective of the balanced card.
- Monitoring, Reporting, and Reviewing:
- These methods guarantee the comprehensiveness of the measurement process and ensure that development will take place at all levels. They also re-calibrate performance indicators on an ongoing basis, and through this, it is ascertained whether work on strategic and interim goals is going in the right direction.

63.To develop Change Request model, including (impact analysis- alternatives analysis-recommendation)

The change request form is:

A pre-built change request form is a form used to document a new change request.

The change request form contains the following contents:

- Information about the name of the change requester.
- Change number.
- A detailed description of the change.
- The reason for the change.

- Evaluation section.
- impact on project cost.
- impact on the schedule.
- influence on quality.
- impact on the scale.
- impact on risk.
- additional notes.
- The approvals of the project manager, the project sponsor, the expert in related matters, and the supplier representative on the change request.

Uncontrolled change is one of the biggest opponents of a project manager:

This is why a coherent change management process can be a project manager's best friend. You can put this kind of process in place of delivering what the customer requested, on the required timeline, and within the agreed budget. Without change control, the project scope becomes a moving target and you risk losing one or more of the project's success factors. The ability to manage and control change, especially project scope change, is key to reaching goals and an exemplary performance indicator for a project manager. Project Change is inevitable, and you should be prepared to deal with it when it happens, not when it does.

Budgeting for Change Management:

One of the challenges that project managers face is balancing the need to control project change while avoiding unnecessary disengagement. The question is: Where is the subtraction point? Because each project is unique, the point at which the change control stops adding value and turns into a red bar will differ from project to project. Some stakeholders, or even project team members, may feel that putting change control in place is your way of avoiding intrusive scope creep and that you're not ready to be flexible and do what's best for the client and business. This concept must be cleared. Let them know that you are doing the exact opposite: you are implementing an effective process of consistently assessing needed changes. If making the change is considered a good idea, you will have processes in place to respond when needed.

Project change management plan:

To help you respond quickly, a project change management plan describes what happens when deviations occur. It is not intended to prevent change; Rather, it is intended to outline a process that shows how to communicate change, how decisions are made, and how to adapt the project accordingly.

Putting the control in place:

The change control process should take effect once a basis for key deliverables, such as work requirements and timelines, has been established. The project team, stakeholders—and anyone else affected by changes to the project should review and endorse the change management plan before it goes into operation.

Small changes that significantly affect the overall success of the project do not have to force the same precision as changes to major scheduling requirements or milestones for critical paths. The Project Change Management Plan should be mentioned when a formal Project Change Request (PCR) is required. for example:

What are the schedule thresholds and budget changes?

Are there changes that always require a change request?

What are the modifications that the change management process can overcome?

One caveat here: There are often lots of small-scale changes that cause damage, rather than the obvious big ones. Think about this when defining PCR criteria. For example, the change management plan should define categories of change requests, such as **major** or **minor**:

Major changes:

They must be documented as PCR. Major changes to the project:

Impacting requirements or work items on the critical path, delaying critical milestones or the overall project completion date by a certain percentage or time period. Key change criteria must be defined for each project.

Requires additional funding (in dollars or as a percentage of the budget). Again, the amount must be defined for each project.

Minor changes:

These routine changes do not require PCR. Minor changes:

- Does not significantly affect the plan. The completion date of milestones or tasks is not extended with project dependencies.

- It does not have any negative financial impact. No project budget discrepancy will occur as a result.

Hints for evaluating change management requests:

The project change management plan should also include information about how change requests will be evaluated. It is important that the criteria for this evaluation are defined before it is needed so that time is not wasted in arriving at a consensus. Setting these parameters will help balance the change with the overall business goals and benefits.

Here are some typical questions to think about when evaluating a change request:

- Does this change add to or change the business requirements?
- Is there action, or is this change necessary for the overall success of the project?
- Does this change require an increase in funding?
- Will this delay the completion date of the project?
- Although this change may have a negative impact on this project, it may lead to important business implications that make it commendable?
- Has changing this change made more sense than delaying it? Will the delay cost the company more money in the end?
- Have all affected stakeholders been considered, and are they supportive of the change?
- Are there contractual ramifications to think about? For example, will fulfillment of obligations with external suppliers be canceled due to this change?

Approval of project change requests:

It is also important to determine who can or cannot approve the requested changes. It is common to define different levels of authority so that routine changes can be handled effectively, while important changes receive the required level of attention by managers. When the proposed change affects the scope of the project, you should consider it a business decision that requires approval from the project sponsor. When scope is not affected, the project team and sponsor may decide that the project manager has the ability to agree to the change within certain limits. For some projects, change control panels are created and meet regularly to consider and approve change requests. There may be different change control panels in the organization, handling different types of change requests. For example, a technical change control panel might look at technology problems.

An easy way to summarize change request approval guidelines is in a table like the one below, which is based on a project model:

Table 27: Change request approval

Change Type	General Description	Standards	Approval From	PCR Required
Major Change	Represents a significant change in project scope, scheduling, or budget	Add new requirements or expand existing business requirements Schedule a delay of more than 14 days or delay the project completion date Requires additional funding of 100,000 or more	Project Change Control	Yes
Major Change	Represents a change in project scope, schedule, or budget	Clarify work requirements scheduling a delay of fewer than 14 days does not affect the project completion date Requires additional funding of less than \$100,000	Project Manager	Yes
Minor changes	Routine change with little or no impact on the project	Does not change the completion dates of major events Impact on project budget less than \$X or X%	Project Manager	No

The project change request form is often used while a project is in progress, with its change template it is easy to follow. When unplanned modifications are necessary, this management technique is adopted.

Today, project managers face different types of issues while completing a project, and as we know that every project plan is not always perfect because the real-time scenarios

may be different. That's why when a manager needs to request a change, it's highly recommended to use his form.

There are some points to keep in mind, if any manager wants to change any project process, he should make sure that the steps of the remaining project tasks are followed. He must ensure that a particular change will not affect the entire project. He must also let his senior management; project partners and other partners know that this change is necessary for the project and has benefits.

Project Change Request Template

Project Name	Change Number
Requested By	Date of Request
Presented To	
Change Name	

Description of Change:

Reason for Change:

Effect on Deliverables (including a list of any affected deliverables):

Effect on Organization:

Effect on Schedule (including Estimated Completion Date for this change):

Effect on Project Cost:				
Item Description	Hours		Dollars	
	Reduction	Increase	Reduction	Increase
Analysis		0		\$ 0.00

Figure 19: Project Change Request Template

64.To identify Risks (threats) and opportunities and giving examples.

Introduction:

Risk is an event that may or may not occur but if realized, can affect project scope, cost, schedule, and/or quality. Risk identification should be performed in the early phase of the project lifecycle to facilitate early planning to mitigate their effects. Risk identification and assessment are continuous throughout the project. New risks are identified, tracked, and analyzed, and existing risks are re-evaluated to assess the probability of occurrence and their impact on the project as well as to devise response plans to minimize or eliminate their impact. The risk source is the people or enterprise, whose operation can lead to the occurrence of the risk. (Project management, Aljaz star). The risks are categorized into technical, organization, project, and external.

Type of risk according to its effects:

A risk is an uncertain event that, if it occurs, has a positive or negative effect on the project or outcome. The risk which has a positive effect is called opportunities Risks while the negative effect is called threats Risks.

Risk break down structure

Threats Risks (Negative):

A threat is an event or condition that, if it occurs, has a negative impact on one or more objectives. (PM BOK Guide, seventh edition)

Examples of the type of threats Risks:

- Fire risk: Fire risk in construction projects Fire risk is always present on construction sites and the Construction
- Health and safety: Safety hazards that lead to work accidents and injuries
- Economic risk: Cost of components: increase in material cost, Exchange rates, the poor estimation budget
- Environment: Weather and seasonal variations: high temperature
- Legal risk: Compliance with regulations, laws, policy changes
- Client risks: Commercial risk - the impact on income and profits if the new asset (building) is not delivered to time, cost or quality.
- Funding risk - the risk of contractor insolvency
- Contractor risk: Contractor risk For contractors the biggest risk is around the tender stage when commitments are made to a price and a timescale. Margins can be lost if the bill of quantities is not accurate. Subcontractors may not stand by

their quotes and work may be more expensive than estimated if the choice of construction method turns out not to be suitable.

Opportunities Risks (Positive):

Opportunity risk is defined as uncertainty that if it occurs would have a positive impact on the achievement of project objectives. The exploit response seeks to eliminate the uncertainty by making the opportunity definitely happen.

An example of an opportunity could be a time and materials-based subcontractor who finishes work early, resulting in lower costs and schedule savings. (PM BOK Guide, seventh edition)

Example of Opportunities Risks

- The domestic construction market is still going strong
- Favorable Contract Terms
- Increasing collaboration and partnering amongst international competitors
- Reliable Investor
- Favorable Financing Arrangements
- Possibility of Developing a Well-Coordinated Project Team and Project Management Strategy for Future Projects
- Looking for areas of development, by utilizing skills and technology to enter new markets
- Adding new products to the existing product line to increase customer base.
- Forward and backward integration.
- Acquiring rivals' businesses.

65.To prepare Risk register.

A Risk Register is a document that included all the information related to the project risks, or A risk register is a repository in which outputs of risk management processes are recorded (PMBOK). A risk register (PRINCE2) is a document used as a risk management tool and to fulfill regulatory compliance acting as a repository for all risks identified and includes additional information about each risk, e.g., nature of the risk, reference and owner, mitigation measures (ISO Guide 73:2009". ISO.), (Kendrick, Tom, 2003)

Contents of the Risk Register include the following:

- Risk ID
- Date Registered
- Person responsible
- Risk Category
- Description: Cause, Event, and Effect
- Impact: Inherent and Residual
- Probability: Inherent and Residual
- Risk score
- Expected Value: Inherent Residual
- Proximity
- Risk Response Categories
- Risk Response
- Risk Status
- Risk Owner
- Risk Actionee

		IMPACT OF EVENT OCCURING				
		1 NEGLIGIBLE	2 LOW	3 MEDIUM	4 HIGH	5 SEVERE
LIKELIHOOD OF EVENT OCCURING	1 NEGLIGIBLE	1	2	3	4	5
	2 VERY LOW	2	4	6	8	10
	3 LOW	3	6	9	12	15
	4 MEDIUM	4	8	12	16	20
	5 HIGH	5	10	15	20	25

Figure 20: Likelihood vs. Impact

Table 28: Risk Register

Project name	XXXXXX
Project number	XXXXXX
Project manager	XXXXXX

ID	Date of risk	Risk category	Description	Likelihood	Impact	Risk Rating	Consequence	Management	Mitigation Measures	Owner
1	5-Dec-21	Operational	Fire risk in construction projects Fire risk is always present on construction sites and the Construction	2	5	10			Assurance	Risk manager
2	5-Dec-21	Finance	increase in material cost, Exchange rates, the poor estimation budget	2	3	6				
3	5-Dec-21	Environment	Weather and seasonal variations: high temperature	1	3	3				
4	5-Dec-21									
5	5-Dec-21	Operational	Change of key personnel	1	2	2	Resources are lost in the delivery of the scheme	Monitor and consider a contingency plan	No service reviews or changes to staffing structures have been identified	Risk manager
6	5-Dec-21	Operational	Lack of contractor availability	1	4	4	Program delayed	Ensure regular meetings and good communication	Pre scheme planning meetings will be scheduled along with regular scheme progress meetings to quickly identify any emerging issues	Risk manager

7	5-Dec-21	Operational	Lack of supply of standard specified materials	1	4	4	Poor quality increased cost or program delay	Ensure regular meetings and good communication	Scheme sites will use standard materials or innovative materials that are readily available	Risk manager
8	5-Dec-21	Operational	Poor contractor performance	1	4	4	Poor quality, increased cost or programme delay	Establish monitoring measures and performance management processes to achieve desired performance	Effectively address performance shortfalls, escalating poor performance and penalizing where necessary	Risk manager
9	5-Dec-21	Financial	Scheme costs increase due to unforeseen site Construction	2	3	6	Delays in scheme progress and increased costs	Ensure detailed estimates are secured for individual sites and include known site history/investigation	In-house site-specific knowledge and pre scheme history are known on the majority of sites identified.	Risk manager
10	5-Dec-21	Financial	Funding Cut / withdrawn	2	4	8	Scheme unable to be funded for delivery in part/whole	Secure / maintain funding commitment for senior decision-makers.	Identify contingency funding arrangements and establish a plan for scheme prioritization in event of funding cut	Risk manager
11	5-Dec-21	Reputational	Negative press on the local authority due to road access being restricted	4	2	8	Poor customer perception of the Borough Council and its ability to appropriately plan works associated with the scheme.	Ensure local press are proactively engaged regarding the successful DfT Challenge Fund award and provide clear details of the scheme delivery plan to publish.	Ensure details of the scheme and temporary measures to be implemented are effectively communicated and the scheme delivered in adherence to this.	Risk manager

12	5-Dec-21	Construction	Not identifying statutory undertakers apparatus	2	4	8	On-site delays, health and safety of site operatives, utility service disruption, prolonged program, and network delay.	Ensure that the statutory noticing period is robustly followed and utility records are provided to the contractor for the full scheme extent.	Early noticing of works to statutory undertakers and engagement to identify site utility apparatus.	Risk manager
13	5-Dec-21	Construction	Unforeseen weather conditions	3	3	9	Delays to the delivery of weather-sensitive site operations	Program development/management activity to consider seasonal weather variations and treatment weather requirements	Program weather-dependent activities appropriately with knowledge of typical, annual local weather conditions.	
14	5-Dec-21	Construction	Human error, mistakes leading to delays	1	3	3	May affect delivery to program and quality of works implemented.	Ensure compliance with operational processes and procedures and the competency requirements of the delivery team are met.	Quality Management Processes established in accordance with ISO9001	Risk manager
15	5-Dec-21	Construction	Inadequate programme	1	3	3	Works overrun target completion date of July 2020.	Undertake ECI at an early stage to ensure resource requirements are understood from the outset.	Ensure programming efficiency and adequate resource is in place to deliver the scheme within the stipulated program window.	Risk manager
16	5-Dec-21	Construction	Removal of arisings non-contaminated and contaminated from site	3	4	12	Increased waste management costs and timescales, program delay.	Undertake pre-construction site materials testing to identify any contaminated/extraordinary waste management requirements	Ensure ECI is undertaken at the earliest opportunity and establish early work commencement to accommodate waste management activities.	Risk manager

17	5-Dec-21	Construction	Accident on site	2	5	10	Injury to employees or members of the public.	All parties to adhere to legal duties under CDM 2015 and construction work related to Health and Safety Legislation	Plan, manage and monitor site works in a way that ensures the health and safety of anyone it might affect	Risk manager
18	5-Dec-21	Construction	Noise requirement. Restriction of working hours	3	3	9	Program delay increased costs	Undertake ECI at the earliest opportunity and engage local Environmental Health officers to determine any working hours restrictions.	Ensure ECI is undertaken at the earliest opportunity and establish early work commencement to accommodate working hours restrictions.	Risk manager
19	5-Dec-21	Construction	Human error, mistakes leading to delays	1	3	3	May affect delivery to program and quality of works implemented.	Ensure compliance with operational processes and procedures and the competency requirements of the delivery team are met.	Quality Management Processes established in accordance with ISO9001	Risk manager
20	5-Dec-21	Construction	Inadequate programme	1	3	3	Works overrun target completion date of July 2020.	Undertake ECI at an early stage to ensure resource requirements are understood from the outset.	Ensure programming efficiency and adequate resource is in place to deliver the scheme within the stipulated program window.	Risk manager
21	5-Dec-21	Construction	Removal of arisings non-contaminated and contaminated from site	3	4	12	Increased waste management costs and timescales, program delay.	Undertake pre-construction site materials testing to identify any contaminated/extraordinary waste management requirements	Ensure ECI is undertaken at the earliest opportunity and establish early work commencement to accommodate waste management activities.	Risk manager

22	5-Dec-21	Construction	Accident on site	2	5	10	Injury to employees or members of the public.	All parties to adhere to legal duties under CDM 2015 and construction work related to Health and Safety Legislation	Plan, manage and monitor site works in a way that ensures the health and safety of anyone it might affect	Risk manager
23	5-Dec-21	Construction	Noise requirement. Restriction of working hours	3	3	9	Program delay increased costs	Undertake ECI at the earliest opportunity and engage local Environmental Health officers to determine any working hours restrictions.	Ensure ECI is undertaken at the earliest opportunity and establish early work commencement to accommodate working hours restrictions.	Risk manager

66. Qualitative Risk Analysis

Qualitative risk analysis is the process of prioritizing individual project risks for further analysis or action by assessing their probability and impact as well as other characteristics." (PMBOK 6th Edition)

The qualitative analysis should be performed throughout the program life cycle and not as a onetime activity as events can occur that will impact the probability, impact, or both factors of risks

Quantitative Analysis Quantitative analysis is the process of quantifying the impact of the risk to the program through numeric analysis Quantitative analysis follows qualitative however, it is not necessarily performed for all risks If, for example, identified risks have a low probability of occurrence, and low impact to the program, the resources required to conduct quantitative analysis may be better used elsewhere.

Qualitative risk analysis involves evaluating the probability and impact of the various risks and listing the risks so as to improve the performance of the project by making the risks with high priority. The valuation of the priority identified risks is done on basis of likelihood or probability of occurrence of risks, the corresponding impact of the risks if it happens, and as well as the urgency of risk response (Nadaf, J., 2018).

Probability – Impact matrix: It helps in the assessment of each risk's priority for consideration and importance.

The ratings for probability and impact are given below:

Probability 1-5:

High: From 4-5 occurrence of probability
 Medium: 3 occurrences of probability
 Low: Between 1-2 occurrences of probability

Impact 1-5:

High - Risk occurrence that has the possibility to greatly impact the project schedule, performance, time, and cost. The work of an activity cannot be continued, and it will stop. The progress of the work is delayed due to this risk (Nadaf, J., 2018).

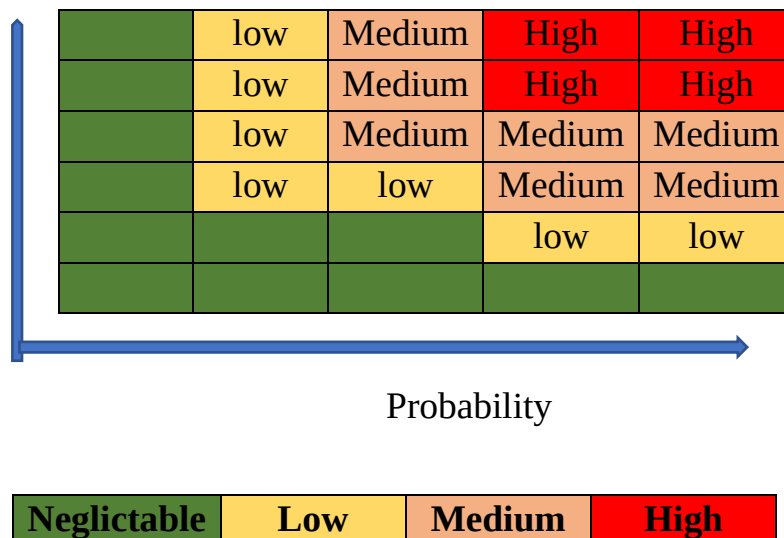


Figure: 21: Probability – impact matrix

67.To specify Risk response strategies.

Aim of the Risk response strategies:

Response strategies are the process by which the team tries to reduce or eliminate the impact of risk materialization; and process, which reduces the negative impact of the risk events on the effective project execution.

Threats Risk response strategies:

A response to a specific threat might include multiple strategies The goal of implementing threat responses is to reduce the amount of negative risk.

There are many strategies that may be considered for dealing with threats as follows (PMBOK®, 6th edition, ch. 11.5.2.4).

- Avoid. Threat avoidance is when the project team acts to eliminate the threat or protect the project from its impact.
- Escalate. Escalation is appropriate when the project team or the project sponsor agrees that a threat is outside the scope of the project or that the proposed response would exceed the project manager's authority.
- Transfer. The transfer involves shifting ownership of a threat to a third party to manage the risk and to bear the impact of the threat occurs.
- Mitigate. In threat mitigation, action is taken to reduce the probability of occurrence and/ or impact of a threat. An early mitigation action is often more effective than trying to repair the damage after the threat has occurred.
- Accept. Threat acceptance acknowledges the existence of a threat, but no proactive action is planned. Actively accepting risk can include developing a contingency plan that would be triggered if the event occurred; or it can include passive acceptance, which means doing nothing.

Tables 29: Examples of response strategies:

	Name of risk			Strategy
1	Fire risk in construction projects	require contractors to take measures to prevent the risk of injury from fire,	Insure assets Compliance with fire & building regulations Early warning systems e.g. smoke alarms,	Mitigate

		provide and maintain fire-fighting equipment, and instruct people in the use of the equipment. Contracts provide for insurance of the works during construction including fire.	sprinklers.	
2	health and safety: Safety hazards that lead to work accidents and injuries	Create a health and safety policy Identify hazards Evaluate the risks and complete a risk assessment Provide staff training e.g. on manual lifting Have procedures for reporting incidents	Create a health and safety policy Identify hazards Evaluate the risks and complete a risk assessment Provide staff training e.g. on manual lifting Have procedures for reporting incidents.	Mitigate
	Financial risk: Exchange rates		Accept the risk and buy or sell currency in the spot market Fix rate via	Accept

			a forward exchange contract Insure against the Forex risk Use a Forex structured product	
	Legal risk: Compliance with regulations, laws, etc		Employee training and refresher courses Seek legal advice on contracts, new legislation, and industry-specific regulations Create a quality assurance team Implement more quality and safety checks	Avoid

Opportunities risk response strategies

Strategies may be considered for dealing with opportunities, as follows: (PMBOK®, 6th edition, ch. 11.5.2.4).

- Exploit. A response strategy whereby the project team acts to ensure that an opportunity occurs.
- Escalate. As with threats, this opportunity response strategy is used when the project team or the project sponsor agrees that an opportunity is outside the scope of the project or that the proposed response would exceed the project manager's authority.
- Share. Opportunity sharing involves allocating ownership of an opportunity to a third party who is best able to capture the benefit of that opportunity.
- Enhance. In opportunity enhancement, the project team acts to increase the probability of occurrence or impact of an opportunity. Early enhancement action is often more effective than trying to improve the opportunity after it has occurred.
- Accept. As with threats, accepting an opportunity acknowledges its existence but no proactive action is planned.

Once a set of risk responses has been developed, it should be reviewed to see whether the planned responses have added any secondary risks. The review should also assess the residual risk that will remain once the response actions have been carried out.

Response planning should be repeated until the residual risk is compatible with the organization's risk appetite.



Figure 22: Risk area



Figure 23: Threat Risks (Negative Risks)



Figure 24: Opportunities Risks (Positive Risks)

68.To prepare a Stakeholder engagement assessment matrix.

A stakeholder is a person, an organization, or a collection of individuals or organizations who are engaged in a project and are impacted by its results and outcomes. Because the project's outcome has an impact on stakeholders, they must be included in important project activities such as decision-making and problem-solving. A stakeholders' engagement evaluation matrix is used to detect the gaps between the current degree of stakeholder involvement and the intended level.

The stakeholder engagement assessment matrix is a tool for assessing and visualizing stakeholder involvement levels and trends. In the stakeholder engagement evaluation matrix, each row represents a single stakeholder or a homogenous group of stakeholders, as appropriate. The stakeholder engagement evaluation matrix's columns reflect different levels of stakeholder involvement and support. In a stakeholder engagement matrix, these are the standard levels.

- Unaware stakeholders are unaware of the initiative, its advantages, and other consequences.
- Resistant stakeholders are aware of the project and its consequences but are opposed to change.

- Neutral stakeholders are aware of the initiative, but they neither oppose nor support it.
- Supportive stakeholders are aware of the initiative and are in favor of the change and its possible consequences.
- Leading stakeholders are aware of the project and its possible consequences and are actively working to ensure its success.

Table 30: Stakeholder engagement assessment matrix

Stakeholder	Power/Interest	Unaware	Resistant	Neutral	Supportive	Leading
Project Manager	High/High					C, D
Vendor	Low/Low			C	D	
Project Sponsor	High/High			C	D	
Chief Architect	High/Low	C				D
Sustainability Expert	High/Low			C		D
Local Authority	Low/High		C		D	

C=Current Engagement

D=Desired Engagement

We can notice the gaps after we've identified the stakeholders and their current and intended levels of participation. Both the sponsor and the project manager are committed to achieving the desired high level of engagement in this project. So, we're off to a terrific start. Communication can boost the involvement of people such as the chief architect and the local government. Gaps between actual and intended engagement levels may be bridged by identifying extra communication needs and then efficiently addressing those requirements.

Recommendations:

Concept Phase

Finish the architectural design at this phase. The other consultants' designs will be developed based on the finished architectural design. If necessary, hire an interior and landscape designer. The plumbing, structural engineer, and electrical experts work on the design and details using the architectural plans as a guide. This is the point at which you choose the kind of flooring you want to install.

Statutory Approvals

Once we've finished the concept drawings, double-check that the design complies with the authorities' legal requirements. Acquire statutory sanctions by presenting the designs to the officials for approval and obtaining official construction authorization. Obtain enough copies of such sanction drawings to be presented to the authorities for the purpose of securing electricity, drainage, and water connections.

Construction Phase

The construction phase is when three components of the project are tracked: cost, time, and quality.

- The contractor gathers his resources to begin work in this phase.
- Construction designs for the start of work must be made available as soon as possible.
- Designers and other experts must present a drawing release schedule. The contractor will be able to schedule his actions more easily as a result of this.
- All construction designs must be supplied in stages ahead of time.

Time Management

When you create a project plan to finish the job within the time range that you want, you are practicing time management. The contractor must produce an overall project plan for the project's completion. All of his needs in terms of drawings, specifications, and judgments will be included in this project plan.

Cost Management

The contractor must produce a cash flow based on the project timetable. The cash flow must account for all payment conditions, items to be acquired, and so on. Every month, a close eye on the budget and actual spending must be maintained. Bills from contractors must be examined and approved for payment. If you provide any items to the contractor, they must be accounted for in the contractor's billing.

Quality Management

The quality of the materials utilized as well as the craftsmanship must be examined. The International Standards code requires that concrete and steel be inspected. During

building, an engineer must inspect the quality of the job. Checking the quality of the job being done may be done using a series of checklists.

Close-Out Phase

All project papers, such as final Structural, and Services drawings, Architectural drawings, final invoices from different suppliers, warranties, and guarantees, are compiled during the close-out phase. Ensure that any regulatory drawings, such as building sanction drawings, are stored safely. For the sake of posterity, these shall be our records.

General economic circumstances, tax legislation, and the government's monetary and fiscal policies all have a significant impact on the residential property market. Because multiple housing projects may be begun at various places by different persons and developers at the same time, a minor increase in overall demand can sometimes result in a significant rise in construction expenditure. Many new builders are drawn to residential house development because of the relative simplicity of entrance, at least at the lower end of the market. As a result, this industry is very competitive, with both high risks and big profits.

Construction activities are often fraught with dangers, both physical and financial. When getting into commercial arrangements with other parties, an owner usually wants to transfer as much risk as possible to others. Such action, however, is not without cost or danger. For example, a contractor who is allocated the risks may either request a higher contract fee to compensate for the greater risks or, out of desperation, may default on the contract or file for bankruptcy. Such outcomes may be averted if the owner allocates risks responsibly.

Instead of using disputes as weapons against other parties, it is critical for the owner to engage legal counsel as consultants to prevent conflicts before they occur. There are enough design and construction issues that are caused by ambiguity rather than malicious intent. Our company should acknowledge more progressive approaches to conflict resolution, such as employing owner-controlled wrap-up insurance to protect all stakeholders involved in the building process from unexpected events or using mediation, consultation, and other non-judicial solutions to resolve disputes among various parties. These compromise methods, however, are not without flaws and should only be used in exceptional circumstances.

Summary:

Even though they are identical to structures being erected in other regions, all building projects are complex and one-of-a-kind. All long-term and premium initiatives need careful planning. Planning to construct a home entails having all of the necessary permissions, building plans, monetary budgets, and expected timetables in a place far ahead of time. Detailed project plans can save our company time when making difficult choices and will help us avoid construction delays. To avoid building errors, communication between all stakeholders is critical, particularly for those that will take considerably more time to repair later. As a result, once we have a solid strategy in mind, be sure that we convey it to the builder, suppliers, and workers.

In this project report, we have thoroughly discussed different factors that can make or break a residential construction project. Our company was given the task of completing a residential house construction project. In this report, we have discussed:

- General project information for the house construction project
- Stages of the house construction project
- Milestones of the house construction project
- Deliverables of the house construction project
- Stakeholder Identification
- Project constraints
- Project risks
- Project Compliance Checklist
- Checklist Model for the Project Stages
- Matrix key stakeholders and their levels of importance or influence
- SWOT analysis list
- Team member
- The communication matrix
- RACI Matrix For construction house
- Negotiation Plan A
- Negotiation Plan B
- Function List
- Relationships between activities
- Project milestones
- Task Cost Overview
- EM after 20% of Project Completion

- VM after 50% of Deliverables Completion
- Project resources of equipment and tools distributing
- Factor rating System for evaluating suppliers
- Supplier scoring and ranking
- Agenda-Invitation
- Change request approval
- Risk Register
- Examples of response strategies:
- Stakeholder engagement assessment matrix

Our company's specialized expertise may be highly useful, especially in big and intricate projects, where professionals from several fields can give significant services.

Understanding how the various aspects of the process interact are, nonetheless, beneficial. Poor coordination and communication among professionals may lead to waste, exorbitant costs, and delays. It is in the best interests of all parties involved to ensure that such issues do not arise. Owners' interests must be considered by all players in the process since, in the end, it is the owners who supply the resources and make the decisions.

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